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BRITISH MEDICAL JOURNAL

THE JOURNAL OF THE BRITISH MEDICAL ASSOCIATION



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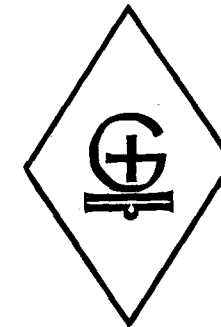
VOLUME II, 1952

JULY TO DECEMBER

LONDON

BRITISH MEDICAL ASSOCIATION

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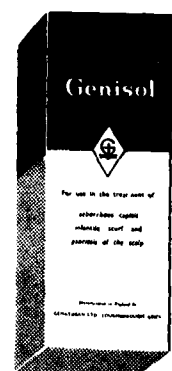
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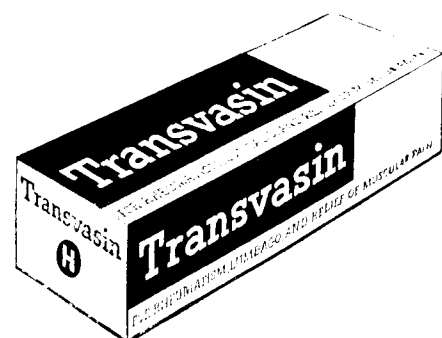
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BRITISH MEDICAL JOURNAL

LONDON SATURDAY JULY 14 1956

British Medical Association

ONE HUNDRED AND TWENTY-FOURTH ANNUAL MEETING, BRIGHTON, 1956

President's Address

THE STATE OF GENERAL PRACTICE TO-DAY

BY

ALEXANDER HALL, O.B.E., M.D.

This is the last year in which the right to nominate the President of the Association lies with the host Division. My nomination and election to this high office should be taken not in any personal but in a representative sense. The general-practitioner members put forward the name of one of their number to signify their determination to reassert and justify once more the claim that their ranks form the front line of the Health Services of the nation, and thus to make manifest their willingness, nay eagerness, to accept the responsibilities implicit in that claim.

It is in these circumstances then that I come to-day to occupy the Presidential chair, and to my colleagues in this Division, to the Representative Body, and to the Council I tender my sincere thanks for the high honour they have bestowed on me.

"In all positions of honour men are excited to do their best." These words are taken from the address of Dr. Jenks, a veteran of Waterloo, who was President when the Association first met in Brighton in 1851: during my year of office I shall try to live up to this aphorism.

It is almost half a century since last the Association met in Brighton, and during this period a general practitioner has occupied the chair of President on only three occasions. During these years medical science has advanced in leaps and bounds; the impact of this remarkable progress on the practice of medicine has been dealt with by successive presidents and in the scientific sections of our Meetings. It might be profitable, therefore, to turn our attentions to other changes which have altered the conditions in which medical practice is conducted and consider whether present conditions can satisfy patient and doctor alike.

First are the changes within the profession. At the beginning of this century almost all doctors undertook general practice even though some by reason of special study or long experience had later gained such knowledge and wisdom of one branch of medicine as to make their opinion and advice sought after in a consultant capacity. With progress in medical science the demand for consultant or specialist advice increased, and many doctors, having reached consultant status, gave up their general practice of medicine. The two

types of practice continued to diverge until, with the advent of the National Health Service in 1948, organizational expediency brought in a more complete cleavage between consultant and general practitioner. The path to consultant status no longer leads through the experience of general practice in the homes of the patients, but through the academic avenues of the examination-room and the hospital corridor. The old type of general consultant has all but vanished.

Both general practitioner and consultant have their parts to play in the provision of a comprehensive health service for the nation, predominantly within the Act; but both are still free to practise privately outside it.

You would not expect otherwise than that after forty years in general practice, during which I have watched all these developments, my observations to-day will be directed to that branch of medical life which I have always found interesting and satisfying, if at times a bit exacting.

Role of the Family Doctor

However much the conditions of practice may have changed, the function of the family doctor remains the same. The term general practitioner strictly means someone who practises medicine, obstetrics, and surgery. As major surgery is no longer carried out in this country by general practitioners I think the term should be replaced by "family doctor." In some countries in the Commonwealth the consultant may act as a super G.P. to whom the patient can make a direct approach, but in this country on the family doctor alone primarily falls the overall responsibility of examining, diagnosing, and treating his patients. The more completely the family doctor can discharge these responsibilities the less frequently will occasion arise to refer patients to hospital. The hospital service was never meant to be, nor can it ever be, a substitute for the family doctor service. I believe, therefore, that the role of the family doctor, far from having become less important in the scheme of things, has had added to it many new responsibilities, important among which is that of knowing when and how best to make available to his patients the special knowledge and experience of his consultant colleagues. Spheres of specialization have become

more over and narrower, and thus the elucidation of a problem often calls for examination or investigation by more than one specialist. The integration of these opinions and the assessment of their significance therefore fall more heavily than formerly on the family doctor, who must survey the patient as a whole and be responsible for the continuity of his care.

From recent pronouncements it is clear that both the Association and the Government are aware that the role of the general-practitioner service is paramount and that it must be sustained as a first-class force. In a speech last year at Birmingham Mr. Iain Macleod, then Minister of Health, said that five principles had guided his thinking in office. He enunciated one of them in these words: "I think we ought to make—and for it to be seen that we are making—the general practitioner the king-pin of the whole of the National Health Services in this country." In his Presidential address to the Association in 1950 Sir Henry Cohen made this observation: "Until we have so reformed the conditions of general practice that students of merit wish to enter it we have not achieved our object." In the recent Guillebaud report there is general agreement that too much emphasis is being placed on the cure of the sick and too little either on prevention or on treatment at home.

These three pronouncements lead one to conclude that the general-practitioner service is not in good heart, that it needs resuscitation if it is to survive. It is failing to fulfil adequately its proper function in the national service. Existing conditions do not give it a fair chance to do so, with the result that much of the work which family doctors should normally undertake is passed on to the hospital or to local government clinics. This process of disintegration is progressive, and if not checked it will inevitably and rapidly lead to the disappearance of family or general practice as we have hitherto known it. Such a calamity ought to be prevented, but it can be prevented only if avoiding action is not too long delayed.

In a brief glance at the changes in the social and economic sphere can we find any hint as to why the community is ceasing to place the same reliance on the family doctor as it formerly did?

Health of the Worker

Health no longer means only the absence of disease, but implies a condition in which sound limbs and a sound mind can function to the best and happiest advantage. The term National Health Service implies that doctors should be as much concerned with the promotion of health as with the care and prevention of disease.

Gradually there has developed a growing appreciation by the Government of the value to the nation of the health of the individual as a "unit of productivity"—that is, as a worker. Voluntary effort, always well ahead of official action, had already done much to foster health, but Government interest and intervention increased, until with the coming into operation of the National Health Service Act it proclaimed its responsibility for the health and welfare of every citizen from the cradle to the grave. But it really provided a "disease" service, and at the same time created conditions unfavourable to the public health service. As Lord Adrian said in a recent address (*British Medical Journal*, May 26): "We praise the achievements of our

medical officers of health and urge them to greater efforts, but the great reorganization of our medical services seems to have passed over their heads and left them with innumerable minor tasks and little chance to make effective progress." The State thus took over from individuals the responsibility of providing medical services and with it the onus of maintaining their standard. Now 90% or more of the population avails itself of these services, and less than 10% of the cost is met from the national insurance contributions.

State-sponsored maternity and infant welfare schemes, the medical inspection of schoolchildren, and the provision of the N.H.S. Act all express a vast extension of the State's direct concern in matters of health and sickness, while public health regulations, Factory Acts, and housing schemes bear witness to the growing activity of central and local government in providing healthy conditions of living. Both sides of industry, too, have accepted responsibility in these matters. The trade unions have made adequate pay, limited working hours, and improvement in working conditions their special concern. From the purely health point of view I doubt if further reduction in working hours is desirable. We would not want the average man to work as long hours as does the average doctor; but full work makes a full life, and leisure is something which needs wisdom to fill it with profit to mind and body.

Industrialists have found that healthy and contented employees go hand in hand with increased output, and to this end have instituted research into working methods and conditions and medical services to detect and correct factors adverse to the health of men and women at their tasks, and recreational facilities to encourage health-giving activities in leisure hours. Rightly, too, the effects of loss of earning power to the individual have been mitigated by the introduction of unemployment, sickness, and industrial benefit schemes and by family allowances and pension schemes. Proper conditions of hygiene may be provided in both factory and home by legislation; adequate provisions of pay and leisure may be agreed by negotiation; but unless these conditions are appreciated and properly used much of their value is lost.

Responsibility of the Individual

The question arises whether the acceptance by the State of more and more of these responsibilities has not induced in the individual a diminished sense of his own personal responsibility to keep himself fit and eager to add his regular daily quota to the work-pool of the nation and to partake in the life of the community. But in so far as this diminished sense may be caused by a lack of knowledge rather than by a lack of willingness further education in health matters should help. From the vast sums spent on education could not more be usefully invested in instruction on the general principles of health culture, both physical and mental? The people of this country should consider whether they are developing an attitude of mind to the National Health Service which is more disease-conscious than health-conscious.

In this connexion may I quote the following from the statement on medical aspects of social security issued by the World Medical Association in 1952: "A powerful factor in recovery from illness and in restoration to health is the sense of personal responsibility of the patient for what happens to him. This is something indispensable in the doctor-patient relationship. In what is called the Welfare State, social security schemes loom large, and in these schemes the provision of (apparently) free medical services is important. The more the State does for the individual

in this direction, the less is the individual's sense of obligation and responsibility." Are we not daily seeing examples of this through the whole of the country? And as the B.M.A. presumably subscribes to the policy of the W.M.A. can we really feel that we are doing enough to keep this aspect before our patients and the government? The willingness with which the public shoulders an expenditure on entertainment, alcohol, confectionery, and tobacco many times greater than that spent on the National Health Service makes one wonder if the true value of good health is appreciated.

The Association's Journal, *Family Doctor*, shows how alive the Association is to the need for further education in health and hygiene, but it reaches such a small proportion of the population that its efforts need amplifying. Much more could be done in schools, but the essential source of information on health for each family should be the family doctor, who should take an active part in providing this as he does in providing expert care in time of sickness. Were this so, millions of lost working hours might be saved and expenditure of millions of pounds on hospital services might be avoided; more important than this, the sum of human happiness would be increased.

Changes in Attitude

The attitude of the public has changed in another way: many of those we care for have travelled widely during the wars. Apart from the greater number at risk, we are dealing with a more reasoning people who no longer accept blindly what the doctor tells them. They know that advice must be based on facts and that facts can be elicited only by proper examination. But there is still a blind and unreasoning faith in the "bottle of medicine," and, thanks partly to the lay press and "digest" articles, a pathetic belief that even the most stubborn ailments can be cured at once by antibiotics and other "wonder drugs." From people would stop talking about "wonder drugs." I wish similar sources many patients are encouraged to diagnose their own condition and, at the cost of much time and energy, have to be convinced how wrong they are. All this means that a consultation which is to be satisfying to both doctor and patient is a more time-consuming affair.

There are changes, too, in families, where it is not uncommon to find both man and wife have work which takes them from the home. The consequent lack of parental influence and control has often a profound effect on the physical, mental, and moral development of the children; nor is it without its drawbacks when illness overtakes the family.

Lastly, there have been changes in the facilities for conducting practice. As a means of transport the doctor-driven motor-car and even the aeroplane have replaced the leisurely horse-drawn vehicle which allowed ample time for chewing the mental cud between visits. The ubiquitous telephone has made the doctor more accessible to his patients, has added a sense of urgency to many calls which are in no way urgent, and by necessity of its being manned 24 hours a day has added greatly to the burdens of the doctor's household. But the family doctor at least has been emancipated from the silk hat and black coat, starched shirt, and striped trousers.

The complexity of modern methods of examination and treatment has necessitated larger accommodation in the consulting-room or surgery, and the multiplicity of instruments and appliances calls for greater expenditure. Whereas in industry the employment of new methods and new machinery usually leads to increased precision, with a saving in cost and time, in medicine new methods of diagnosis add to the cost and demand more time in their application and interpretation.

The Time Factor Paramount

This general review of the conditions in which we work brings out the overriding importance of the time factor. But can we say that in general practice throughout the country we are giving more time to each patient than was formerly the case? The various social changes and

changes in attitude which I have mentioned should not themselves have undermined the confidence of the community in the family doctor to which I have referred earlier. The essential cause for the lowered prestige of the family doctor lies, I believe, in the National Health Service.

Changed Relationships

First the Act altered the relationship between the doctor and the patient by introducing the State as a third party. This new type of eternal triangle is fraught with as many dangers as the more familiar type and has tended to make the relationship between the contracting parties less personal and more liable to lack that esteem and mutual trust which are essential if confidence is to be engendered. I know that in a State-provided scheme such intrusion is unavoidable. But in a statement in 1952 the World Medical Association amplified the second of its principles—"No intervention of third party between physician and patient"—as follows: "When medical care is provided as part of social security the State or the Local Authority or the Insurance Company enter into relationship with the patient and doctor. Such relationship must not involve interference with the essential freedom of either." Can we be really confident that this is the case in Britain to-day? For example, the closed area denies the freedom of the doctor to take up work—in the N.H.S.—where he wants, and hampers transfer from one area to another should health, family educational requirements, or other causes make such transfer desirable. In the N.H.S. it is virtually impossible for a doctor in the general-practitioner service to attain consultant status, and this, too, is not in line with Principle V of the World Medical Association, of which, I need hardly remind you, the B.M.A. is one of the principal member associations—indeed, the originator of it. Principle V is, "Freedom of the physician to choose the location and type of his practice."

Secondly, the manner in which the National Health Service was introduced was unfortunate. It was heralded as a free service in such a way as to lead to irresponsible demands, not only for time-absorbing service but for supplies which many expected to be forthcoming, not according to need as judged by the doctor, but as something which the patients' weekly contribution entitled them to receive on demand. The development of this "entitlement" complex led to full surgeries and high prescription rates. This made it more difficult to give that extra time which modern medical science requires. The erroneous belief of many patients that their insurance contributions pay for the whole of the benefits of the Health Service has altered their attitude to the whole profession and made them more prone to be litigious, although, of course, the free legal aid scheme has greatly encouraged this.

Thirdly—what was worse—the specialist services were heralded as something new and superior, and available to every citizen for the first time; by comparison the family-doctor service was thus presented as a second-rate affair with very limited capacities. Denial to the family doctor of diagnostic facilities in the x-ray department and the laboratory except through consultant and specialist exaggerated the apparent incompetence of the general practitioner, while the denial of his right of access to hospital beds even for midwifery completed the ignominy and altogether undermined confidence in him.

Naturally the public came to demand more and more specialist services, usually at or in hospital, nothing short of which, they were led to believe, was the best; and the qualifying student sought to enter the hospital services rather than the ranks of general practice, which has been given, rather than has gained, the reputation of being something short of the best. Consequently hospital departments became overcrowded with cases which, had the patient had confidence in his G.P., could equally well have been dealt with at home and in the consulting-room or surgery.

I think, therefore, we can fairly say that the reduced status of the family doctor emanated not from any essential

in the profession itself but from the treatment it received at the hands of those who introduced the N.H.S. But the profession is not altogether free from blame, because it was not always successful in distinguishing between principle and expediency. In large part the new health service was manned by the same doctors who were in practice before its inception. They were men and women with a sense of vocation who asked only to be allowed to get on with the job of looking after their patients.

When the Act was being framed the Association pointed out its many weaknesses and eventually secured some important modifications, but in the end political rather than medical considerations prevailed, and in 1948 the Association advised the profession to accept service under the Act, although it infringed principles the profession held sacrosanct, and resolved to seek reforms by amendments. Eight years of sustained effort by the Association still leaves us seeking many of these reforms.

The financial aspect was improved by the Danckwerts award, which was, after all, but a belated carrying out of the promises made by the Government in the Spens report. But money is a means, not an end, and if general practice is to take its rightful place again and attract recruits of the right calibre it must be made a worth-while and satisfying job in other and more fundamental respects. To this end the principles we established in 1948 must not be lost sight of.

To restore the prestige of the family doctor we are entitled to ask the Government for evidence of a change of policy; we want to be more than the king-pin of a lifeless mechanical service; we want to be the heart and soul of a living organism. We should be directed not by bureaucratic theory but by the guiding finger of practical experience and human understanding.

Problems to be Solved

Every family doctor should be encouraged to use his brain to try to solve the problems it has been trained to solve, and should be given the facilities which will make his work a matter of interest and not mere routine. Medicine is never at its best where conditions suppress the individuality of the doctor. Until every region in the country provides facilities for the family doctor to enlarge the scope of interest he can take in his patients, until the Ministry and others cease to belittle his capability to undertake midwifery—that intimate service which is often the foundation of that mutual trust so precious in family practice—until they show they remember his existence and use him as a medium for health education, as they failed to do in the matter of poliomyelitis vaccine, or for sounding live medical opinion, as they failed to do in the matter of the ban on heroin—until then we cannot assume any change in the attitude of the Government and the ubiquitous planners towards the family doctor.

If the Government continues to damn the general-practitioner service with faint praise or to present it to the country not as the dog but as the tail and a very short one at that, it is not letting it be seen that it is making the family doctor the king-pin of the whole of the National Health Service in this country.

The health services must fall within the general policy of the Government of the day, but, Mr. Bevan has said, the tragedy is that it has become the Tom Tiddler's ground of party politics. The services can well stand up to the ordinary variations of pressure in the political atmosphere, but there is always a risk of more violent disturbances developing and bringing with them conditions which encroach on the freedom of medicine. The Association and its members individually have a duty, not only to themselves but to the public, to preserve and foster the practice of medicine outside the National Health Service away from the cold blast of bureaucratic control. The greater the area of freedom provided by the private practice of medicine,

in which the doctor is his own master and able to mould his practice according to his own temperament and capacities, the greater will be the encouragement to maintain a general high standard and the stronger the deterrent to the introduction into the National Health Service of terms and conditions of service which we believe will make such standards unattainable.

It also remains the duty of the Association to detect and fight any tendency on the part of those who administer the health services towards regimentation or automation of the profession. Few administrators have more than little personal experience of general practice, and cannot conceive that ill-considered action on their part may seriously disrupt the doctor-patient relationship. Any attempt by the Ministry of Health to by-pass the general practitioner must be resisted.

First Line of Defence

What is the proper function of the general-practitioner service? It is to provide the first line of defence against ill-health and the force which supplies the first counter-attack when "operation sickness" has already begun. To sustain the service as a first-class force implies keeping the morale constantly at concert pitch, by ensuring proper working conditions and pay that family doctors may work in an atmosphere free from such hustle as robs both patient and doctor of mutual respect, and of time for proper consultation, free from limitation of facilities which makes him appear incompetent and deprives him of the interest of investigating and of the satisfaction of treating his patients, not as far as the machine permits but as far as his training and experience will allow. It also implies attracting a steady flow of recruits of the right type.

Students in their final year must be made more familiar with what general practice has to offer. They must have an opportunity of hearing about this and asking about that, not from a teacher, or even a dean, who cannot speak from personal experience, but from someone actively engaged in general practice and preferably someone with a certain amount of private practice. When they learn how very worth-while the work of the family doctor can be even the best students will not hesitate to join our ranks and help to make it even more so.

A patient is dependent on the sympathy and good faith as well as on the skill of his doctor, and the young doctor cannot be taught to give this full service; he can learn to do so only in the school of experience. In my view, after registration the sooner he takes up an ordinary assistantship and learns to assume responsibility under the wing of an experienced practitioner the better.

"It is therefore necessary that the doctor should be quite frank and positive in his statements, for uncertainty will never allay apprehension," said another of our past presidents, Dr. P. T. J. O'Farrell. Only with experience and with the appreciation of his own limitations will come to the young doctor that frankness and assurance which makes the patient trust him and willing to leave to him the decision on the need for specialist help. When this trust has been re-established, then and only then will the family doctor again fulfil his proper function and the undue emphasis on the hospital services be corrected.

With time and facilities to use his knowledge and experience the general practitioner can and willingly will accept further responsibilities in the health services of the country with satisfaction to both the patient and himself, and with relief to the hard-pressed and costly hospital services.

One thing should be made clear, and that is, if whatever steps are taken succeed in restoring to the family doctor responsibilities which at present are undertaken by the hospital services, he must not be grudged the same weapons with which to fight. These are frequently antibiotics which will inevitably increase the family doctor's prescribing costs; but this should not be held against him, as it relieves the hospital not only of the cost of the drugs but also of heavy maintenance charges.

To discharge these responsibilities requires much more than mere scholastic attainment, for the practice of medicine must be a constant adaptation to new conditions. While man's soul may remain unchangeable, is man physiologically the same as he was when this Association was founded? So many factors crowd on him to alter his biological individuality. The increased scale of the problems and their number which beset us in both our national and our family life, the supersonic tempo which makes life a scramble after livelihood, power, productivity, or progress, the urge to snatch the present opportunity in the uncertainty of the morrow arriving, from these a new pathology has developed under our own eyes and for which we ourselves are responsible. Even now we are hoist with our own petard. How much more will that be when the atomic age arrives?

To meet the spiral effect of these stress conditions many seek escape in the noise and excitement of modern social activities such as football pools, non-stop television, and boogie-woogie, while many others prefer to shelter under the umbrella of sedatives or stimulants. Wonderful and ever-changing as the products of the pharmacologist's laboratory are, by themselves they can but alleviate and postpone eventual breakdown, mental or physical. To help such people successfully to ride the storm and reach a safe anchorage the doctors' equipment must include human understanding based on sound moral principles and sympathy born of true charity, qualities of mind which remain unchanged throughout the centuries.

Conclusion

You who have so patiently listened to me may conclude that many of my views are reactionary. They are certainly the views of someone who "reacts" to what he sees to-day, the views of someone, in the words of a remarkable essay in *The Times Literary Supplement* earlier this year, who believes in "perhaps an old-fashioned society, inherited without much self-questioning, but nevertheless a society that cohered and had a dynamic and still offered opportunities to the young and the talented and the enterprising; not a society harried, hag-ridden by regulations and financially penalized. . . ." Medicine is in the middle of all this. It is losing its dynamic. Somehow or other this Association must bend its efforts towards not only preserving but also enlarging the area of freedom and dignity in the medicine that still exists within the framework of the National Health Service. If we cannot succeed in this, then I fear for the future of medicine and especially of General Practice. The decline in standards which I and others see is harmful to the public deluded into believing that the National Health Service is the best possible service because it is State-sponsored and is labelled free. We need men of conviction who do not lack the courage to express their opinions clearly, unpopular though they may be; we need a new dynamic in medicine. Let us see that it comes from within the Association.

In the first quarter of this year there were increases in almost all categories of nursing staff in both mental and mental deficiency hospitals, amounting to 270 in the first and 175 in the second. These figures were given by Mr. R. H. TURTON, Minister of Health, when he spoke recently to the Association of Hospital Matrons. The most welcome feature of all, said the Minister, was the increase in the numbers of both male and female student-nurses, an increase of 10%, and 109 more female student-nurses, an increase of over 5%. In mental deficiency hospitals the increase in male student-nurses was 16 (6%) and of female student-nurses 36 (8%). These increases had occurred before the recent salary settlement. Of particular interest was the notable increase in the number of male student-nurses in mental hospitals, which might be partly due to the deferment of National Service during training.

BEHAVIOUR IN VITRO OF SOME NEW ANTISTAPHYLOCOCCAL ANTIBIOTICS

BY

LAWRENCE P. GARROD, M.D., F.R.C.P.

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AND

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The numerous antibiotics now available could be regularly depended on for the treatment of almost any bacterial infection but for one factor. This is acquired bacterial resistance, and the species which has shown the greatest capacity for this, with the most serious consequences, is *Staph. pyogenes*. The literature abounds with reports of infection by strains of this organism resistant not only to penicillin but to streptomycin, the tetracyclines, and, less often, to chloramphenicol. It can also become resistant to erythromycin, which is at present the last line of defence against a return to the conditions of pre-penicillin days. That a strain resistant to this as well as to other antibiotics can kill patients as in the past is evident from the experience of Martin *et al.* (1954) at the Mayo Clinic.

It follows that the identification of further antibiotics capable of replacing those now in use for this purpose would afford very comforting security. The Antibiotics Clinical Trials Committee of the Medical Research Council decided recently to examine or re-examine the properties of certain antibiotics which might prove useful in this direction, and some of the work reported here was undertaken to provide information to that committee.* Only *in vitro* observations are reported, but these are capable of revealing properties of some consequence to therapeutic efficacy, and the comparison under identical conditions of eight different antibiotics affords some idea of their relative merits and of any relationships which may exist between them.

Antibiotics Examined

Erythromycin.—This was included because two of the other antibiotics studied are evidently related to it. The pure material used was kindly supplied by Eli Lilly & Co.

Spiramycin.—This antibiotic was discovered in the laboratories of Rhône-Poulenc. According to Chabbert (1955) its antibacterial spectrum corresponds closely to that of erythromycin, but the latter is 4 to 20 times more active. Staphylococci were readily made resistant to spiramycin, and were then resistant to the same concentration of erythromycin: thus in the resistant organism the difference in degree of activity of the two antibiotics disappears. Hudson, Yoshihara, and Kirby (1956) found very little cross-resistance: of 13 strains resistant to erythromycin, 11 were sensitive to spiramycin. These authors used spiramycin successfully in the treatment of pneumonia, as did Renoux, Dupoux, and Huet (1955). This antibiotic was kindly furnished by Dr. W. R. Thrower, of May & Baker Ltd.

E129.—This is an antibiotic produced by submerged fermentation of a new species of *Streptomyces*, isolated in the Fermentation Research Division of Glaxo Laboratories Ltd. from a sample of soil collected in Jericho, Jordan. It has been extensively studied in these Laboratories, and shown to have a spectrum similar to that of erythromycin.

*Some of the antibiotics examined have become available only since this committee last met, and it is not to be understood that the committee has considered all of them, or decided on undertaking clinical trials of any.

a low toxicity, and full therapeutic action in mice on infection by *Staph. pyogenes*, *Str. pyogenes*, and *Str. pneumoniae*. It is known to be a mixture of several substances, and recently one of these, Factor B, has been separated from it. For a supply of both E129 and Factor B we are indebted to Dr. J. Ungar, of Glaxo Laboratories Ltd.

Cephalosporin P.—This is one of several interesting antibiotics shown by workers at Oxford to be formed by a species of *Cephalosporium* isolated from the sea near a sewage outfall in Sardinia by Brotzu (Florey, 1955). Its antistaphylococcal activity was studied by Ritchie, Smith, and Florey (1951). *In vitro* activity was high and toxicity very low: on the other hand, the therapeutic effect was much inferior to that of the tetracyclines, and resistance was readily acquired *in vitro*, although no evidence was obtained that this occurred *in vivo*. We are greatly indebted to Sir Howard Florey and Dr. E. P. Abraham for the gift of some pure cephalosporin P.

Micrococin P.—This antibiotic is formed by an organism of the *B. pumilis* group isolated from soil in East Africa by Fuller (1955), who found it to be highly active *in vitro* against Gram-positive organisms and *Myco. tuberculosis*, of low toxicity, and therapeutically active in mice against *Str. pyogenes*. We are much indebted to Dr. A. T. Fuller and Dr. D. R. Bangham for a supply of this substance and for much further information about it. The named used has been proposed for it by Abraham, Heatley, Brookes, Fuller, and Walker (1956), since it appears to be nearly identical with the antibiotic micrococin, originally described by Su (1948) and by Heatley and Doery (1951).

Albomycin.—The properties of this antibiotic discovered in the U.S.S.R. were recently described by Gause (1955). It is credited with a wide range of activity and extensive therapeutic powers demonstrated both experimentally and in the clinical field. Perhaps the most remarkable claim made in this paper is that albomycin is 10 times as active as penicillin against staphylococci *in vitro*. A supply of this drug had been obtained through the British Embassy in Moscow for the treatment of a patient who was not in fact given it, and we were fortunate in obtaining it for laboratory study. The labels on the ampoules bore the numbers VI-56, K-13855, 235.

Novobiocin.—This antibiotic, best known as "albamycin" (Upjohn Company), which has been independently discovered in three laboratories and given six names, has had its generic name changed from streptonivcin to novobiocin: other trade names are "cathomycin" (Merck) and "cardelmycin" (Pfizer). An account of its properties is given in a series of five papers (Smith *et al.*, 1956; Hoeksema *et al.*, 1956; Wilkins *et al.*, 1956; Taylor *et al.*, 1956a, 1956b); its most striking properties are a high degree of activity against various Gram-positive organisms, especially staphylococci, and the remarkably high blood levels attained and maintained for many hours after oral administration. An experimental study at the Mayo Clinic (Martin *et al.*, 1955) confirms these findings and the therapeutic activity of the drug in mice. A series of papers in the April, 1956, issue of *Antibiotic Medicine* reports clinical trials, with generally promising results. Staphylococci can develop resistance to it rather rapidly *in vitro*. Persistence in the blood appears to be due in part to protein binding and in part to biliary excretion and reabsorption: little is excreted in the urine. We are indebted to the Upjohn Company for a supply of this antibiotic.

Vancomycin ("vancocin") is formed by *Streptomyces orientalis* n.sp., isolated from a soil sample obtained in Indonesia examined in the Lilly Research Laboratories. We are indebted to Eli Lilly & Co. for a supply of this substance, and for an account of their observations on its properties (McCormick *et al.*, 1955-6; Ziegler *et al.*, 1955-6; Griffith and Peck, 1955-6). It is active chiefly against Gram-positive cocci and is bactericidal. Attempts to induce resistance to it in staphylococci resulted in only a fourfold to eightfold change in sensitivity. It has a low toxicity, and has been administered intravenously and intramuscularly to

human subjects, attaining concentrations in the blood which should suffice for therapeutic effect and being excreted in the urine. Intramuscular injection causes pain.

Methods

The medium used for all purposes was ox heart extract peptone broth or agar, pH 7.4.

Preparation of Antibiotic Solutions.—The more soluble antibiotics were dissolved in sterile distilled water: the original solutions of micrococin P and of E129 and Factor B were made in ethanol.

Minimum Inhibitory Concentrations were determined on plates containing doubled dilutions of the antibiotic, divisions of which were inoculated with a 1-mm. loopful of an approximately 1/500 dilution of a 24-hour broth culture. These were read for presence of growth visible to the naked eye after 24 hours at 37° C. Blood (0.5 ml. saponin-lysed horse blood to 15 ml. medium) was added for tests with pneumococci and streptococci.

Tests of Bactericidal Action.—Broth containing 10 µg. of the antibiotic per ml. was inoculated with 0.01 ml. of a 24-hour broth culture per ml. and kept in a water-bath at 37° C., surface viable counts being made at 0, 2, 4, 8, and 24 hours.

Habituation.—Previous experience in this laboratory has shown that this process is more rapid in broth than on agar. Broth containing doubled dilutions of antibiotic was heavily inoculated, and transfer made daily with a 6-mm. loop (= ± 0.025 ml.) from the highest concentration showing growth to a further range of tubes. This was repeated 16 times, unless a high degree of resistance developed at an earlier stage.

Studies of Cross-resistance.—Organisms so habituated were tested for sensitivity to other antibiotics by the method used for determining minimum inhibitory concentrations.

Effect of pH.—Broth was adjusted to pH 5.5, 6.5, 7.5, and 8.5 by the addition of N-HCl or NaOH, antibiotic was added in different concentrations, and tubes were inoculated with 1 drop of an approximately 1/500 dilution of staphylococcus broth culture: these were read for turbidity after overnight incubation.

Effect of Inoculum Size.—Broth tubes (4.5 ml.) containing doubled dilutions of antibiotic were inoculated with (1) 1 drop (± 0.02 ml.) undiluted broth culture, (2) 1 drop broth culture diluted 1/500 in saline.

Results

Minimum Inhibitory Concentrations

The results obtained with 55 strains of *Staph. pyogenes* are given in Table I (a few of these strains were omitted in some of the tests). The antibiotic to which the majority were most sensitive is micrococin P. Next in activity is

TABLE I.—Number of Strains of *Staph. pyogenes* Inhibited by Antibiotics

Antibiotic	Total Strains Tested	Concentration (µg./ml.)										
		0.007	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	16
Erythromycin	55											
Spiramycin	55											
E129	52											
E129, Factor B	52											
Cephalosporin P	52											
Micrococin P	54											
Albomycin*	51	1	29	11	5	5	23	29	2			
Novobiocin	52											
Vancomycin	51											
	55											

* In reading these results, the presence of one or two colonies of a resistant variant was ignored.

erythromycin: spiramycin was 16 to 32 times less active, and E129 had about a quarter and Factor B about a half the activity of erythromycin. The order of activity of the remainder was novobiocin > cephalosporin P > vancomycin > albomycin. The last-named was the only antibiotic to which any of these strains were highly resistant. Even

some of the sensitive strains either included a small minority of resistant cells or developed resistant variants very rapidly: the growth of one or two colonies only in such tests has been ignored in compiling Table I.

Similar tests were done with 12 strains each of Group A *Str. pyogenes* (Table II) and of *Str. pneumoniae* (Table III). Erythromycin is the most active against each of these species; of the performance of the others, that of spiramycin is decidedly better than against staphylococci, but

TABLE II.—Numbers of Strains of *Str. pyogenes* Inhibited by Antibiotics

Antibiotic	Concentration (µg./ml.)										
	0.007	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	16
Erythromycin	1	2	9								
Spiramycin											
E129											
E129, Factor B											
Cephalosporin P											
Micrococin P											
Albomycin											
Novobiocin											
Vancomycin											

TABLE III.—Numbers of Strains of *Str. pneumoniae* Inhibited by Antibiotics

Antibiotic	Concentration (µg./ml.)										
	0.007	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	16
Erythromycin*											
Spiramycin*											
E129											
E129, Factor B											
Cephalosporin P											
Micrococin P											
Albomycin											
Novobiocin											
Vancomycin*											

* One strain in each case not inhibited by 0.12, 2, or 1 µg./ml. respectively of erythromycin, spiramycin, and vancomycin: not tested further.

cephalosporin P and novobiocin show differences in the opposite direction. Albomycin is consistently and highly active against *Str. pneumoniae*, but has no action on *Str. pyogenes* (it also failed to inhibit 12 strains of *Str. viridans* in concentrations up to and including 128 µg./ml.). The remainder behave similarly against all three species: Factor B is again somewhat more active than E129.

Tests were also done with single strains of nine species of Gram-negative bacilli, and the only one of these antibiotics with a substantial action on them was albomycin. Its minimum inhibitory concentrations in µg./ml. were: *Bact. coli*, 0.5; *Bact. aerogenes*, 0.5; *Bact. friedländeri*, 0.12; *Salm. typhi*, >128 (seven strains tested); *Salm. paratyphi* B, 0.25; *Salm. typhimurium*, 0.12; *Sh. sonnei*, 0.25; *Proteus mirabilis* and *Ps. pyocyanea*, >128 (four strains of each tested). Thus the extraordinary contrast between the sensitivity of pneumococci and resistance of streptococci finds a parallel in the behaviour of paratyphoid and typhoid bacilli.

Of the remaining antibiotics, cephalosporin P, micrococin P, and vancomycin had no demonstrable action on any of these nine species: the remainder inhibited some of them in concentrations less than 32 µg./ml. in only one instance. This was the inhibition of *Proteus* (three strains) by novobiocin at 4 µg./ml.

Bactericidal Action

Only six of the antibiotics proved to be bactericidal in a concentration of 10 µg./ml. Of what may be called the erythromycin group, E129 and Factor B were rather more active than erythromycin and much more so than spiramycin, active than erythromycin and much more so than spiramycin, in the presence of which there was an initial rise in the count. Novobiocin was rather less active than erythromycin; and vancomycin, after the first two hours, gave the lowest survivor counts of all (Table IV).

TABLE IV.—Percentage Mortality of *Staph. pyogenes* in Broth Containing 10 µg. of Antibiotic per ml. at 37° C.

Antibiotic	2 Hours	4 Hours	8 Hours	24 Hours
Erythromycin	9	25	74	98
Spiramycin	+5	+74	+15	78
E129	88	90	95	99
E129, Factor B	70	87	94	99.4
Novobiocin	48	67	68	96
Vancomycin	63	95	99.5	99.99

In the presence of cephalosporin P, micrococin P, and albomycin there was growth, slow up to eight hours but profuse overnight. According to Ritchie *et al.* (1951) cephalosporin P is bactericidal: the difference between their results and these is undoubtedly an effect of inoculum size. The inoculum in these experiments was about 5×10^6 per ml.: a test with cephalosporin P was repeated using 5×10^6 , 5×10^4 , and 5×10^3 per ml., and with each of these the 24-hour count was zero or near it. It also seems that micrococin P is an antibiotic the effect of which depends much on inoculum size. This is even more true of albomycin, in the presence of which a large inoculum of staphylococci yields highly resistant variants within a very short time. Various other attempts were made to demonstrate bactericidal action in albomycin, including the use of shaken cultures (its action being said to depend on oxygen) and of *Bact. friedländeri*, which is highly sensitive and does not rapidly produce resistant variants on solid media, but in every experiment free growth took place overnight.

Effect of Inoculum Size

The effect of a 500-fold difference in staphylococcus inoculum size on capacity to inhibit growth in broth was only twofold for erythromycin, spiramycin, and E129, and fourfold for Factor B, novobiocin, and vancomycin. For cephalosporin P it was eightfold, for micrococin P more than sixteenfold, and for albomycin, in an experiment with *Bact. friedländeri*, more than 8,192-fold (dilute inoculum inhibited by 0.03, undiluted not by 128 µg./ml.). The test could not be done with *Staph. pyogenes* and this antibiotic for reasons given later.

Effect of pH

Erythromycin and spiramycin are decidedly more active in an alkaline medium, but E129 has a constant activity at pH 5.5-7.5 and is less active at pH 8.5 (Fig. 1). This difference suggests a fundamental dissimilarity between E129 and the other two.

Of the remainder, vancomycin and micrococin P are little affected by pH; cephalosporin P and novobiocin are less,

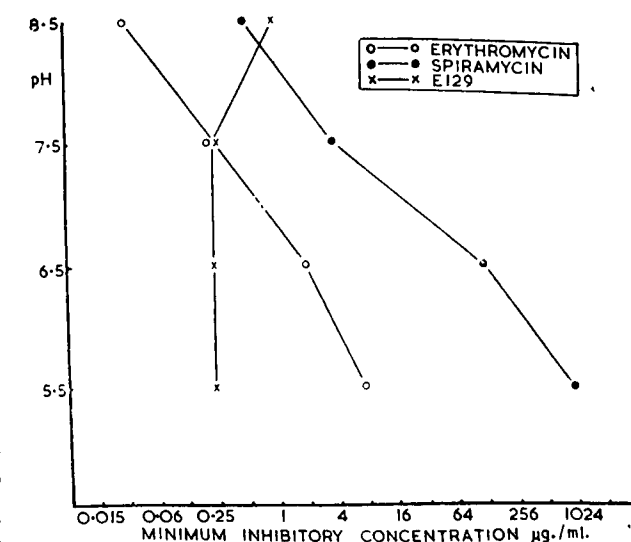


FIG. 1.—Effect of pH on bacteriostatic activity.

The 1930's witnessed the rapid build-up of evidence that the incidence of leprosy in Eastern Nigeria was not only generally high but in some localities phenomenal. At new settlements at Uzuakoli and Oji River experience at Itu was repeated, and far more patients sought admission than could be accommodated. In 1937 detailed information about specific localities began to be available. In that year a survey of the Abua clan by one of us (T. F. D.) revealed

492 patients with active leprosy among a population of 14,515 (34 per 1,000). That one small group, and one unusually health-conscious, could have so high an incidence was as surprising as it was disconcerting. This survey was quickly followed by many others, and, although lower figures were sometimes recorded, in a number of instances the incidence was far higher, figures of 50, 100, and even 150 per 1,000 being recorded. By 1942 it was evident that a formidable amount of leprosy existed in the region. By then the vigorous efforts of missionary societies were evolving methods of leprosy control which aroused Government interest, and led directly to the creation in 1945 of the Nigeria Leprosy Service, which has cared for many thousands of patients and undertaken very intense and extensive leprosy control measures.

Unusual Features of the Disease

Leprosy in Eastern Nigeria, especially as encountered on surveys between 1937 and 1948, has certain unusual features. In comparison with its manifestations in some other parts of the world, it is a relatively mild disease. The patient with mutilations and serious complications is generally rare. Even though severe and moderately severe infections have been more than sufficient to fill settlements to capacity, they represent only a minority of the total. Often more than 50% of patients in a locality have shown only one or very few lesions, which involve little physical discomfort and no disability.

The relative distribution of the various types of the disease is also of interest. Frank lepromatous cases rarely represent more than 10% of the total. The proportion is often smaller. The more flamboyant forms of tuberculoid leprosy are also uncommon, the bulk of infections consisting of tuberculoid leprosy of low intensity, and a smaller but considerable group of indeterminate character.

Furthermore, the disease is not particularly selective where sex and age are concerned. There is often little difference in incidence between the sexes. Infection is not by any means confined to childhood and youth; indeed, the frequency of apparently recent infections in the later age groups has attracted the attention of those familiar with leprosy elsewhere (Lowe and Smith, 1949).

Finally, the generally good response to treatment is also noteworthy. It was apparent before the days of sulphone therapy.

Decline in Leprosy Incidence

These features of the disease are interesting pointers to its natural history in Nigeria. They become even more interesting in the light of events during recent years. From 1948 onwards evidence began to appear that in some heavily infected localities the incidence of leprosy was declining. The following are two examples of this.

Ndi Oji Abam, Owerri Province

At one isolated group of villages (Ndi Oji Abam, Owerri Province) a careful survey early in 1941 brought to light 369 cases of active leprosy in a population of 3,057, an incidence of 121 per 1,000. Excessive though it was, this amount of leprosy represented by no means the whole story. In addition to those who showed unmistakable signs of active disease there were others who showed suspicious but uncertain lesions, and yet another group who presented scars and ulcers from the application of caustics to what they themselves regarded as leprosy lesions. The people here were extremely co-operative, and it proved possible to maintain a relatively close watch on events after the survey. During subsequent years new cases of active leprosy among the resident population became evident, as follows:

1941	37	1946	12	1951	9
1942	45	1947	20	1952	8
1943	71	1948	13	1953	10
1944	19	1949	16	1954	8
1945	26	1950	5		

In a few instances these cases were discovered by the examination of contacts, but most came forward for treat-

ment on their own initiative, presenting extremely early lesions. The high degree of co-operation given by the people is attested by two further intensive surveys, undertaken in 1947 and 1955. The former of these brought to light only 18 persons who had developed leprosy since 1941 and had not bothered to seek treatment on their own. In all cases the infection was slight. They are included in the figures for 1946 and 1947. The most recent survey, in January, 1955, revealed only 8 cases previously unknown. Four are included in the total for 1954.

Thus the stream of new infections evident between 1941 and 1943 then began to decline and had become a trickle by 1950, since when it has remained at low level. As a result of this and the symptom-free discharge from treatment of many patients, the amount of active leprosy in this area has declined enormously—522 cases at the end of 1943 comparing with 216 in 1947 and 49 at the end of 1954, a fall of over 90%.

Bende Clan, Owerri Province

This is a very different area from Ndi Oji Abam, although they are separated by less than 20 miles. It was the first administrative centre of British rule in the area, and has had flourishing contacts with surrounding clans for over half a century. The people are mainly traders and so are often away from home, sometimes travelling long distances. They also have a relatively high standard of living.

Survey work in such an area is necessarily less certain than in an isolated community, but in two surveys, in 1943 and 1951, a high level of accuracy was in fact achieved. During this period, in a population of 3,500, the incidence of leprosy declined from 31 to 5 per 1,000. In the second survey only three previously unknown cases were found. It was possible to transfer the three remaining lepromatous cases to the central settlement. In this clan leprosy has almost completely died out in a period of ten years.

These are examples of a process that has in fact been going on in many areas to a greater or less degree, and during the past six years a mass of evidence has accumulated of a decline in the incidence of the disease that is widespread and is gaining in momentum each year. Its scale is indicated by the fact that, whereas in the three provinces of Onitsha, Owerri, and Rivers 30,630 patients with active leprosy were taking treatment in December, 1948, by the end of 1954 the number had dropped to 14,770, a decline of over 50%.

Causes of the Decline

In the community, as in the individual, leprosy usually takes a very chronic course, and with one exception, to which reference is made later, the few examples of a decline in the disease have taken decades to develop. A decline in incidence on the scale now apparent in Eastern Nigeria, occurring in so short a period, is a most unusual phenomenon. When one comes to examine the influences that may be responsible, it becomes evident that several are at work, and that they are operating in a most complex manner, so that what has probably been decisive at one time and place does not apply at another. The subject is a very large one, and it is possible here to examine very briefly only a few of its main features.

Has There Been a Leprosy Epidemic?

The rather curious association of a very high incidence, an essentially mild disease, and a rapid decline over a short period of years has been reported before—namely, in the case of the epidemic of leprosy in the island of Nauru in the early years of this century (Bray, 1930). The question immediately arises whether what has been witnessed in Eastern Nigeria is a similar outbreak, but on a far larger scale, and in particular whether the very high incidence recorded around 1940 was the result of an epidemic that had developed during the preceding 20 to 30 years and was then not far from its peak. However reluctant one may be to accept such a hypothesis, there is a great deal of evidence in favour of it.

1. Conditions were extremely favourable for a leprosy epidemic to develop. It is well known that leprosy is most likely to spread not among entirely primitive communities but among communities in which the social and economic changes of civilization have begun to operate. Even as recently as the early years of this century, each of the multitudes of villages in the Region was very much an isolated unit, with neighbouring villages probably hostile. Travel was not to be undertaken lightly. There was no central African authority, and, although leprosy was known and was often dealt with ruthlessly, in some places there was greater laxity. Then with bewildering rapidity the country was opened up. The fear of travel disappeared. Education spread rapidly, but hygiene and standards of living lagged far behind, especially during the years of depression in the 1930's. It is impossible to imagine a situation more likely to encourage the spread of leprosy.

2. The people are themselves of the opinion that leprosy did spread very greatly during this period. Personal opinion is of course highly unreliable as evidence, but in this case it does deserve some respect, for the Ibo is a very efficient diagnostician where leprosy is concerned, and, as generally very little clothing was worn during the years concerned, there was ample opportunity to observe the disease.

3. The relative rarity of the patient bearing the stigmata of a long-standing infection calls for explanation. Either many patients died before this stage was reached or the disease was formerly much less common.

4. It is customary to gauge the activity of leprosy in a community by its incidence among children as compared with that among adults. This simple and obvious method is reliable enough when conditions affecting the immunological status of the community are relatively stable, but it breaks down under unstable epidemic conditions. Here in parts of Eastern Nigeria leprosy is very common both in children and in adults, and the frequency of the unstable indeterminate and borderline varieties of leprosy among the higher age groups is particularly suggestive. It is what one would expect in the earlier stages of an epidemic with all age groups susceptible.

Taken together, these strands of evidence are weighty, and receive added strength from experience during the past 10 years. If an epidemic of leprosy did develop in many areas during the third and fourth decades of this century, it is not to be expected that the excessive incidence found in it is not to be expected that the excessive incidence found in a number of surveys could in fact continue at that level. Some decline would be expected with the development of resistance to *Mycobacterium leprae* in the population, and resistance to the tuberculoid form, with a corresponding disease to exhibit the tuberculoid form, with a corresponding decrease in the indeterminate group. A total decline with a relative increase in tuberculoid leprosy has been noted in certain areas.

Even if it is true that an acute epidemic of leprosy has appeared in parts of Eastern Nigeria, its inevitable decline offers only a partial and very inadequate explanation for the observed facts. Leprosy may decline naturally, but in this case the process has undoubtedly been hastened by other influences.

Influence of Tuberculosis

Lowe, working in Eastern Nigeria, drew attention to the immunological relationship between leprosy and tuberculosis (Lowe and McNulty, 1953). There seems to be little doubt that tuberculosis is also a factor in the situation. The opening up of the country which facilitated the spread of leprosy also encouraged the spread of tuberculosis inland from coastal areas. It is significant that the areas of highest leprosy incidence have never been found in close relationship to ports and townships on the main routes of communication. Tuberculosis of the lungs is still a relatively uncommon disease in many rural areas, but its spread, followed by the development of allergy to tuberculin, has probably influenced the natural course of leprosy through the production of a concomitant allergy to lepromin in a proportion of those infected. It is very difficult to

assess the importance of tuberculosis as a factor in the general decline of leprosy. A positive reaction to tuberculin is often found in leprosy patients who are negative to lepromin. Pseudo-reactions to tuberculin are not uncommon. It has even been suggested that *M. leprae* may be one of the agents responsible for them (Lowe, 1955). The impression remains that, even if tuberculosis is having a limiting effect on leprosy in and around ports and townships, its effects in remoter rural areas are not yet sufficient to have contributed much to the decline of leprosy already observed in such areas.

Improved Living Conditions

Another, and very welcome, factor in the situation is the considerable rise in the standard of living of the people, which began towards the end of the war and has steadily gained in impetus. Far more clothing is worn and opportunities for contact are thereby lessened. Standards of housing have improved, sometimes greatly, though it may be doubted whether this is as yet sufficient to have had any significant influence. Of greater importance is the advance in child health that has undoubtedly occurred, and the spread of medical facilities, which have reduced the incidence of diseases causing abrasion of the skin—for example, yaws and scabies. Opportunities for the spread of *M. leprae* by contact are certainly fewer than they were, and the healthier population is better able to withstand infections of all kinds.

Influence of Leprosy Control Measures

Finally, it is necessary to consider the influence of leprosy control measures on the natural course of the disease. In doing so it is first worthy of note that in many localities there was no need to stimulate an awareness of the infectivity of leprosy. This already existed, enshrined in taboos relating to contact with patients and demonstrated in efforts to expel patients from the community and, in one or two instances, in the provision of segregation villages for them. The original requests for leprosy surveys came because these efforts had broken down and the disease had got out of hand. Although in some places prejudice against leprosy was so strong that the very idea of doing anything to help patients was abhorrent, this did not apply in areas of very high incidence, and here it was not difficult to establish treatment centres and local segregation villages and organize preventive work, often at negligible cost and with the co-operation of the entire community, both patients and non-patients. The fact that the entire community often participated needs to be stressed. Once started, the idea of local anti-leprosy schemes spread, and between 1938 and 1943 many centres were established, which have continued up to the present, their number growing each year, and together dealing with many thousands of patients. The effect of all this effort may be reviewed from the two standpoints of treatment and isolation.

In Eastern Nigeria leprosy has been particularly amenable to treatment, and good results were achieved with hydnocarpus oil during the years when it was the mainstay of treatment. The resolution of tuberculoid lesions was generally hastened, and large numbers of patients with this type of leprosy were discharged in an inactive condition. On lepromatous cases its effect was very much slower, and, although some did gradually resolve, in other cases it succeeded in doing little more than keep the patient alive. Judged by its action on the two stable forms of the disease, it may be concluded that hydnocarpus oil had very little effect on the spread of leprosy, for the non-infective tuberculoid cases resolved and the infective lepromatous cases continued to stay infective for a long time. Where, however, patients displaying the unstable indeterminate varieties of leprosy are concerned its action may very well have been of importance. It is thought by many workers that these varieties of leprosy play an important part in the evolution of lepromatous leprosy (Lowe and Chatterji, 1941). In Nigeria our experience has been similar. In such patients the virtue of hydnocarpus oil was evident, for, once under

treatment, they rarely degenerated into the lepromatous type of the disease. Through its action on such patients in particular, hydnocarpus oil must have contributed to the decline of leprosy.

The virtue of the isolation of open cases is self-evident. Over the past 20 years several thousands of these have been isolated at settlements in Eastern Nigeria, and this must inevitably have had its effect on the disease. In addition, particularly in Owerri and Rivers Provinces, during the past 15 years approximately 10,000 patients have been isolated for longer or shorter periods in local segregation villages, this number including most of the known cases likely to be infective in the localities concerned. Even though this group of patients enjoyed considerable freedom, and visits home were sometimes frequent, they were for a considerable part of their time removed from the compounds where they formerly lived, and many opportunities for infecting others were thereby prevented. The virtue of the system as an anti-leprosy measure was commented on by Cochrane (1953). There seems to be no doubt about its importance.

Since 1949 the most important leprosy control measure of all has come into play with the general adoption of sulphone treatment. This area provided the first large-scale experiment in the use of oral 4:4'-diaminodiphenylsulphone (D.D.S.) in the field, initiated by the enterprise of Drs. Lowe and Bland. In Onitsha Province it has been reported on by Garrett (1951) and Garrett and Corcos (1952). Since 1951 oral D.D.S. has been the standard treatment for leprosy at all centres, and its effects are now manifest. The long-standing lepromatous cases whose infection lingered on under hydnocarpus treatment are for the most part now discharged. Treatment is extremely popular, attracting patients at an earlier stage of the disease than ever before. Early lepromatous cases speedily become bacteriologically negative. The general public is increasingly leprosy-conscious, and prejudice in localities long resistant to local leprosy control measures has finally succumbed. Relapses hitherto have been unimportant, and there have been no grounds for losing the confident outlook that sulphone treatment engendered. Here, then, is a potent anti-leprosy weapon rendered especially powerful because, thanks to an existing organization, it proved possible to apply it at many centres simultaneously.

The only clue to the relative importance of the four influences antagonistic to leprosy, which have been discussed briefly here, lies in the speed with which change has occurred. Circumstances are unusual, but it is extremely unlikely that natural regression of the disease, the spread of tuberculosis, or a rising standard of living can, either singly or collectively, have produced such profound effects in the space of seven years. They have doubtless played their part, but there seems to be little room for doubt that intense and widespread leprosy control work has been of great importance, that the effort of many devoted leprosy workers has borne fruit, and that the cost of the Leprosy Service to the British taxpayer through the Colonial Development Fund has entirely justified itself.

Summary

Leprosy is a disease of major importance in Eastern Nigeria, where it has a number of unusual features: (a) its incidence as encountered in surveys between 1937 and 1948 was generally high, sometimes phenomenally so; (b) its character is usually mild; (c) highly infective lepromatous cases form only a small minority of total infections, and indeterminate cases are common; (d) the disease affects all age groups; and (e) since 1948 signs of a decline in incidence have steadily increased, and a large-scale reduction in the disease is now evident.

The facts suggest that an epidemic of the disease has occurred which is now waning. In its decline the influence of tuberculosis, improved living conditions,

and leprosy-control measures is probable, and the relative importance of these factors antagonistic to the disease is briefly discussed.

Thanks are due to the Director of Medical Services, Eastern Region, Nigeria, for permission to publish this paper.

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LETTERER-SIWE SYNDROME IN ADULTS

REPORT OF TWO CASES

BY

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Descriptions, from both clinical and pathological aspects, of the commoner lymphatic node tumours are abundant, and their recognition now presents no great difficulty. It is amongst the rarer members of this group of tumours that the greatest difficulty in accurate diagnosis is often encountered. Robb-Smith (1938) has attempted the task of clarifying a most confused group of conditions, and it seems desirable that cases of the rarer types of lymphoid tumours should be recorded, not merely because of their rarity, but in order that the adequate study of such cases may eventually make their clinical and pathological recognition easier.

The cases described below are of the rare Letterer-Siwe syndrome in adult life: they showed several of the clinical features described by Robb-Smith in this condition, with other features not hitherto recorded. The presenting symptoms in each case consisted of a severe macrocytic anaemia with steatorrhoea.

Case 1

The patient, a married woman aged 39, was admitted to hospital in January, 1947, for the investigation of a severe anaemia with nausea, anorexia, and rapid loss of weight. A short bout of diarrhoea lasting a few days had occurred

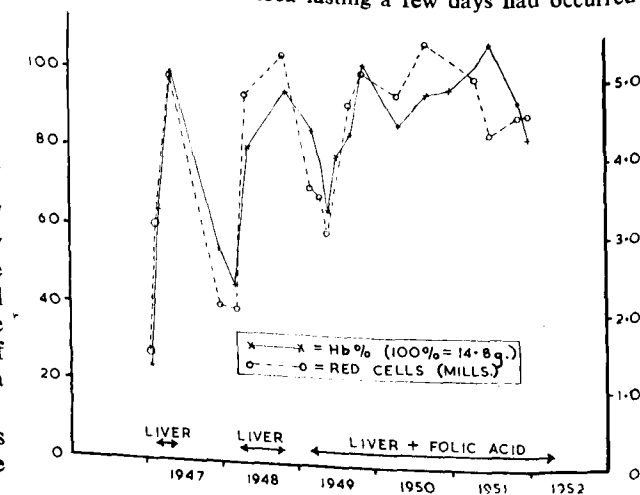


CHART I.—Case 1.

in September, 1946. She was seven months pregnant. Investigations showed a very severe macrocytic anaemia with haemoglobin 24% (Chart I), red cells 1,400,000 per c.mm., with a mean cell diameter of 7.9 μ . A fractional test meal showed the presence of free acid. Marrow biopsy revealed a typical megaloblastic picture. A diagnosis of macrocytic anaemia of pregnancy was made and treatment included blood transfusion, crude liver injections of 2 ml. twice a week, and proteolysed liver and iron by mouth. The patient made a rapid recovery, being discharged from hospital early in March, 1947, with a haemoglobin of 100%. A healthy female child was born in April.

In January, 1948, there was a gradual return of the earlier symptoms of anaemia and loss of weight; the patient now began to suffer from diarrhoea, with frequent pale, watery, offensive motions. She was readmitted to hospital in February, 1948. Her weight was 5 st. 11 lb. (36.7 kg.). The haemoglobin was 46%, red cells 2,000,000, mean cell diameter 8.6 μ . A fractional test meal again showed the presence of free acid; serum calcium was 10 mg. per 100 ml. Total faecal fat was 39.6%—free fatty acid 27.5%, soaps 9.3%, neutral fat 2.8%. A revised diagnosis of idiopathic steatorrhoea was made, and treatment was begun with crude liver injections, 4 ml. daily. Vitamin B, calcium, and iron were also given, and the patient was put on a low-fat, low-carbohydrate, high-protein diet. Response to therapy was good, and the patient was discharged in April with a haemoglobin of 82%, and red cells 4,800,000, having gained a stone (6.4 kg.) in weight. The maintenance dosage of liver was 2 ml. of crude liver weekly. The low-fat high-protein diet was continued.

In December, 1950, a severe generalized eczematous dermatitis occurred, which remained troublesome for some weeks.

By March, 1951, the skin condition had greatly improved, but the patient was now complaining of pains in the back, legs, and right shoulder. Examination showed tenderness over the mid-dorsal spine, and an x-ray film showed wedging of the eighth dorsal vertebra. Serum calcium was 8.4 mg. per 100 ml., serum phosphorus 3 mg. per 100 ml., and serum alkaline phosphatase 14 units. This localized osteoporosis, as it was thought to be, was treated with high dosage of vitamin D, and the pain and disability disappeared completely within a month.

In August small irregular raised nodules, purplish in colour and painful to the touch, began to appear in the skin of her legs and arms. Biopsy of a skin nodule was performed, and sections showed a low-grade tumour of lymphatic or reticulo-endothelial tissue. It now seemed possible that the whole picture might be that described by Robb-Smith as reticulum-celled medullary reticulosis (Letterer-Siwe syndrome) of adults.

In October a sternal marrow biopsy showed a slight increase in eosinophil myelocytes, but nothing else abnormal. By December generalized lymphatic node enlargement appeared. Her weight fell to 5 st. 10 lb. (36.3 kg.) with increasing general weakness. Soon after this, periods of increasing general weakness. Soon after this, periods of pyrexia of Pel-Ebstein type began and the weakness and pyrexia became even more pronounced. In January, 1952, her weight was 4 st. 11 lb. (30.4 kg.). Abdominal pain of severe colicky type with flatulence and occasional diarrhoea also appeared.

The patient was readmitted to hospital in January. Biopsy of an epitrochlear lymphatic node was performed and the picture, described below, was that of a malignant tumour of lymphatic tissue.

A course of nitrogen mustard was given without any evidence of clinical improvement, although the enlarged lymphatic nodes showed some reduction in size. The pyrexia, cachexia, and abdominal pain continued, and although there was no sign of further lymphatic node involvement, skin metastases, or bony metastases, her condition steadily deteriorated and death occurred on May 7, 1952.

Biopsy Reports

Skin Nodule.—Biopsy in September, 1951, showed a subcutaneous nodule of densely cellular infiltration, the predominant cell being a fairly well differentiated histiocyte-like cell. There was evidence of active growth in frequent mitotic division figures.

Epitrochlear Node (Fig. 1).—Biopsy in January, 1952, showed the normal gland architecture to be completely destroyed by a malignant neoplasm, the features of which were those of a primary lymphatic tumour. The picture

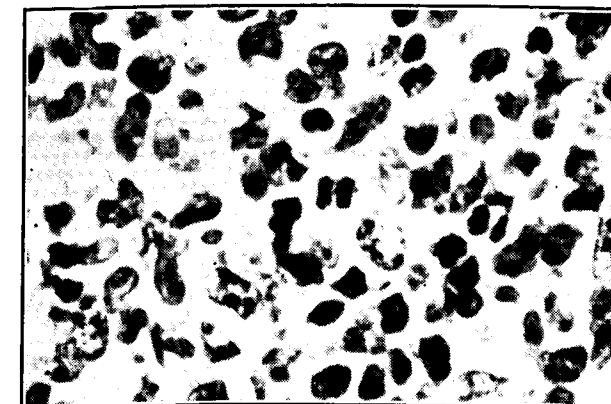


FIG. 1.—Case 1. Photomicrograph of section of epitrochlear lymph node ($\times 900$).

varied in different areas of the node, some areas showing predominance of quite well differentiated histiocyte-like cells similar to those seen in the skin biopsy, while larger areas show a pleomorphic picture. Reticulin staining showed a diffuse and considerable increase in reticulin. The general picture was that of a "reticulum-cell sarcoma" as defined by Willis (1948). In the Robb-Smith classification the picture was that of reticulum-celled medullary reticulosis.

Summary of Necropsy Findings

The body was extremely wasted. A few petechial haemorrhages were scattered over the skin of both lower limbs. There were a few small indurated nodules in the skin in both infraclavicular regions. The peritoneum contained about 2½ pints (1.4 litres) of milky fluid. The liver (weight 28 oz.—790 mg.) showed diffusely scattered very small white areas. The spleen (weight 5½ oz.—156 mg.) was also studded with very small white areas (1–2 mm. diameter). The mesentery was crowded with numerous lymphatic nodes up to half an inch (1.3 cm.) in diameter, with large, hard, matted masses of nodes at the root of the mesentery merging with similar retroperitoneal masses. Other organs showed no macroscopic abnormality.

Histology

Both spleen and liver (Fig. 2) contained numerous sharply defined irregularly scattered areas of infiltration by a

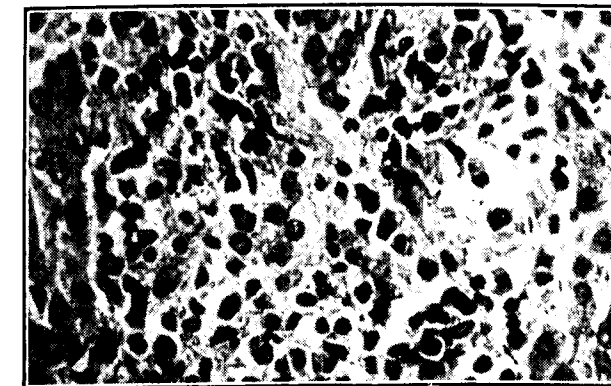


FIG. 2.—Case 1. Photomicrograph of section of liver. ($\times 550$).

neoplasm showing the characters described above in the lymphatic node biopsy. In many of these areas partial or complete necrosis had occurred, but particularly in areas adjoining blood vessels a very cellular picture was seen, the predominant cell being a histiocyte-like cell. The periphery of the pancreas was infiltrated by the same tumour tissue, although here necrosis was widespread and almost complete. Several lymphatic nodes from mesentery, porta hepatis, and inguinal and infraclavicular regions showed replacement of normal lymphoid structure by tumour tissue, very much of which was completely structureless and necrotic, though a few small islands of recognizable tumour tissue with the same predominantly histiocytic cell picture had survived. The mesentery, apart from the numerous enlarged lymphatic nodes, showed diffuse infiltration by necrotic tumour tissue, and many grossly dilated lymphatics.

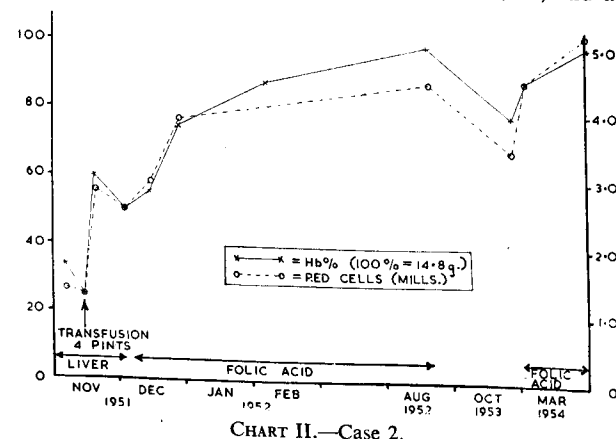
The affected dorsal vertebrae showed no recognizable infiltration, and areas of fibrous tissue represented the original lesions.

Comment

The history falls naturally into three periods. Firstly, a severe macrocytic anaemia of pregnancy in 1947; next a period of three years from 1948 to 1951 during which the clinical picture was that of idiopathic steatorrhoea associated with a macrocytic anaemia; and, finally, the last phase from mid-1951 to 1952 during which generalized spread of a lymphatic node tumour occurred, involving peripheral lymphatic nodes, skin, and bone.

Case 2

A man aged 39 was admitted to hospital on November 5, 1951, suffering from a severe anaemia. He had been well up to a month before, except for two short bouts of diarrhoea and vomiting in July and August, 1951. He had never been abroad. On examination nothing abnormal was found beyond the anaemia and a general pigmentation of skin. There had been no obvious loss of weight. Blood examination showed a very severe macrocytic anaemia, with haemoglobin 34% (Chart II), erythrocytes 1,340,000, and a



mean cell diameter of 7.8 μ . Treatment with a refined liver preparation, 2 ml. daily, was begun, but there was no response after 10 days, and a transfusion of 4 pints (2.3 litres) of blood was given. Meanwhile a fractional test meal showed the presence of free hydrochloric acid. Faecal fat estimations showed 50% total fat with normal split/unsplitted ratio. A crude liver preparation was substituted for the refined liver, but no response was obtained, and on December 6 liver therapy was discontinued and folic acid, 25 mg. daily, was given. Response was rapid, a good reticulocyte crisis being obtained, and the patient was discharged on January 16, 1952, with a diagnosis of idiopathic steatorrhoea. His blood picture was nearly back to normal.

He remained in good health on 5 mg. of folic acid twice daily until the end of 1953, when he was readmitted with a relapse of his anaemia and diarrhoea following the stopping of folic acid a month before. Again he responded well to folic acid and was discharged.

On March 2, 1954, he was readmitted to hospital with a two-months history of increasing dyspnoea and cough, with pyrexia and loss of weight. He was gravely ill and had the physical signs of a bilateral bronchopneumonia. Anaemia was not present. No response to antibiotics was obtained, and on radiological grounds a tuberculous bronchopneumonia was suspected. He was transferred to a sanatorium, where he died a few days after admission.

Necropsy Findings (April 3, 1954).—The body was that of a young man showing marked absence of subcutaneous fat. The lungs showed a well-established bronchopneumonic consolidation of gross miliary pattern. The hilar nodes were enlarged, especially on the right side. The liver was enlarged and appeared to be fatty and toxic. The spleen was enlarged and congested, and the mesenteric lymphatic nodes were grossly enlarged.

Histology.—The lungs showed bronchopneumonia. Metastases of a malignant reticulum-cell tumour were present, with central necrosis. There were also scattered miliary areas of recent monilia infection with giant-cell reaction. The reticulum-cell tumour showed well-differentiated histiocyte-like cells predominating, with rather frequent mitotic figures and occasional multinucleated and atypical cells (Fig. 3). Hilar and mesenteric nodes showed extensive deposits of the same reticulum-cell tumour as that described in the lung metastases. Much necrosis was present (Fig. 4). The liver had very frequent small miliary metastases of the same reticulum-cell tumour (Fig. 5).



FIG. 3.—Case 2. Photomicrograph of section of lung showing metastases of a malignant reticulum-cell tumour. ($\times 620$.)

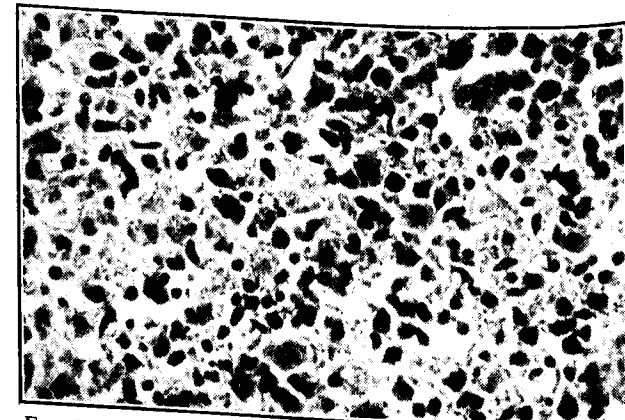


FIG. 4.—Case 2. Photomicrograph of section of mesenteric node showing the same reticulum-cell tumour as Fig. 3. ($\times 340$.)

Summary

Two cases of Letterer-Siwe disease in adults are recorded, with early involvement of mesenteric lymph nodes, giving rise to the sprue syndrome with severe macrocytic anaemia responding only to folic acid. The clinical picture and the pathology of the disease are discussed.

My thanks are due to Professor Payling Wright for helpful criticism; to Dr. J. McMurray for the necropsy report of Case 2, and for providing necropsy material; and to Dr. B. B. Hosford for his co-operation.

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Comment

Death was due to bronchopneumonia following pulmonary, hepatic, and lymph-node metastases of a malignant reticulum-cell tumour, probably arising in the mesenteric lymph nodes.

Discussion

While the cause of idiopathic steatorrhoea (as of sprue) is as yet unknown, it has been recognized for some time that a small proportion of all cases of steatorrhoea are caused by simple obstruction of mesenteric lacteals by a widespread mesenteric lymphadenitis. Ryle (1936) described how such obstruction may occur from tuberculous mesenteric nodes with the production of the sprue syndrome, and Hurst, Payling Wright, and Ryle (1942) describe the history and necropsy of such a case. Hamilton Fairley and Mackie (1937) described a sprue-like syndrome in adults associated with lymphoma, lymphadenoma, and lymphosarcoma of mesenteric nodes, and caused, as they suggest, by defective intestinal absorption from lymphatic obstruction. In two of their four cases anaemia was present, macrocytic in one and normocytic in the other.

For neoplastic disease of mesenteric nodes to produce the sprue syndrome without other evidence of disease it is necessary that the neoplastic condition be a low-grade one, of slow growth, occurring primarily in mesenteric nodes, remaining localized in that area for a considerable interval before becoming generalized and manifesting itself in peripheral lymph nodes or elsewhere. These conditions existed in the two cases here described. That the presenting symptom in Case 1 was that of macrocytic anaemia of pregnancy is not surprising, since pregnancy is a recognized precipitating factor of both sprue and idiopathic steatorrhoea (Morgensen, 1937). That the two cases here described were under observation for four years and two years respectively without developing palpable peripheral lymphatic nodes, hepatosplenomegaly, or other signs of generalized spread indicates the slow-growing, relatively benign nature of the neoplastic process; and careful study of biopsy and of the necropsy material from these cases has led us to place them in Robb-Smith's category of reticulum-celled medullary reticulosis (Letterer-Siwe syndrome). While this condition has most often been recorded in children (Wallgren, 1940; Varga *et al.*, 1948), where it may be confused with aleukaemic leukaemia, Robb-Smith has observed the condition in adults, in whom a very different clinical picture is produced; the condition runs a much more chronic course, is associated with lymphatic node enlargement, splenomegaly, severe anaemia, and pyrexia; and symptoms of steatorrhoea have been observed. This condition merges with the lesions of the lipoidoses and eosinophil granuloma of bone, in which the distinction between a chronic inflammatory condition and the true neoplasia is difficult, and, on the other hand, with the more obviously malignant "reticulum-cell sarcoma" of Willis (1948). Willis's Case XII in particular shows some striking similarities to the cases here described.

EFFECT OF MITRAL VALVOTOMY ON RENAL FUNCTION

BY

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After surgical intervention some patients with mitral stenosis complicated by congestive heart failure improve to such an extent that they no longer require treatment. Merrill (1946) and Mokotoff *et al.* (1948) suggested that the abnormal renal circulation, which has been demonstrated in patients with chronic rheumatic heart disease both with and without congestive heart failure (Merrill, 1946; Aas and Blegen, 1949; Davies and Kilpatrick, 1951; Werkö *et al.*, 1955), was directly responsible for impairment of salt and water excretion in these patients and for the development of heart failure. Therefore it seemed desirable to investigate renal function before and after mitral valvotomy and to attempt to relate any changes to those in the clinical state.

Material and Methods

Fifteen patients, of whom all but one were female, were studied before and after mitral valvotomy.

The clinical state of the patients was assessed both before and after operation, using the grades of disability defined by Baker *et al.* (1952); these may be briefly summarized as 0, no disability; 1, slight disability; 2, moderate disability; 3, severe disability; and 4, total incapacity. The first post-operative assessment of the clinical state was made six months to one year after operation.

Observations on the renal circulation were made about two hours after a meal with the subjects propped up

comfortably in bed at an angle of approximately 45 degrees. The renal plasma flow was measured by sodium *para*-amino-hippuric acid clearance and glomerular filtration rate by inulin clearance, using the technical method described by Dick and Davies (1949). Measurements were made during two accurately timed periods of urine collection of approximately 20 minutes. The filtration fraction, that fraction of the plasma passing through the kidney which is filtered by the glomeruli, was calculated by dividing the glomerular filtration rate by the renal plasma flow. The renal blood flow was calculated from the renal plasma flow and the haematocrit reading.

The diuretic response to ingested water was tested before and after operation in five patients (Cases 1, 2, 8, 10, and 11). Fluids and food were withheld from 6 p.m. on the preceding evening. Between 9 and 9.15 a.m. the patient drank a litre of water and emptied the bladder at 9.15 a.m. The bladder was emptied every 15 minutes for the next four hours and the volume of each 15-minute specimen was measured. From these volumes the maximal rate of urine flow in millilitres per minute and the volume excreted in the first two hours were calculated.

These investigations were carried out a few days before and from two to five weeks after valvotomy.

Results

The effect of mitral valvotomy on the renal circulation, water excretion, and the clinical state is shown in Tables I and II.

TABLE I.—Effect of Mitral Valvotomy upon Clinical State and Renal Circulation

Case No.	Age and Sex	Follow-up (Months)	Clinical State (Grades 0 to 4)	Haematocrit (%)	Renal Blood Flow (ml./min.)	Renal Plasma Flow (ml./min.)	Glomerular Filtration Rate (ml./min.)	Filtration Fraction
1	38 F	19	a 2 b 1	36 40	695 815	445 489	95 96	0.21 0.20
2	34 F	20	a 3 b 1	36 42	350 412	224 239	52 63	0.23 0.26
3	38 F	22	a 3 b 2	46 40	417 408	225 245	67 69	0.30 0.28
4	23 F	9	a 3 b 1	37 36	560 674	353 432	80 104	0.23 0.24
5	38 F	35	a 4 b 2	47 52	323 342	171 164	65 72	0.38 0.44
6	41 F	42	a 4 b 4	51.5 37	497 327	241 206	75 83	0.31 0.40
7	35 F	8	a 4 b 4	37 41	421 721	248 455	93 108	0.375 0.24
8	43 F	35	a 2 b 1	40 43	638 581	383 331	108 93	0.28 0.28
9	40 F	32	a 2 b 1	43 40	418 365	239 237	57 66	0.24 0.28
10	38 F	13	a 4 b 2	42 39.5	466 411	270 248	72 56	0.27 0.23
11	43 F	36	a 3 b 1	35 41	471 276	306 157	76 44	0.25 0.28
12	39 M	6	a 3 b 2	46 41	624 732	337 432	81 139	0.24 0.32
13	36 F	36	a 4 b 1	37.5 38	428 586	268 357	81 76	0.30 0.21
14	25 F	20	a 2 b 1	46.5 45.5	577 597	309 325	106 81	0.34 0.25
15	40 F	20	a 3 b 1	48 44	440 465	229 260	74 78	0.32 0.30

a=Before operation. b=After operation.

1. *Effect upon Clinical State.*—Before operation five patients (Cases 5, 6, 7, 10, and 13) were in grade 4, six (Cases 2, 3, 4, 11, 12, and 15) in grade 3, and four (Cases 1, 8, 9, and 14) in grade 2. All except three were reassessed one year after operation. One of these three (Case 4) had improved from grade 3 to grade 1 nine months after operation and another (Case 12) had improved from grade 3 to grade 2 six months after operation; both patients subsequently failed to attend for follow-up. The third patient (Case 7)

TABLE II.—Results of Water Diuresis Tests Before and After Mitral Valvotomy

Case	2-hourly Volume (ml.)	Maximal Diuresis	
		Rate (ml./min.)	Time (minutes)
1 {after before	296 767	4.9 10.9	67 52
2 {after before	390 222	6.0 4.2	112 52
8 {after before	417 658	7.3 10.0	67 67
10 {after before	247 500	12.5 6.0	97 82
11 {after before	384 341	6.7 5.5	97 97
Normal range (Taylor, 1955)	702 to 1,338	9.7 to 16.9	48 to 104

first appeared slightly improved, but died nine months after valvotomy with congestive heart failure. Six of those followed up for at least one year (Cases 1, 3, 8, 9, 12, and 14) improved by one grade, but four of them (Cases 1, 8, 9, and 14) were only moderately disabled (grade 2) prior to operation. A decrease in disability of two grades was observed in six patients (Cases 2, 4, 5, 10, 11, and 15) and a decrease in disability of three grades in one (Case 13). The remaining patient (Case 6) showed no improvement in the first year and remained in grade 4, but after this she gradually improved to grade 3. In the other cases followed up for more than one year (Table I) there was no change in the clinical condition, but one patient (Case 5) developed hypertension and subsequently died three years later from a cerebral haemorrhage.

2. *Effect Upon the Renal Circulation.*—Accepting a change of at least 20% as being significant, valvotomy was followed by an increase in renal blood flow, renal plasma flow, and glomerular filtration rate in Case 4, and in renal blood and plasma flows unaccompanied by a change in glomerular filtration rate in Cases 7 and 13 (Table I). In Case 12 the renal blood flow showed a slight increase, but because of a fall in the haematocrit reading after operation the renal plasma flow increased to a much greater extent, and this was accompanied by an increase in the glomerular filtration rate. In Case 2 the glomerular filtration rate increased and in Cases 10 and 14 it decreased, with little change in renal blood and plasma flows. In Case 11 valvotomy was followed by a decrease in renal blood flow, renal plasma flow, and glomerular filtration rate, and in Case 6 a slight fall in renal blood flow associated with a decrease in haematocrit caused a marked fall in renal plasma flow, the glomerular filtration rate showing little change. In the remaining cases (Nos. 1, 3, 5, 8, 9, and 15) the changes in renal blood flow, renal plasma flow, and glomerular filtration rate were much smaller (Table I). As a result of these changes in renal plasma flows and glomerular filtration rates the filtration fractions increased in three cases (Nos. 5, 6, and 12), decreased in three (Nos. 7, 13, and 14), and showed little or no change in the remainder (Table I).

3. *Effect Upon the Diuretic Response to Ingested Water.*—After operation the volume of urine excreted in the first two hours after the ingestion of 1 litre of water increased in three cases (Nos. 1, 8, and 10), decreased in one (No. 2), and showed little change in the other, Case 11. In Cases 1 and 8 the maximal rate of excretion increased, whereas in Cases 2, 10, and 11 it decreased. The time of maximal rate of urine flow was earlier after water ingestion in Cases 1, 2, and 10, and the same in Cases 8 and 11 (Table II).

Discussion

All patients in the present series showed abnormally low values for renal blood flow, renal plasma flow, and glomerular filtration rate compared with those found in normals by Davies and Kilpatrick (1951), using a similar clearance technique. These findings are similar to those reported by

Blegen and Aas (1950), Heller and Jacobson (1950), and Werkö *et al.* (1952), and in many of the cases confirm that changes in renal circulation in patients with valvular heart disease occur long before the onset of congestive heart failure. After operation the renal blood flow and renal plasma flow often increased, but did not return to the normal range in any of the patients, and only in Case 12 did the glomerular filtration rate reach normal levels.

The clinical state following valvotomy improved in all except two patients (Cases 6 and 7), but this improvement was not always associated with one in the renal circulation, nor was it consistently accompanied by a change in the diuretic response to water ingestion. In the group with congestive heart failure (patients in grade 4), one patient (Case 13) improved to such an extent—grade 4 to grade 1—that she was only slightly disabled after operation and her renal blood and plasma flows increased greatly. In Cases 5, 6, and 10 there was less improvement in the clinical state, and this was associated with much smaller changes in renal circulation (Table I). The fifth patient with congestive heart failure (Case 7) showed a dramatic increase in her renal blood and plasma flows after valvotomy, but despite this she improved only slightly at first and then relapsed into congestive heart failure. Although all 10 patients without heart failure improved clinically after operation, only two (Cases 4 and 12) showed an improvement in renal circulation, and in one (Case 11) the renal blood and plasma flows and glomerular filtration rate decreased. These results are in accordance with those of Werkö *et al.* (1955) and Judson *et al.* (1955), who reported variable changes in renal blood flow after valvotomy.

Before operation all five patients whose response to the ingestion of 1 litre of water was tested excreted less than 702 ml. of urine in two hours (Table II), which was the lowest value found in normal fasting subjects by Taylor (1955). In all but one patient the maximal rate of diuresis was also below normal, but the time of the maximal urine flow was not delayed beyond the normal range given by Taylor (1955), except in one patient (Table II). After operation there was an improvement in the diuretic response in three patients. The maximal rate of diuresis increased to within normal limits in two patients, and in one of these the two-hourly urine volume also reached normal limits. In all patients maximal diuresis occurred within the normal time range (Table II). There was no apparent correlation between the improvement in diuretic response and changes in the renal circulation, since the patients whose two-hourly urine volumes and maximal rates of diuresis increased showed no significant change in renal blood flow or glomerular filtration rate, and Case 2, whose glomerular filtration rate increased, had a diminished diuretic response after operation. These results are in keeping with those of Judson *et al.* (1955), who reported that post-operative increases in water excretion could not be consistently correlated with any specific change in renal function.

Although these results show that sometimes there is a marked improvement in the renal circulation following mitral valvotomy, the series is too small to allow these changes to be correlated with recovery from or persistence of congestive heart failure. It is obvious that further studies are required, especially in patients with congestive heart failure who recover completely after operation, before it is possible to decide whether improvement in the renal circulation as a result of the operation is directly related to an increase in the capacity to excrete salt and water and the disappearance of congestive heart failure.

Summary

The renal circulation was studied before and after mitral valvotomy in 15 patients, and in five of these the diuretic response to water ingestion was also tested.

Five patients had congestive heart failure prior to operation; six others were severely and four moderately disabled.

Before operation the renal circulation was impaired in all patients and the diuretic response was abnormal in the five patients in whom it was studied.

After operation one patient died with congestive heart failure, another was unchanged, and the remaining 13 showed improvement in their clinical state. The renal circulation improved in five patients, was further reduced in four, and showed little change in six. In three of the five patients studied the diuretic response improved, and in one it became more abnormal.

From this small series there was no obvious correlation between changes in the renal circulation, diuretic response, and the clinical state, although one patient with congestive heart failure who was greatly improved showed a considerable increase in renal blood and plasma flows after operation. The results indicated a need for further study, especially in patients with congestive heart failure prior to operation.

We wish to thank Dr. J. W. Brown, Dr. C. E. Davies, Professor C. H. Stuart-Harris, Mr. J. T. Chesterman, and Mr. A. W. Fawcett for permission to investigate patients under their care, and Mr. A. F. Nichols and Miss S. Exley for technical assistance.

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SEA-SNAKE BITES

BY

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Sea-snakes are the most abundant and venomous of the world's reptiles. They inhabit the shores of the Indian and Pacific Oceans, ranging from the Persian Gulf to south Japan, the coasts of tropical Australia, and the southern Pacific islands. In this vast triangle all fishermen know the sea-snake and its hall-mark, the flat rudder-like tail. Water-snakes, also common along these shores, have round tapering tails (see Fig. 1). They are harmless—a fact familiar to the fishermen.

The frequency of particular genera and species of the sea-snake family (Hydrophiidae) varies in different parts of the world, but, generally speaking, the commonest species is *Enhydra schistosa* (common sea-snake). The adult is 3–4 feet (0.9–1.2 metres) long, about 1–2 inches (2.5–5 cm.) thick, a uniform grey above and whitish below. It is easily recognized by the deep cleft in its chin (see Fig. 2). Young ones have dark-grey bars. Most other species are banded. Some species of *Hydrophis* grow to a length of 9 feet (2.7 metres), but are relatively slender, with small heads. The genus *Astrotia* are the most massive, being up to 4 inches (10 cm.) thick. *Pelamis platurus* has the widest distribution, and has been noted off the western coasts of tropical America and the

shores of south-east Africa (Smith, 1943). The genus *Laticauda* is amphibious, but the rest of the sea-snakes are purely marine.

Sea-Snake Venom

Rogers (1902-3) found the average yield per bite of the common sea-snake (*E. schistosa*) to be 9.4 mg. This was about one-twenty-fifth of the yield from a cobra, but it was much more potent. The fatal dose for a 70-kg.

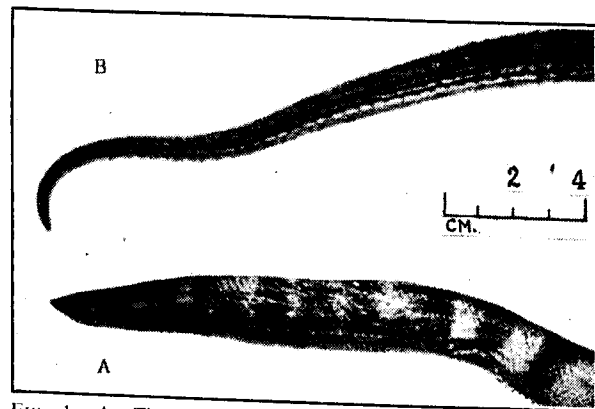


FIG. 1.—A, The flat oar-like tail of a poisonous sea-snake. B, The rounded tapering tail of a harmless water-snake. Both inhabit coastal waters.

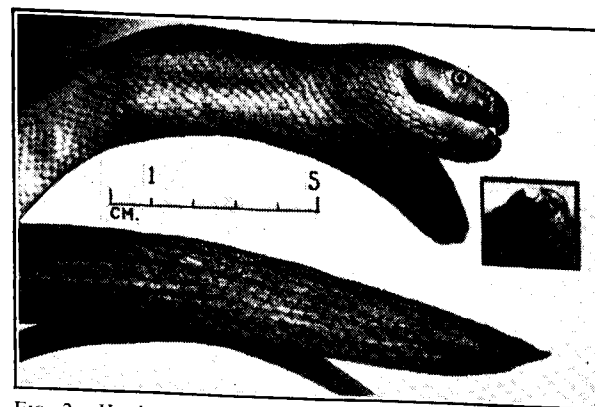


FIG. 2.—Head and tail of a young adult *Enhydrina schistosa*, the common sea-snake (3 feet—0.9 metre—long). Eyes are small and rounded; valvular nostrils on top of snout. Inset is a view of the chin showing the characteristic cleft.

man was estimated as 3.5 mg., or about one-third of an average bite. *P. platurus* was equally toxic, *Hydrophis* species less so. Fraser and Elliot (1905) confirmed the virulence of *Enhydrina*, and found *Lapemis curtus* toxicity similar to that of the cobra. Smith (1926) found *L. hardwickii* extremely toxic for guinea-pigs. Smith and Hindle (1931) reported the venom of *Laticauda colubrina* to be twice as toxic as cobra for mice, but thought the yield too small to kill healthy human adults. Rogers (1903-4) and Fraser and Elliot (1905) demonstrated a neurotoxic effect mainly on the respiratory centre but also on the motor nerve-ends. Unlike cobra venom, there was no direct action on the vasomotor centre or heart and no vasoconstriction, haemolysis, or effect on the coagulation (in concentrations likely to be present in human beings). After a latent period of half to several hours, depending on the dose, progressive paresis, dyspnoea, and ptosis ensued. Respiration finally ceased, although the heart continued to beat for two to three minutes. Thus the Hydrophiidae (true sea-snakes)

are almost purely neurotoxic, in contrast to the other two poisonous snake families, the Elapidae being chiefly neurotoxic but slightly haemotoxic, the Viperidae mainly haemotoxic. Cobra antivenene was ineffective against *Enhydrina* or *Lapemis* poisoning. Richards (1873) kept a dog alive for over 24 hours by tracheotomy and bellows. Prior to this it was moribund. Venom was probably excreted in the dog's urine. Further investigations on sea-snake venom will be reported in due course.

Sea-Snake Poisoning

Records are rare and usually inadequate. The literature describing seven fatal cases (Cantor, 1841; Richards, 1886; Fayrer, 1874; Forné, 1888; Buckland, 1879; Fossen, 1940; Bokma, 1941) and two recoveries (Peal, 1903; Bokma, 1942) will be reviewed in a paper published elsewhere, together with an account of a series of cases personally observed or investigated in a current survey. From these a clear clinical picture emerges.

Victims are mostly fishermen bitten through some accident such as handling nets, sorting fish, treading on a sea-snake, etc. They usually know that it was a sea-snake and are aware of the significance. People bitten whilst bathing, paddling, etc., often do not see the snake or, if they do, think it is a fish. After the initial prick there is no pain or reaction at the site of the bite, the appearance of which is described below under "Diagnosis." A delay of minutes to several hours, usually about one hour, then elapses before further symptoms ensue. Thus the victim continues activities promoting spread of the venom. He may not even connect the bite incident with his illness.

The symptoms are due to bulbar and motor paresis, which is usually generalized from the start but may begin in the legs and ascend, rapidly within an hour or two, to involve the trunk, arm, and neck muscles. During the first few hours the complaint may be "aching," "stiffness," or considerable pain on moving rather than actual weakness. The paresis is usually flaccid, with depressed or absent tendon reflexes, but may be spastic, with hyperreflexia initially. Bulbar palsy may precede, accompany, or follow the peripheral paresis. Jaw stiffness due to trismus is the outstanding feature and is easily overlooked. Ptosis is another early and important sign. It is often mistaken for drowsiness (the patient is usually mentally clear until respiratory failure is advanced). Thirst, burning or dryness of the throat, a general feeling of coldness, and increased sweating are common early symptoms, some of which may be due to fright, but more probably are bulbar manifestations. The pupils are usually dilated. Dysarthria and dysphagia, mainly due to the trismus, are also common although not invariable. Vomiting, nasal regurgitation, and ocular and facial palsy may occur.

The paresis progresses gradually or rapidly, the patient being unable to sit up unaided, then incapable of lifting the heels or head off the bed, and finally lies quite inert. This total paralysis, combined with ptosis, may give a deceptively peaceful appearance. Muscles are extremely tender, although objective sensory involvement is absent or minimal. As trismus increases, only the end of the tongue, eventually not even the tip, can be protruded beyond the teeth margin. There is no clinical evidence of cerebral, cerebellar, or extrapyramidal involvement, and sphincter disturbance is uncommon. In fatal cases respiratory paralysis with terminal hypertension and cyanosis usher in death, which may take place a few hours or several days after the bite. Occasionally, little or no peripheral paresis occurs and the patient dies from pure bulbar palsy, often with convulsions. Failing vision is a fatal sign to fishermen. Cerebrospinal fluid is normal, albuminuria usual, and haemoglobinuria common. The peripheral blood is normal apart from a leucocytosis and some haemoconcentration. Except for the urine findings, there is no clinical evidence of direct cardiovascular involvement by the venom.

A Fatal Case

This is a representative fatal case from my series. A preliminary report has already been made (Reid, 1956).

A 26-year-old Chinese man was bitten at 3 p.m. on October 24, 1954, whilst bathing off Penang Island. He was walking in mud about 20 feet from the shore, the water up to his chest, when he thought he had been bitten by a crab. He looked at his foot but saw nothing wrong with it. No pain or swelling was felt after the initial prick. He continued bathing. Half an hour after the bite he had difficulty in talking owing to a dry feeling in the throat. He returned home. One hour after the bite he had general aching pains in the proximal limbs, with some stiffness and pain across the lumbar region. Two hours later he was unable to sit up unaided or open his mouth properly. Three hours later he noticed difficulty in swallowing. He was unable to sleep, and 12 hours later felt numbness of the fingers though not of the toes.

He was admitted to hospital on October 25, and I first saw him at 10 a.m.—that is, 19 hours after the bite. Two pairs of fang marks, each 7 mm. apart, were seen below the right external malleolus. There was no swelling or discoloration of surrounding skin. He was mentally clear. There was well-marked ptosis and trismus (maximal jaw opening, 2 cm.). The masseters were tender, but spasm was not observed. The eye and facial movements were full and there was no nystagmus. He was able to talk, to cough quite forcibly, and to swallow water, the latter with some difficulty owing to the trismus. The pupils were dilated and reacted to light; abdominal and cremasteric reflexes were present but no plantar responses were obtained. All muscles were tender. There was generalized paresis, with increased tone and tendon reflexes. He was able to move the limbs in bed but unable to lift them or the head off the bed. There was no objective loss of light touch, pain, or vibration sense. The blood pressure was 130/85 and the remaining physical examination was negative. The urine was normal except for a trace of albumin. The Hess test, bleeding-time, coagulation time, platelet count, and prothrombin time were normal; Hb 100%, and W.B.C. 16,000. He had been given 10 ml. of polyvalent antivenene intravenously and 5 ml. into the bite area on admission. On the basis that the venom action was similar to that of curare, 1.5 mg. of neostigmine was given intravenously at 10.45 a.m. Abdominal pain and vomiting followed, but there was no change in the paresis. In the afternoon his temperature rose to 101° F. (38.3° C.) and the pulse rate to 120 (probably a serum reaction). Thereafter the temperature varied between 98 and 99° F. (36.7 and 37.2° C.) and the pulse rate between 95 and 110.

Early next morning (36 hours after the bite) haemoglobinuria was apparent and continued until his death. The paresis was now more marked, the tone was diminished, and tendon reflexes were absent. Trismus had increased (maximal jaw opening 1 cm.) and there was difficulty in looking upwards. Breathing and coughing were normal. In the afternoon a marked increase in sweating developed. The E.C.G. (14 leads) was normal; Hb 110%; W.B.C., 20,000; plasma bilirubin, 1.2 mg. per 100 ml.; Kahn test negative; and spectroscopy showed a mixture of pigments in the urine, chiefly methaemoglobin.

Early on October 27 (60 hours after the bite) difficulty with breathing first appeared. He could cough fairly well; B.P. 128/75, Hb 108%, W.B.C. 26,000. A Bragg-Paul pulsator was started and he was nursed in the prone position. At 11 a.m. the paresis was quite flaccid, with slight hand and foot movements only. Breathing became embarrassed within a minute of stopping the respirator. Sweating continued to be profuse; B.P. 130/80. At 2.45 p.m. the B.P. was 145/100; there was no cyanosis or evidence of respiratory obstruction. At 3.15 p.m. cyanosis was denoted. At 4.30 p.m. the B.P. was 159/90 and pulse rate 120. At 7.45 p.m. the pulse was imperceptible, heart sounds were faint, there was no response to questions, and the pupils were dilated but reacted to light. He died at 8.20 p.m., 77 hours after the bite.

In addition to polyvalent antivenene he had received cortisone, 100 mg. twice daily, penicillin, intravenous glucose-saline, and 100 mg. gastric tube. Although haemoglobinuria continued till the end, the plasma bilirubin just before death was 1 mg. per 100 ml. and the urinary output had remained satisfactory. The Schumm and the Coombs tests were both negative.

A Mild Case

Less severe cases will not develop respiratory insufficiency. Trismus, ptosis, and peripheral paresis resolve rapidly within a few days, occasionally taking a few weeks. The milder cases only develop "weakness" or "stiffness," often con-

fined to the lower limbs, for a few hours or days. Tendon reflexes are depressed or absent. Usually, there are minimal bulbar symptoms as well and albuminuria. The following is a representative mild case.

A Chinese girl aged 16 was sorting fish on the shore at Batu Muang, a small Penang fishing village, at 8 a.m. on March 25, 1955, when she accidentally trod on a sea-snake, which bit her left ankle. It was an *E. schistosa*, 2 feet (0.6 m.) long. She felt no pain after the bite. She was given herbal medicine and brought to hospital at 12 noon. Her only complaint was "stiffness" in both legs and back, which started half an hour after the bite. Below the left medial malleolus were fang marks 8 mm. apart. On admission the knee- and ankle-jerks were sluggish, but no other abnormality was observed; in particular no objective paresis or bulbar signs were present. The urine contained a trace of albumin. Cortisone, 250 mg. intramuscularly, and polyvalent antivenene, 20 ml. intravenously, were given. She had a brisk anaphylactic reaction requiring three injections of adrenaline.

At 3 p.m. the knee- and ankle-jerks were more sluggish, maximal jaw opening was 4 cm. (5 cm. at noon), the urine contained a heavy cloud of albumin; Hb 94%, and W.B.C. 15,000 (P. 80%, L. 16%, M. 1%, E. 3%). Next morning she was feeling well; the maximal jaw opening was again 5 cm., the tendon reflexes were brisker and the W.B.C. 16,000; there was no spectroscopic evidence of haemoglobinuria, and the urine deposit, Hb, blood urea, serum bilirubin, and plasma prothrombin time were all within normal limits. She was discharged on March 30, when the tendon reflexes were significantly brisker than on the 26th. Albuminuria subsequently diminished, and was absent by April 17.

If recovery takes place it is complete. No permanent after-effects such as occur in poliomyelitis were known to the many fishermen whom I have questioned.

Diagnosis

When there is a "sea-snake scare," as recently happened in Penang, the majority of cases coming to hospital thinking they may be sea-snake victims turn out to be something else. During the last 3½ years, 17 cases of fish sting, mostly by catfish, have been admitted to Penang General Hospital, compared with nine cases of sea-snake bite and one case of eel bite and jelly-fish sting (and 28 cases of land-snake bite). On the other hand, if the doctor is unacquainted with the features of sea-snake poisoning he may miss the diagnosis entirely, even though the patient claims to have been bitten in the sea.

The minimum criteria of sea-snake bites are that (1) the patient was in the sea or river-mouth, sorting fishing-nets, etc., (2) felt no pain after the initial prick, and (3) bears fang marks at the site of the bite. The bite may be felt as a slight "brush." Sometimes the patient is quite unaware of a bite until the fang marks are seen. They are usually around the ankle—one or more pairs of circular dots as though made by a hypodermic needle. The pattern varies according to the number of teeth penetrating as well as the fangs, which are small in sea-snakes, rarely exceeding 4 mm. long. Behind them is a maxillary row of teeth and two internal palatine rows—that is, four parallel rows in the upper jaw. Most of my cases have had four dots (see Fig. 3), although two is common and single or multiple

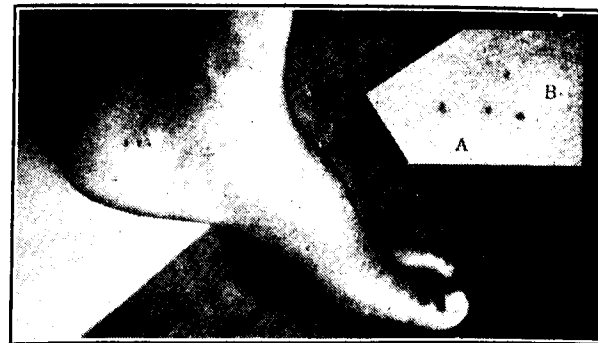


FIG. 3.—Sea-snake bite, typical marks: inconspicuous, no local reaction or tenderness. The dots represent two bites (fang marks A and B in the inset).

dots may occur. Fang marks are slightly bigger than the teeth marks, usually 5-10 mm. apart, and there is no swelling, bruising, or tenderness around them (unless, of course, local "treatment" has been given). Sometimes the fangs or teeth break off and remain embedded. Fishermen draw a hair over the site to extract them as a diagnostic measure. Pin-head oozing of blood stops within a minute or two. The bite marks are often inconspicuous, and a good light may be needed to see them.

These three points—the sea, absence of pain, and fang marks—justify a presumptive diagnosis of sea-snake bite, and treatment should be given. The diagnosis is certain if the snake has been seen to have a flat tail or there is evidence of sea-snake poisoning, such as leg paresis, trismus, or ptosis. The delay between the bite and the onset of poisoning symptoms may be deceptive. Although usually half to one hour, periods of up to six hours have been recorded. If, however, more than six hours have elapsed since the bite and there is no evidence of poisoning, either it is not a sea-snake bite or no venom has been injected. Fish stings are easily distinguished, as they are always extremely painful and tender (see Fig. 4).



Fig. 4.—Sting mark from a catfish (*Plotosus*; "ikan sembilang"). This is always very painful, and the mark is ragged, linear, and tender. It is not always as conspicuous as in this case.

Treatment

From evidence which will be reported elsewhere, it is improbable that first-aid and local treatment are of any benefit except from the psychological viewpoint. Mainly for this latter reason, the following first-aid measures are recommended: (1) avoid all exertion, especially with the limb bitten (the most important measure); (2) apply a tourniquet to the thigh (in leg bites) or arm above the elbow (in upper-limb bites), releasing it every 30 minutes; (3) leave the fang marks alone; and (4) if possible, kill the snake by one sharp blow on the neck (avoid the head) and, after wriggling has stopped, lift by the tail into a container and bring to the doctor.

Specific antivenene is not yet available for sea-snake poisoning. A polyvalent antiserum containing a krait fraction should be used, as, of the Elapidae, krait poisoning (Ahuja and Singe, 1954) bears the closest resemblance to that of sea-snakes. In the admission room 20 ml. is slowly injected intravenously, preceded by cortisone to prevent serum reactions, which are frequent and may be severe. Adrenaline is indicated if, as commonly happens, the reaction occurs immediately, before the cortisone is acting. I have not found parenteral antihistamines of help. The problem of antivenene dosage and therapy is discussed later.

Feeding by gastric tube, preferably "polythene," which is less irritating than rubber, will usually be necessary on account of the trismus and, if present, dysphagia. The fluid and electrolyte balance may need careful watching, note being made of vomit and increased sweating on the output chart. The posture should be frequently changed and antibiotics given to prevent or control infection. Mor-

phine derivatives, on account of their depressive effects on respiration, must not be given. If a sedative is required, a barbiturate or intramuscular paraldehyde is suitable.

If respiratory insufficiency develops it may be due to (1) damage to the respiratory centre by the venom; (2) peripheral paralysis of respiratory muscles; and (3) obstruction of the airway by secretions, food, or vomit. The management of such cases, similar to that of bulbospinal poliomyelitis, toxic polyneuritis (Russell, 1955), and tetanus (Shackleton, 1954), is difficult and complex (Astrup *et al.*, 1954). The patient should be nursed prone, with the foot of the bed raised to drain secretions. Intubation, tracheotomy, and artificial respiration by intermittent positive pressure may all be required, involving intensive team-work between the medical and nursing staff. Cuirass respirators are inefficient and tank respirators have too many disadvantages (Astrup *et al.*, 1954).

Discussion

A great many problems remain to be solved, including various biological features of the sea-snakes, many aspects of the venom (such as yield and toxicity of different species in varying circumstances, rate and route of absorption, rate of fixation, its nature, site, and mode of action, excretion, and fate in the body), the effectiveness of a tourniquet, other local measures, and prolonged artificial respiration; and, most important, the question of specific antivenene. The latter should be effective against all the common species of sea-snakes, and could be combined with hyaluronidase to enable injection at peripheral dispensaries. In some river-mouth villages, active immunization might be the best solution. Detailed discussion of these matters will be postponed until the results of current research are available. At this stage it would seem profitable to consider three problems—namely, the incidence of sea-snake bites, the safety of bathing, and the outcome when people are bitten.

What is the Frequency?

It is generally assumed that sea-snake bites are extremely rare. Certainly, records are scarce. The three main reasons for this are: (1) the timidity of the snake; (2) the victim is usually a fisherman in some remote village: he very rarely comes to responsible medical authorities (Smith, 1926); and (3) for fear of offending the sea-snakes and other reasons, fishermen are reluctant to talk about incidents, especially fatal ones. The casual inquirer would probably be told that none occurred. Although the seas around northern Australia abound with sea-snakes, there are no known instances there of poisoning (Gray, 1930; H. Flecker, 1953, personal communication). Smith (1926) quotes a pearl-fisher who told him divers were often bitten, although symptoms were slight or absent. P. D. G. Pugh (1953, personal communication) was unable to confirm this from the many divers he questioned. In Gato, a small islet of the Philippines, enough sea-snakes breed to maintain a supply of 10,000 skins, at least 1 metre long, a year indefinitely (Herre and Rabor, 1949). Before the war 30,000 were taken each year. Despite this abundance, no cases have been recorded from the vast forces in that area during the second world war (personal communications from the Departments of Navy, Army, Air Force, U.S.A., 1955). Bokma (1941), in Java, found only six fatal cases over 20 years. There is a conspicuous dearth of reports in the Indian medical literature. Reviewing world mortality of snake bite, Swaroop and Grab (1954) produced few facts about sea-snake victims except that fishermen were occasionally bitten.

However, Rogers (1902-3) said that deaths were not rare among oyster fishers along the Madras coast. Peal (1903) was told that three or four fishermen were bitten each year in a fishing village on the Orissa coast and 25% died. Hospital statistics give virtually no help in assessing incidence, because at present the victims rarely go to hospital. An exception is Kuala Perlis, a village of about 1,200 fishermen in northern Malaya, from which 30 cases of sea-snake bite

were admitted in 1953 and 29 in 1954 (A. A. Wahab, 1955, personal communication). Smith (1926), writing of the Gulf of Siam, says, "There is hardly a village that cannot tell you of its fatalities." The preliminary findings of the survey of fishing villages already mentioned fully confirm this statement. Kuala Muda, a river-mouth 60 miles south of Kuala Perlis, has 10-15 cases each year amongst 750 fishermen (two fatal cases in 1954 and 1955).

In eight small villages (averaging 200 fishermen each) around Penang island I have so far personally interviewed the victims or close witnesses in 43 cases (8 fatal) occurring during the last 10 years. For varying reasons this is a considerable underestimate. Villages vary, but sea-snake bite is certainly not rare, especially at river-mouths. I believe that with improved transport, diminishing prejudice against hospitals, etc., many more cases amongst fishermen will come to light, as has already happened in north-west Malaya. This area contains a minute fraction of Asian fishing villages. Unless it is exceptional in the incidence of sea-snake bite (and there seems to be no reason why this should be so), the yearly toll amongst Asian fishing folk must be considerable, the mortality far from negligible.

Is it Safe to Bathe?

Sea-snakes, though very poisonous, are inoffensive and bite only under considerable provocation (Wall, 1909; Smith, 1926; Herre, 1942; Tweedie, 1953). However, two bathers were fatally bitten on the same afternoon in 1954, both ironically enough near "Lover's Isle," a famous beauty spot of Penang and (formerly) a favourite bathing-place. This posed the question, is it safe to bathe along the vast coastline frequented by sea-snakes? Millions must have previously bathed or paddled without harm. The risk is obviously infinitesimal. However, this statistic would be of small solace to a victim and not very reassuring to anxious mothers who are aware of the existence of sea-snakes.

Of 68 cases recorded or personally investigated 15 were bitten (7 fatally) whilst bathing, wading, or paddling for pleasure. Of the remaining 53 victims, 36 (11 fatal cases) were fishermen bitten at work, in 13 the circumstances of the bite (5 fatal) were closely connected with the fishermen's occupation, and 4 non-fishermen were fatally bitten when they grabbed the snake. As the vast majority of victims are fishermen not observed by doctors, these figures mean a little except that a sea-snake bite whilst bathing is a possibility, albeit remote. For the fisherman it is an occupational hazard which many accept with apparent nonchalance, although fully conversant with the implications.

Are there any special factors that make bathing dangerous? Little is known about the breeding habits of sea-snakes, although at such times they are said to be more active and aggressive (Herre, 1942). Many fishermen believe that altered salinity makes them attack people. This theory is supported by the fact that certain villages at larger river-mouths have a much higher incidence of bites, especially among bathers (8 of the 15 cited above were bathing, etc., in a large river-mouth). However, the latter may merely be due to sea-snakes being commoner around river-mouths (Smith, 1926). In captivity there is no doubt about the reluctance of the sea-snake to bite. I have observed a number of different species in glass tanks and have repeatedly tried to goad them into biting a plastic doll, fish, etc., both in the water and on the floor, without any success, provided they are not held. My present opinion is that these bathing cases are unfortunate coincidences, and it is just as safe to bathe now as always. But it would be wise to avoid river-mouths.

The Outcome

The outcome of a bite depends essentially on the amount of venom injected. Only a minority of those bitten develop severe symptoms or die. I have been accidentally bitten twice by sea-snakes, and dogs have been experimentally bitten with little or no evidence of poisoning.

It would thus be difficult to assess the effectiveness of antivenene in human victims. So far it has not proved possible to make specific antivenene, although the problem is being pursued. The mortality in cases of krait-poisoning treated by polyvalent but not specific antivenene is 77.1% in India (Ahuja and Singh, 1954). Similarly, polyvalent antiserum is not likely to be effective in sea-snake poisoning except in large amounts (preliminary findings suggest that antivenene with a krait fraction has limited neutralizing power against sea-snake venom). Little progress seems to have been made during the last 30 years in refining and concentrating antivenenes. Discussing this problem in 1921, Acton and Knowles pointed out that, for a "large" bite, over 700 ml. of antivenene would be required within a quarter of an hour. Polyvalent antivenenes available to-day are feeble affairs, 1 ml. neutralizing less than 1 mg. of venom. Specific antivenenes are not much more potent.

Theoretically, to counteract a "large" bite from the commoner venomous snakes an enormous dose of antivenene would still be necessary. As with diphtheria, the sooner the antiserum is circulating the more effective it is likely to be. Dividing and delaying the dose, as is often done, is irrational; but a pint (570 ml.) of antivenene by rapid intravenous drip would probably kill the patient. Even with 10 ml., reactions have often been very severe despite cortisone, etc. One is therefore reluctant to "push" intravenous polyvalent antivenene dosage. Subcutaneous injection with hyaluronidase may solve this problem when a specific antiserum becomes available. It will then be more important to decide whether the victim has received a "large" bite or not. Points indicating this are: (1) the snake has been seen to be fat—for example, thicker than a man's thumb; (2) fang marks more than 10 mm. apart; (3) rapid involvement of poisoning symptoms—for example, several features within half an hour; and (4) haemoglobinuria and failing vision. With one or more of these criteria, admittedly far from infallible, a large dose of antivenene would be indicated.

Experimentally, Rogers (1902-3) noted a similarity to tetanus toxin, which Wright (1954) found to be rapidly fixed to cells of guinea-pig brain stems. More than half the dose injected was fixed within two hours. Presumably sea-snake neurotoxin reaches the brain stem much more quickly than tetanus toxin. If a lethal dose is injected and fixed like tetanus toxin the outlook would appear to be grim. However, Richards (1873) kept his dog alive for over 24 hours by artificial respiration. Using similar methods, Lassen (1953) reduced the mortality of bulbospinal poliomyelitis from 94% to less than 40%, and Shackleton (1954) showed that cases of tetanus hitherto deemed inevitably fatal could be saved. As permanent after-effects of sea-snake poisoning are unknown, severe effects are usually short-lived, and there is experimental evidence that venom is excreted in the urine, it is possible that modern methods of artificial respiration by intermittent positive pressure will save many severe cases. With a specific antivenene the mortality should be even further reduced.

Summary

The clinical picture, diagnosis, and treatment of sea-snake poisoning are outlined.

Further problems are mentioned. The incidence and outcome of sea-snake bites and the safety of bathing are discussed. Cases amongst bathers occur, but are extremely rare except in river-mouths. In contrast, the incidence in fishermen and their kin is much higher than the scanty literature would indicate. A specific antivenene, adequately concentrated and refined, is urgently needed for these cases.

I wish to thank Mr. M. W. F. Tweedie, Raffles Museum, Singapore, for his help and advice, especially on the classification of snakes; Dr. H. W. Parker, British Museum, and the Librarian; Royal Society of Medicine, for their help with the literature; Mr. C. J. Sundram for the photographs; Dr. K. J. Lim for help on numerous aspects; the Director of Fisheries, Federation

of Malaya, for information about fishing villages; and the Director of Medical Services, Federation of Malaya, for permission to publish.

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OBSTETRIC INDICATIONS FOR THE USE OF PUDENDAL NERVE BLOCK ANALGESIA

BY

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The problem of anaesthesia during the second stage of labour is complicated by the fact that the safety of both mother and foetus has to be considered. Anaesthesia often has to be induced in an unprepared patient in whom the foetus is showing signs of distress.

The technique of pudendal nerve block is simple and safe, and it avoids many of the dangers and difficulties of inhalation, extradural, and spinal anaesthesia. It produces analgesia of the lower vagina, the vulva, a varying area of surrounding skin, and some relaxation of the pelvic floor. Excluding those patients who are mentally unsuited for local analgesic techniques, safe and reliable analgesia can be produced for a number of obstetric manoeuvres with a minimum risk to the mother and her yet unborn infant.

Anaesthetic Mortality and Morbidity

The present low maternal death rate due to anaesthesia should not lead to complacency, as there are fewer greater tragedies to a family than the loss of its mother. Inhalation anaesthesia is the most common form of anaesthesia used during the second stage of labour. Its complications are the inhalation of vomit or regurgitated stomach contents, depression of the foetal respiratory centre, and relaxation of the uterus leading to post-partum haemorrhage. Spinal and extradural techniques need even more specialized experience, and there is always the risk of infection and permanent spinal cord or nerve damage. Both of these techniques produce varying degrees of hypotension.

Inhalation of vomit has been reported as a cause of death by many workers, and consideration must be paid to the asthmatic type of aspiration pneumonia caused by

the inhalation of acid stomach contents. Mendelson (1946) described 60 cases giving rise to two fatalities; these occurred among 44,016 cases.

The following authors have also described deaths due to aspiration of stomach contents. The incidence is higher than in prepared surgical cases, but often anaesthesia in obstetric practice is administered as an emergency, and it is well known that the emptying time of the stomach in women in labour is delayed. Eastman (1941) reported 51 deaths; an incidence of 1 in 40,000 anaesthetics. Dieckmann (1945) reported 45 cases in 46,000 deliveries (2 deaths; an incidence of 1 in 23,000 anaesthetics). Gilliatt (1949), reviewing the causes of death among 55 patients, found that 3 were due to inhalation of vomit; an incidence of 1 in 11,382 anaesthetics. Merrill and Hingson (1951) reported 59 deaths; an incidence of 1 in 44,135 anaesthetics. Parker (1954) reported 5 deaths; an incidence of 1 in 3,708 anaesthetics. Hall (1940) and Willcox (1949) have also reported five and two deaths respectively.

The variation between the British and American figures is explained by the more frequent use of general anaesthesia during the second stage of labour in American hospitals.

Local analgesics rarely give rise to death, and when death does occur the following factors are usually involved: (1) large amounts of agent, (2) intravenous injection, and (3) idiosyncrasy. The first two factors are controllable and preventable; the third can be minimized by interrogation about previous idiosyncrasy, and the symptoms can be controlled by the administration of a rapidly acting barbiturate. Idiosyncrasy is very rare.

The toxic effects of lignocaine have been discussed in the correspondence columns of the *British Medical Journal* (1955). There is no doubt that lignocaine can be dangerous, but not if the maximum dosage is kept well below 1 g. in a single dose. Many of the cases mentioned as having had toxic reactions have one thing in common—namely, that 2% lignocaine had been used. Lock and Greiss (1955) report a death following the injection of 40 ml. of 2% lignocaine for pudendal nerve block in a secundipara with mitral stenosis. She died seven minutes after the injection. Dutton (1955) reports a case in which convulsions occurred after 80 ml. of 1% lignocaine had been used. Therefore safety lies in weak solutions of lignocaine, used in the minimum quantity necessary for effective analgesia.

The Pudendal Nerve and its Branches

The pudendal nerve arises from the second, third, and fourth anterior sacral trunks, which form a single trunk 0.5 to 1 cm. proximal to the ischial spine. The nerve trunk courses through the greater sciatic foramen inferior to the piriformis muscle, passing posterior to the ischial spine—between the sacrospinous ligament anteriorly and the sacrotuberous ligament posteriorly. As the nerve passes the inferior tip of the ischial spine it enters the pudendal canal. The nerve lies medial to the pudendal vessels. It divides into three main branches: the inferior haemorrhoidal nerve; the dorsal nerve of the clitoris, and the perineal nerve.

Inferior Haemorrhoidal Nerve.—Klink (1953) in a series of 85 dissections found that in 50% of cases this nerve did not arise from the pudendal nerve but as a separate branch from the fourth anterior sacral primary ramus. In these cases the nerve did not lie in the pudendal canal but passed through the sacrospinous ligament 0.5 to 1 cm. inferomedial to the pudendal nerve. This nerve supplies the mucosa of the lower part of the anal canal, the external anal sphincter, and the skin anterior and lateral to the anus.

The dorsal nerve of the clitoris runs between the layers of the urogenital diaphragm, terminating in the filaments supplying the clitoris.

The perineal nerve arises above the inferior border of the ischial tuberosity and divides into superficial and deep branches. The former constitutes the main nerve supply of the superficial structures of the vulva and perineum, and also anastomoses with the perineal branches of the posterior

femoral cutaneous nerve of the thigh. The latter are the source of supply to the deep muscles and fasciae of the perineum.

The ilio-inguinal nerve also send branches to the mons pubis and the labia majora.

Effect of Pudendal Nerve Block

Klink (1953) studied the effect of this nerve block on the sensation of touch, pin-prick, and haemostat pinch in the vagina. He found that whereas 10% of patients felt pin-prick and 50% felt haemostat pinch in the lower part of the vagina, a nerve block abolished response in this area and in the surrounding skin.

It is therefore possible by careful technique to obtain satisfactory skin anaesthesia and relaxation by blocking the main pudendal nerve and skin infiltration to exclude branches from the ilio-inguinal nerve and perineal branches from the posterior femoral cutaneous nerve. In those cases where the levator ani receives its main supply direct from S. 4 relaxation may be poor.

Technique

The skin infiltration is begun at a point midway between the anus and the ischial tuberosity, using a fine needle. The nerve block and skin infiltration is then performed, using a 5-in. (12.5-cm.) needle, though a 3-in. (7.5-cm.) needle is often long enough to reach the ischial spine.

The main procedure is the pudendal nerve block, and aspiration must be performed before injection of the analgesic solution in order to make certain that the point of the needle is not in the lumen of a pudendal vessel.

Skin infiltration of the vulva is performed to produce a terminal block of any nerve filament arising from the ilio-inguinal nerve. A further injection into the deep tissues of the perineum and the levatores ani ensures analgesia in those cases where the inferior haemorrhoidal nerve arises as a separate branch from S. 4. An alternative is to inject 5 ml. of analgesic solution just medial to the ischial spine. The greatest technical difficulties arise in obese patients and when the presenting part is at the outlet, making palpation of the ischial spine less easy.

The purpose of the nerve block is explained to the patient and she is warned that only pain will be relieved, but that she will still be able to appreciate the sensation of pressure. Inhalation of gas and air or trichlorethylene is continued if necessary to relieve the discomfort of uterine contractions. As with all local analgesic techniques, patience and gentleness are required to achieve the patient's co-operation. Usually the interest of the mother to see the birth of her baby makes eye-shielding unnecessary.

The Investigation

The present series consists of 57 patients (38 primigravidae and 19 multigravidae) in whom pudendal block was carried out. An analysis of the group is given in the accompanying Table.

Analysis of Series	
Total number of cases	57
Number of forceps deliveries	24
Stillbirths	2
Assisted breech delivery in multiple pregnancies	6
Forceps delivery in multiple pregnancies	5
Spontaneous vertex deliveries	7
Stillbirths	1
Number of infants delivered under pudendal block analgesia	51
Number of stillbirths	3

Of the three stillbirths one was a spontaneous delivery of the second twin, the second was a forceps delivery for foetal distress in a case of mitral stenosis, and the third was a forceps delivery of the leading twin because the foetal heart could suddenly not be heard.

Post-mortem examination in the last-mentioned case revealed no evidence of cerebral haemorrhage other than the petechial haemorrhages associated with foetal anoxia.

Drugs

A mixture containing 1% procaine or 1% lignocaine, 1 in 100,000 adrenaline, and 1,000 units of hyaluronidase was used. The first 19 cases had procaine blocks, and in the remainder lignocaine was employed. To 50 ml. of analgesic solution was added 0.5 ml. of 1 in 1,000 adrenaline. These volumes were chosen to eliminate the risk of a miscalculation of the adrenaline concentration. Then 1,000 units of hyaluronidase was added to the solution. It was found that by using freshly made solutions of procaine or lignocaine in saline which did not contain chlorocresol (usually added to maintain sterility) the sensation of stinging directly after the injection was relieved. A total of 30 to 40 ml. of solution was used. Many papers have been written on the use of hyaluronidase as an adjunct in nerve-block analgesia, and the use of adrenaline to prolong the duration of analgesia is well recognized.

Douglas and Vosburgh (1951) tested concentrations of 1% and 2% procaine with and without the addition of hyaluronidase and adrenaline. They got the best effect from using 60 ml. of 1% procaine with hyaluronidase and adrenaline. With procaine and hyaluronidase, the delay before the onset of analgesia was only one to two minutes, but the duration of analgesia averaged only 32 minutes. With the addition of adrenaline (1 in 240,000) the delay averaged five minutes and analgesia lasted about 80 minutes.

In the present series of cases the following points were observed: (1) A five-minute delay occurred before the onset of analgesia, using 1% procaine plus adrenaline. (2) With the use of lignocaine and adrenaline the average delay was only one to two minutes, and an episiotomy could be performed without distress to the patient within that time. (3) The duration of analgesia was not timed, but was at least an hour. On several occasions a few millilitres of solution had to be injected before the superficial skin sutures were inserted. (4) Supplementary inhalation anaesthesia was used in three cases.

Indications

Normal Labour

This group comprised five cases of spontaneous delivery, all in primigravidae. Pudendal nerve block was performed because the duration of the second stage had exceeded one hour and only slow progress was being made. This effectively abolished the discomfort caused by stretching of the soft parts, and spontaneous delivery was accomplished with the aid of an episiotomy. Abolition of the perineal reflex meant that the expulsive efforts of the mother had to be directed for about a quarter of an hour, after which time expulsive effort recurred spontaneously.

Foetal Distress

In this group there were 11 cases of forceps delivery (seven primigravidae) and one stillbirth. The advantages of this form of analgesia are mainly that it allows the administration of pure oxygen to the mother while delivery is in progress, and the foetal respiratory centre is not depressed.

A block can be performed in two minutes and the forceps applied within five minutes of beginning the injection. This is equally as quick as induction and stabilization of anaesthesia with nitrous oxide, oxygen, and ether. Another merit is that there is no delay until the arrival of an anaesthetist.

The one stillbirth was in a patient with mitral stenosis. Oxygen was given by a B.L.B. mask during delivery.

In one case a transverse position of the head was easily corrected.

Delay in the Second Stage of Labour

The 13 patients, including 10 primigravidae, in this group had low forceps extractions because of failure to make steady progress. They comprised two cases of previous caesarean section (one patient also had heart disease); two cases of pulmonary tuberculosis (one bilateral artificial pneumothorax, and one tuberculous pleural effusion in early

pregnancy); eight cases in which the main indication was a second stage of labour prolonged for two hours—there were five primigravidae over the age of 30 among them; and one case of deep transverse arrest: the position of the vertex in this case was thought to be anterior until more adequate examination, after the nerve block had been performed, showed the true position. Kielland's forceps were applied and a forceps rotation and extraction was performed without distress to the mother. Unless rotation can be done without difficulty pudendal nerve block analgesia is not suitable for manoeuvres such as forceps rotation and extraction. Traction was performed at the time of uterine contractions.

Previous Caesarean Section.—Routine forceps delivery is advocated only when there has been no previous vaginal delivery. In this type of patient the second stage of labour may be prolonged, and it is felt that once the cervix is fully dilated no further prolonged strain should be placed on the uterine scar. In the case of patients who have had previous vaginal deliveries forceps delivery is indicated if the second stage of labour has lasted over half an hour.

Maternal Disease.—In cases of chest disease, heart disease, protruded intervertebral disk, etc., especially in primigravidae, forceps extraction under pudendal nerve block analgesia is a safe method of reducing the strain of the second stage of labour.

Assisted Breech Delivery

The nine patients in this group included six primigravidae. In an assisted breech delivery anaesthesia or analgesia is required during delivery of the arms and the head. Induction of anaesthesia with thiopentone, nitrous oxide, oxygen, and divinyl ether (Law and Ransom, 1954) or "neothyl" (methyl-n-propyl ether) combines the dangers of general anaesthesia with delay before anaesthesia is stabilized. Pudendal nerve block can be performed when the breech is on the perineum, and analgesia is sufficient to allow the performance of an episiotomy, Løvset's manoeuvre, and controlled extraction of the foetal head.

In four cases forceps were applied for delivery of the after-coming head.

The time for induction of the nerve block is when delivery of the buttocks is anticipated. Otherwise loss of the perineal reflex produces a time-lag of about 15 minutes before spontaneous expulsive efforts become re-established.

This technique allows a gentle unhurried and controlled delivery of the head without any danger of maternal anoxia. Oxygen can also be administered to the mother, so allowing good oxygenation of the infant during delivery.

Multiple Pregnancy

This group comprised five cases of twins and one case of triplets. Four of the mothers were primigravidae. There were two stillbirths.

The indications for pudendal nerve block fall into two categories: (a) when the breech is presenting; and (b) when forceps delivery of the leading presenting vertex is indicated: in these cases the urgency for extraction of the second twin because of general anaesthesia is removed. One is always loath to have to reintroduce anaesthesia.

* Among the 13 infants in this group there were six assisted breech deliveries; two spontaneous vertex deliveries (one stillborn) and five forceps deliveries—the indication in four cases was foetal distress.

Repair of Severe Lacerations

Pudendal nerve block was carried out for third-degree tears in four cases; repair of recto-vaginal fistula in three cases, and secondary suture of perineum in three cases.

The advantage of this form of analgesia is that immediate repair of third-degree tears is possible, and the same applies to the repair of the recto-vaginal fistulae of small dimensions immediately after delivery.

Secondary suture can also be satisfactorily performed, but gross perineal infection is an absolute contraindication.

Failures

There were three failures in this series. Case 1: twin pregnancy; foetal distress. After nerve block the vertex was found to be in the occipito-posterior position and general anaesthesia was induced. Forceps rotation and extraction was carried out. Case 2: Bronchiectasis; cyanosis in labour relieved by oxygen therapy. Re-examination revealed an occipito-posterior position and posterior lip of cervix. Continuous caudal analgesia given, and manual rotation and forceps delivery performed at full dilatation of the cervix. Case 3: Breech presentation with extended legs. Breech extraction performed under deep ether anaesthesia because of delay in delivery of the buttocks.

Complications

Bruising.—In six patients vulval bruising occurred after infiltration with analgesic solution. Severe varicose veins of the vulva are a contraindication to the use of this type of analgesia.

Haematoma Formation.—In two patients an ischio-rectal haematoma was formed. This was found on vaginal examination because the patient complained of unilateral perineal pain. In neither case was there any rise in the temperature, and no special treatment was required.

Oedema of the Vulva and Perineum.—Three patients had severe oedema, arising about six hours after delivery. By raising the foot of the bed the oedema resolved in about 12 to 24 hours. An injection of hyaluronidase might be a useful adjunct to this treatment.

Perineal Sepsis.—There were no cases of infection of the perineum, and all the episiotomies performed under pudendal nerve block analgesia healed by first intention.

Advantages

(1) The fatality described is the only one I have found reported in the literature associated with pudendal nerve block. (2) There are no pulmonary complications directly attributable to the procedure. (3) The technique is relatively simple and may be used in a home as well as in a hospital. (4) There are no ill effects on such vital sites as the liver, lungs, cardiovascular system, or kidneys. (5) There is no interference with the action of the uterus, the anterior abdominal wall, or the respiratory system. (6) The risk of asphyxia of the child, such as may occur after the use of inhalation anaesthesia, is absent. (7) The tissues must be handled gently, and there is seldom need for brutal hurry. (8) There is a reduction of bleeding from the episiotomy.

Disadvantages

(1) A needle may break during an injection, but since a needle nearly always breaks near the hub a long needle is advised. (2) Intravenous injection. Aspiration should always be performed before injection, and injection should be carried out slowly. (3) Idiosyncrasy to procaine or lignocaine. Fortunately this is rare. (4) Local complications such as bruising and oedema.

Contraindications

(1) When intrauterine manipulations are required. (2) Vulval sepsis, oedema, or varicose veins. (3) For correction of malposition of the presenting part unless this is very easy to perform. (4) In highly strung nervous patients.

Summary

A series of 57 patients (38 primigravidae and 19 multi-gravidae) in whom pudendal nerve block was performed is reported.

Pudendal nerve block was found to give safe and effective analgesia for the performance of low forceps delivery, for assistance in breech delivery, for the repair of severe lacerations, for the management of certain types of multiple pregnancy, and as a method of anaesthesia

for cases of lung and heart disease. It is also a useful technique in the management of the second stage of labour in primigravidae.

The risk of aspiration pneumonia is obviated, and for this reason the technique can help to reduce mortality and morbidity.

There were no foetal deaths that could be attributed to the anaesthetic used.

It is suggested that this is a simpler form of analgesia than caudal and spinal analgesia, and one which allows for full oxygenation of the mother and the foetus.

The maternal complications were comparatively slight and the length of stay in hospital was not increased, though 9 out of the 57 patients had oedema, bruising, or haematoma formation.

In three cases another form of anaesthesia was given in order to accomplish a technically more difficult delivery.

My thanks are due to Miss Janet Bottomley and Mr. Oswald Lloyd for their permission to perform the pudendal nerve blocks and to report the results.

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FLUID CONTENT OF THE NUCLEUS PULPOSUS AS A FACTOR IN THE DISK SYNDROME

FURTHER OBSERVATIONS

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The possibility that the hydrophilic property of the nucleus pulposus of the intervertebral disk has some bearing upon the development and symptomatology of low back pain, sciatica, brachial neuritis, and disk prolapse was suggested by Charnley (1952) and by us (Naylor, 1951; Naylor and Smare, 1953). The swelling of the nucleus due to an increased fluid content is thought to cause increased internal pressure within the disk, thus stretching the annulus fibrosus and stimulating the nerve-endings contained therein. Whilst the adult intervertebral disk has a poor blood supply, a considerable fluid interchange can occur, as shown by the rapid absorption of 35% diodrast when used in disk nucleography (Cloward and Buzaid, 1952). Charnley further showed that the absorption of fluid by the isolated nucleus could result in considerable pressure being developed when the nucleus was contained in a plethysmograph.

These results were obtained with nuclear material which was (a) removed from the disk, the annulus being disregarded; and (b) was not maintained at constant volume.

A preliminary investigation was carried out by two of us (Naylor and Smare, 1953) to discover whether the nucleus contained within a lumbar disk could absorb enough fluid to develop a high intra-disk pressure that might account for the symptoms associated with disk lesions. Isolated cadaveric disks, from subjects of varying ages, were immersed in water or isotonic saline solution and the pressure developed within the disk was recorded by means of a mercury manometer. Pressures of between 8 and 300 cm. mercury (1.5–58.1 lb. per square inch) were obtained from young subjects, but no pressures were recorded in disks from aged subjects in whom advanced degeneration was found to be present. A more comprehensive survey has now been made on disks from subjects in the age range 19–87 years, using the apparatus described below.

Apparatus

A diagram of the apparatus is shown in Fig. 1. A standard Bourdon gauge type pressure indicator A, reading up to a maximum of 60 lb. per square inch (4.2 kg. per square cm.), was connected to a copper tube B, of $\frac{1}{2}$ in. (1.3 cm.) internal diameter. Tube E, a glass capillary about 8 in. (20 cm.) long and 1 mm. internal bore, was attached by pressure-tight joints to B and to a 20-gauge serum needle F. A metallic bellows, C, closed at one end, was connected to tube B and could be compressed by means of screw D. The whole apparatus above point X was filled with water, while below this point there was an unbroken column of mercury as far as the tip of the serum needle. The mercury-water interface was arranged to be about halfway along the glass capillary, and consequently was always visible.

When used the needle was inserted through the annulus fibrosus of the disk into the nucleus pulposus. On absorption of fluid by the nucleus, expansion of the latter forced mercury up the serum needle. The bellows, C, was compressed until the mercury meniscus returned to its original position. The pressure recorded by the gauge was thus the pressure developed in the nucleus. An indicator (not shown in Fig. 1) was used to enable the mercury meniscus to be adjusted with precision.

Experimental Procedure

Fresh lumbar disks, usually in sets of five (L1–2, L2–3, L3–4, L4–5, L5–S1), were obtained from necropsy subjects with a plate of bone on each side (about $\frac{1}{4}$ in. (6 mm.) thick, this being essential for maintaining the nucleus under conditions corresponding as far as possible with those *in vivo*). Forces generated by the increase in volume of the nucleus will consequently result in a slight increase in the circumference of the annulus fibrosus and not in a bulging of the bone end-plates. The annulus of the disk under test was pierced by a hollow needle of the same gauge as that used in the apparatus, and the needle attached to the apparatus inserted along the track made. This minimized the risk of blockage of the needle by tissue. Each disk was then totally immersed in distilled water contained in a Petri dish.

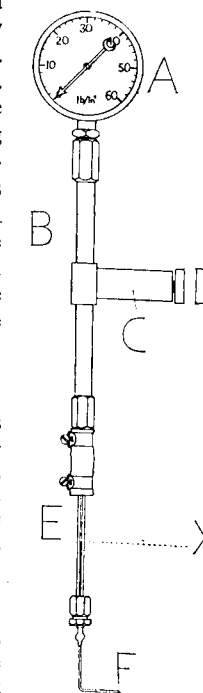


FIG. 1.—Diagram of apparatus (see text).

By means of this procedure, pressure readings were taken at intervals of about three hours over a period of up to 48 hours. The Petri dishes were immersed in a temperature-controlled water bath, enabling all experiments to be carried out with disks maintained at a temperature of 22° C.

Results

Some 137 disks from 29 subjects (both male and female) aged from 19 to 87 years were examined on the apparatus. The largest number was in the age group 41-60 years; unfortunately, fewer specimens below 41 years were available. Fig. 2 shows the results obtained. In 30 disks no

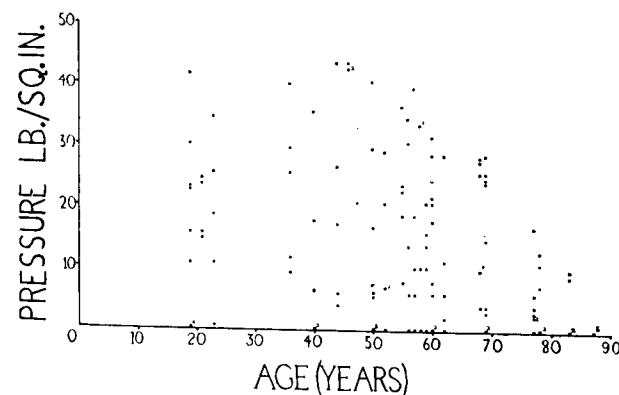


FIG. 2.—Scattergram of pressure recorded in 107 cases.

pressure was recorded, final pressures of between 0.5 and 42 lb. per square inch (0.04 and 3 kg. per square cm.) being recorded by the other 107. The numbers of disks (expressed as a percentage) developing a given pressure for the age groups considered—namely, 19-40 years (29 disks), 41-60 years (59 disks), 61-90 years (49 disks)—were plotted on histograms (Fig. 3).

The following features were noted: (1) The wide variation in pressure recorded not only with age but also by disks from any one subject. (2) The relatively large percentage of disks recording pressures of 30-45 lb. per square inch (2.1-3.16 kg. per square cm.) in the age group 41-60 years. This feature may also be characteristic of the age group 19-40 years, but lack of data precludes any certainty. (3) The relatively low pressures developed in subjects over 60 years of age. (The above features can also be inferred from Fig. 2.)

The rate of pressure increase varied considerably for each individual disk. No consistent correlation between age and rate of pressure increase was apparent.

At the end of each set of experiments the disks were removed and sectioned with a view to attempting to correlate the pressure developed with the conditions prevailing in each nucleus. As expected, degeneration (as measured by increased hardness and discoloration from white to brown or grey) and an increased number of cavities, usually filled with mercury, appeared frequently in aged subjects. On inserting a serum needle into a disk the mercury has been observed to fall, indicating cavities of up to 0.1 ml. in volume in the proximity of the needle-tip. This is consistent with the demonstration of cavities by means of nucleography (Lindblom, 1950; Erlacher, 1952).

Discussion

The hydrophilic properties of isolated nuclear material may be explained by a process regulated by two opposing factors—namely, (a) osmotic pressure differences between the protein gel and surrounding medium, this being duly influenced by the mucopolysaccharide content; and (b) the cohesive forces of the tissue. Equilibrium is established when these forces are equal and opposite.

Sylvén *et al.* (1952) have shown that more hydrophilic groups of mucopolysaccharide become attached to the collagen molecule with advancing age of the nucleus, and this may result in decreased water-binding capacity. The precipitation of large orientated collagen fibres and possibly of elastin (Happey, Horton, and Naylor, 1956) will decrease the gel concentration within the nucleus. Both the above-

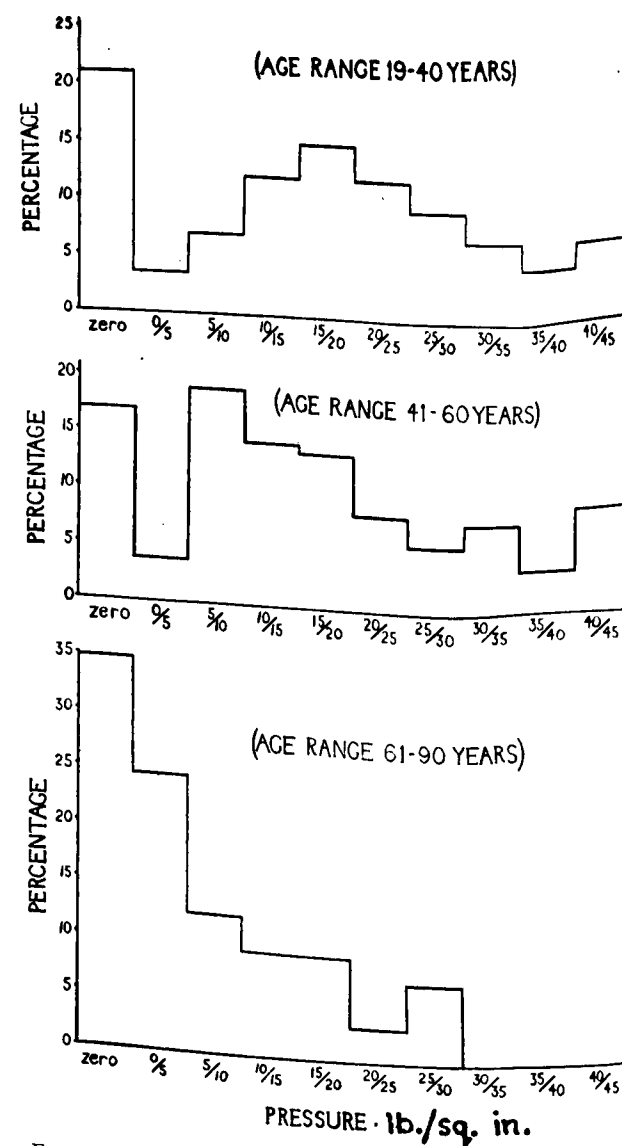


FIG. 3.—Percentage of disks developing a given pressure, arranged according to age groups.

mentioned factors should lead to a decrease in the swelling and water uptake of the nucleus with advancing age. This is in agreement with the observations of Göcke (1932).

In our experiments concerning the increase in pressure in the nucleus pulposus, the nucleus has been confined within the annulus fibrosus. This represents a close approach to conditions appertaining *in vivo*.

It is suggested that the pressure developed in the nucleus pulposus in this state may be affected by the following factors: (1) the amount of hydrophilic mucopolysaccharide material; (2) the concentration of protein gel in the nucleus; (3) the presence of cavities of differing size in the nuclei pulposi, which occur more often in disks from aged subjects; and (4) variations in the elasticity of the annulus fibrosus. Experimental evidence (Happey, Horton, and Naylor, 1956)

has been obtained which indicates that the elasticity of the annulus fibrosus may vary with its position in the disk, and, furthermore, the elasticity may be different for each individual disk.

The differences in mucopolysaccharide content occurring in the nuclei of disks from any given subject are probably insufficient to account for the large differences in pressure encountered within such disks. It is suggested that the controlling factor may be the variations in the osmotic pressure due to differences in gel concentration within each nucleus pulposus. Any decrease in concentration resulting from increased precipitation of collagen would automatically reduce the water uptake and hence decrease the pressure developed. The implications are the development of a high pressure in one disk together with the action of body weight and muscle action, which may be sufficient to cause herniation in this disk but not in another. In this connexion it should be noted that local variations in the precipitation of protein within a nucleus occur in, and after, the fourth decade. On the basis of the above argument, this may lead to differences in pressure within the nucleus when immersed in aqueous solutions.

The observations of Göcke (1932) on isolated nuclei are in agreement with our observations on nuclei surrounded by an annulus—namely, that water uptake and therefore pressure decrease with advancing age. This may be readily explained, since the frequency of occurrence of cavities and decreased number of free polar mucopolysaccharide groups augmented by the increased gel concentration will tend to lower the pressure developed in aged subjects. Disks from subjects in the age group 20-55 years develop a high intradisk pressure, after which the pressure progressively decreases with age (Figs. 2 and 3). This observation may afford some explanation of the well-known fact that not only is disk prolapse more common before the age of 50 years than after and rare after 60, but that attacks in a patient become less frequent with advancing age, since the decreasing pressure developed should make excessive stress on the annulus less likely.

A considerable number of disks in all age groups failed to record a pressure. This may result from the appearance of cavities due to removal of the forces of compression from the disk (these cavities should be distinguished from those due to chemical changes). There is no apparent correlation between the presence of these cavities and the development of small or zero pressures, for disks with large cavities do occasionally record considerable pressures.

Summary

Further extended measurements on the intradisk pressure developed on immersion in distilled water have been made, using large numbers of disks. Though disks from the same subject were found to generate widely differing pressure, there is a general trend towards a lower pressure with increasing age. The possible causes of such behaviour are discussed.

One of us (W. G. H.) is indebted to the Bradford Education Authority and the Bradford "A" Group Hospital Management Committee for a joint scholarship to carry out this work.

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NEPHROSIS TREATED WITH INTRAVENOUS T.A.B.

BY

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In the search for effective treatment for nephrosis—Type II nephritis of Ellis (1942)—the observation that infection might be associated with remission (Aldrich, 1926; Ball and Evans, 1932) led to the use of measles by Janeway and Hutchings (1947) and of malaria by Gairdner (1952) and Byrne (1952), the last of whom related the success of this form of treatment with the irregular remissions produced by corticotrophin (A.C.T.H.) (Barnett *et al.*, 1950; Riley, 1950).

Intravenous T.A.B. vaccine, a simple and well-known means of producing pyrexia, was used in the case reported here, and it regularly brought about a diuresis. The better-controlled production of pyrexia so induced allowed study of the mechanism involved. Below we give our observations on the diuresis, albuminuria, plasma proteins, plasma cholesterol, and the 17-ketosteroid excretion.

Case Report

A woman aged 53 noticed ankle oedema in September, 1951, which rapidly extended. Treatment at another hospital in April, 1952, with mercurial diuretics (mersalyl), plasma transfusion, urea, and a high-protein/low-salt diet, had not been beneficial, and Southey's tubes had been used. Two weeks after her discharge oedema recurred, and this steadily progressed in spite of mersalyl and urea. She had been bedridden for some weeks before admission. There was no previous history of acute nephritis.

On admission in December, 1952, she had gross generalized oedema, with pleural effusions and ascites, and the knees could not be flexed to the slightest degree. The blood pressure was 140/70. The fundi were normal. The thyroid was firm, with slight generalized enlargement, but there was no clinical evidence of toxicity or myxoedema. No other abnormality was detected.

Her urine contained albumin (Esbach, 20 g. per litre), but there was no other significant abnormality. Blood urea was 30 mg. per 100 ml.; plasma albumin, 2 g. per 100 ml.; plasma globulin, 1.5 g. per 100 ml.; plasma cholesterol, 680 mg. per 100 ml.

A low-salt/high-protein diet and unrestricted fluids were given throughout the period of observation, and fluid balance and Esbach estimations were recorded daily. The patient was at rest in bed for the first 12 weeks.

After observation for several weeks, during which mersalyl failed to produce a diuresis, intravenous T.A.B. therapy was started. The 24-hour fluid intake varied between 0.9 and 1.2 litres, and the 24-hour urinary output between 0.3 and 0.7 litre during this control period.

T.A.B. vaccine, containing 2,000 million organisms per ml., was used. The dose required was diluted to 1 ml. with sterile normal saline. Doses of 200-300 million organisms produced moderate fever (maximum temperature 102° F.—38.9° C.) and a generalized reaction (vomiting, backache) lasting up to 24 hours. Smaller doses had no appreciable effect. Five out of six injections in this dose range produced a successful response.

Five individual periods of diuresis have been studied. Some of the features of the response during two of the periods (second and third) are shown in the Chart. The data for the whole group are described below.

Diuresis.—Relative oliguria occurred on the day of injection. Diuresis followed in 24–36 hours and became manifest by a sudden large nocturnal output. The duration of the response was from 7 to 10 days, but lasted 35 days on the solitary occasion when a second injection was given during a successful response. The termination of the

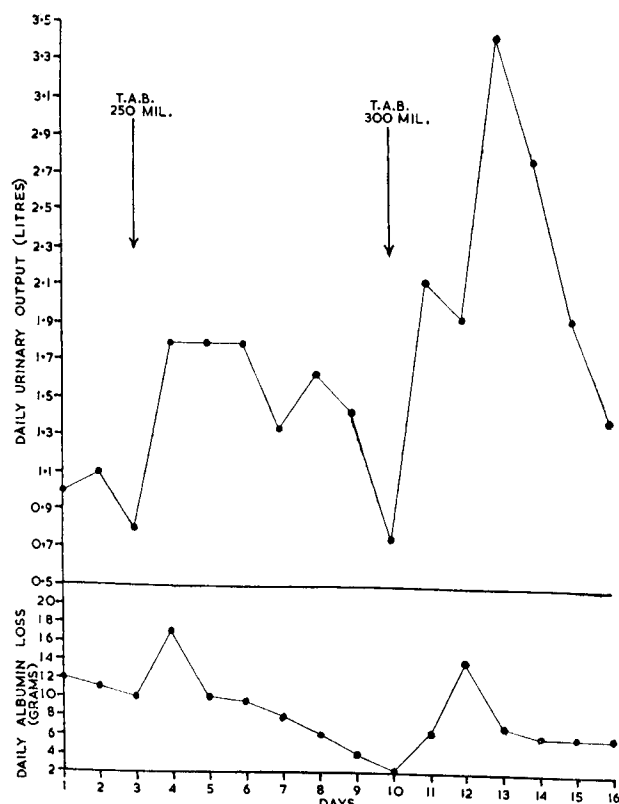


Chart showing part of day-to-day reactions to T.A.B.

response, recognized by a rise in urinary albumin to more than 10 g. per litre and by a fall in urinary output below 1.2 litres, was also a sudden event. The average daily urinary output for the five periods was 1.8, 1.5, 2.2, 1.8, and 1.3 litres. Fluid intake remained between 0.9 and 1.2 litres. The net fluid loss for the whole of the five periods was 29.9 litres. A weight loss of approximately 40 lb. (18 kg.) was recorded.

Albumin Loss.—At the onset of diuresis the total urinary loss of albumin increased (see Chart). This was followed after 48 hours by a decrease in total albumin loss. Compared with an initial average loss of 12 g./24 hours, the average 24-hour losses during the five periods of treatment were 1.5, 7.1, 8.0, 6.5, and 4.7.

Plasma Proteins.—Determinations of plasma albumin and globulin were made at the onset and termination of three of the periods of diuresis. At the onset of diuresis these values were albumin 1.4, 1.7, and 1.6 g. per 100 ml., and globulin 1.6, 1.8, and 2.6 g. per 100 ml.; and at the termination of diuresis, albumin 3.2, 2.4, and 1.4 g. per 100 ml., and globulin 1.3, 2.1, and 1.6 g. per 100 ml. On the solitary occasion when diuresis continued for 35 days the plasma proteins at the end of this period were albumin 1.6 g. and globulin 2.9 g. per 100 ml. It can be seen that the diuresis was independent of plasma protein concentration.

Plasma Cholesterol.—Estimations of plasma cholesterol were similarly made at the onset and termination of two periods of diuresis. These values were 474 and 642 mg. per

100 ml. at the onset, and 672 and 696 mg. per 100 ml. at the termination. During the diuresis lasting 35 days 920 and 938 mg. per 100 ml. were recorded on the 21st and 35th days respectively.

17-Ketosteroids.—The 24-hour urinary excretion of 17-ketosteroids was measured at random intervals during the periods of diuresis. Values of 1.3 and 2.9 mg. per 24 hours were obtained at the onset of diuresis, 2.2 mg. 48 hours after the onset of diuresis, and 1.9 and 3.1 mg. on the 14th and 35th days in the case of the long-continued diuresis.

Discussion

Intravenous T.A.B. vaccine had a definite diuretic action in this case of nephrosis. The previous unrelenting course of the disease and the fact that individual large diureses occurred within a constant interval after T.A.B. would eliminate the occurrence of spontaneous remission.

The mechanism of the diuresis has been shown to be independent of plasma protein concentration, although secondary conservation of albumin occurs and cannot easily be explained by the three known mechanisms of producing a diuresis in nephrosis—namely, increase in plasma osmotic pressure, osmotic diuresis, and increased renal loss of sodium.

The action of pyrogens upon renal blood flow (Smith, 1951) is to induce an initial short period of ischaemia, followed by hyperaemia lasting four hours or more and reaching values of 30–60% above normal. There is, however, no change in filtration rate, and these transitory changes cannot be held to be responsible for the continued diuresis.

It has been shown by Slessor (1951) that hormones of the cortisone type may be concerned with the inactivation of the antidiuretic hormone. In the light of this work it is here suggested that the diuresis occurring during fever therapy for nephrosis might be due to increased corticoid output inactivating antidiuretic hormone, thus causing a primary water diuresis. Although in the above case we have been unable to show that following T.A.B. therapy there is an increase in urinary corticoids associated with a lowering of blood cholesterol, the diuresis in response to corticotrophin (Riley, 1951) is also independent of plasma proteins, and is associated in most cases with a lowering of blood cholesterol.

Summary

A case of Type II nephritis treated with intravenous T.A.B. is recorded.

Intravenous T.A.B. regularly produced a diuresis and a decrease in albuminuria. The diuresis was independent of changes in plasma proteins or cholesterol. A possible mechanism is suggested.

We are indebted to Mr. G. H. Pitt for referring this case to us.

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Miss Gertrude L. Annan has been appointed librarian of the New York Academy of Medicine in place of Miss Janet Doe, who is retiring after thirty years' service at the Academy. Miss Doe has made a number of valuable contributions to medical bibliography, including a notable *Bibliography of the Works of Ambroise Paré*, 1943, and the editing of the *Handbook of Medical Library Practice*, 1943; 2nd ed., 1956.

Medical Memorandum

Regional Ileitis in Mother and Son

A familial incidence of regional ileitis is recognized (Crohn, 1949). We have been able to find reports of 18 instances. Five of these were recorded by Crohn (1949) from his series of 298 cases of the disease. Armitage and Wilson (1950), in their series of 34 patients, noted a single familial case.

In nine of the descriptions brothers and/or sisters were affected (Lewisohn, 1938; Brown and Scheifley, 1939; Edwards, 1948; Riech, quoted by Kirsner *et al.*, 1948; Crohn, 1949; Armitage and Wilson, 1950). In a recent communication (Crohn and Janowitz, 1954) an additional six instances (making a total experience of 11) of familial incidence are recorded, but the relationships are not described. Of the remaining three, the patients were first cousins (Bockus, 1943); a child and her two aunts (Crohn, 1949); and a father and son (Kirsner *et al.*, 1948).

We present here an acute regional ileitis occurring in the son of a woman suffering from the chronic disease.

CASE REPORTS

The mother from the age of 15 years had had occasional attacks of right-sided abdominal pain, sickness, and constipation. In 1945 (aged 27) she became pregnant; her bowel dysfunction was much less marked during the pregnancy. The remission persisted for some six months after the son was born in September, 1945. Symptoms then returned. Attacks of abdominal pain became more and more frequent, and she lost weight. Sixteen months after delivery she was admitted to Selly Oak Hospital, Birmingham, with acute abdominal pain. After a period of observation, an operation was performed. Her appendix was removed and she was told that she had regional ileitis. She continued to get occasional attacks of sickness and pain, but these resolved promptly if she restricted her diet to fluids.

In March, 1949, her second child, a girl, was born. During the pregnancy she was perfectly well. About six months after delivery symptoms recurred and became increasingly severe.

In January, 1951, she was admitted to Selly Oak Hospital with acute abdominal pain and vomiting. An ileo-transverse colostomy was performed. In January, 1952, owing to persistent symptoms and the presence of a large palpable mass in the right lower abdomen, she was readmitted to Selly Oak Hospital under Mr. R. P. S. Kelman, who performed a right hemicolectomy with resection of the terminal ileum. The histological report (Dr. J. S. McKinnell) confirmed that "the whole picture is quite typical of a chronic stage of regional ileitis with sinus formation." Since the operation she has remained well.

The son, aged 7½ years, was admitted to Neath General Hospital in April, 1953. He had had severe abdominal pain for 24 hours. There had been vomiting, and two loose bowel actions following a mild aperient. During the preceding six months similar but milder attacks had occurred on three occasions. He had seemed generally unwell, and had lost weight.

The signs were indistinguishable from those of acute appendicitis. His temperature was 101° F. (38.3° C.) and there was marked tenderness and guarding in the right lower abdomen and acute tenderness on rectal examination. Other systems were normal.

At operation, using a gridiron incision, the last 2 ft. (60 cm.) of small intestine was found to be acutely inflamed and oedematous, thick and turgid, and typical of acute ileitis. A wide-necked Meckel's diverticulum was incorporated in the inflamed gut. There were numerous large glands in the mesentery. The appendix was congested, but secondarily so. Appendicectomy was performed and a mesenteric gland removed for histological examination.

The report on it (Dr. D. B. Richards) stated that the appearances, in conjunction with the clinical and operative findings, were consistent with the diagnosis of regional ileitis. Convalescence was uneventful.

X-ray examination of the chest showed no pulmonary lesion, and a Mantoux test was negative. Barium studies—the first one month and the most recent eleven months after the operation—did not demonstrate any narrowing or alteration in the mucosal pattern of the terminal ileum.

COMMENT

The clinical course, the operative findings, and the histology of the specimen in the mother's case leave no reasonable doubt that she was suffering from chronic regional ileitis. A feature of interest is the marked exacerbation which followed the amelioration of symptoms during pregnancy and lactation (both children were breast-fed for about six months). This is comparable to the behaviour of many other diseases, and has been previously noted in Crohn's disease (Raffensperger, 1948).

Doubt has been expressed of the similarity in nature of progressive Crohn's disease and the "acute terminal ileitis" that is periodically encountered during operations for supposed acute appendicitis in children (Bargen, 1945; Armitage and Wilson, 1950; Storrs and Hoekelman, 1953). This opinion is based upon the rarity of progression of these cases to the chronic disease.

However, in a condition of such relative rarity, in which the aetiology is uncertain, and in which opportunities for histological study in the initial phase are uncommon, the matter must remain one for conjecture. The pathology of the disease in its later stages is non-specific, and its occurrence is infrequent enough to permit the view that it follows a rare failure of resolution of the original acute specific disease. In Crohn's series 30.6% had presented initially with symptoms and laparotomy findings which prompted appendicectomy alone. It may be that in children the powers of resolution are greater.

When at operation an acute terminal ileitis is discovered, the only procedure to be considered is appendicectomy. Some writers, including Crohn, have discouraged appendicectomy on the ground that it favours fistula formation. However, most recorded series have shown that, although fistula in regional ileitis has often been preceded by appendicectomy, the incidence of fistula following the procedure in the early acute phase of the disease is small, and an uncomplicated resolution is the common experience, particularly in children. The advantages of appendicectomy are summarized by Storrs and Hoekelman, who point out that, if the appendix remains, later symptoms referable to the right iliac fossa may be difficult to interpret, and also that involvement of the appendix in the process may lead to appendicular obstruction and early perforation.

We are grateful to Mr. R. P. S. Kelman for information in the case of the mother, and to Dr. J. S. McKinnell and Dr. D. B. Richards for the histological reports.

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Reviews

STATISTICAL APPROACH TO EXPERIMENTS

Experimental Design and its Statistical Basis. By D. J. Finney, M.A., Sc.D., F.R.S. (Pp. 169+xi. 30s.) London: Cambridge University Press. 1955.

It has been Dr. Finney's aim in this small book to discuss the theory and practice of experimental design as based upon the present-day statistical approach, and to do so with sufficient simplicity to meet the needs, and remove the fears, of research workers in most fields of biology. He regards as usually entirely false the idea, firmly held by many investigators, that experiments and other research investigations can be conducted statistically or non-statistically just as the worker wishes. The biologist concerned with any quantitative assessments must inevitably use statistical methods of some kind. His only choice lies between good methods and bad. One of the greatest assets, however, of the good experimental design is that it frequently makes the conclusion so clear that laborious statistical analyses and formal tests of significance become unnecessary. For instance, the analysis of variance may be required only to give objectivity to inferences that a good experimental plan has made obvious with the aid of merely a few averages.

The first-class experimentalist has, of course, always been aware of this—though more often, perhaps, through intuition and a sense of rightness than through an intimate knowledge of Graeco-Latin squares. Unfortunately all workers are not so genetically endowed. They need help in the principles of experimental design and in a form which calls for no special training in statistics or mathematics. Dr. Finney has done much to provide it, though he rightly makes no claim that his subject is easy. To get much from these compact 160-odd pages the reader new to the ideas will certainly need to ponder and study not a little. Within this short space Dr. Finney compresses not only the simpler problems of measurements and counting, of relative frequency and tests of significance, but also the main experimental designs of modern usage—randomized blocks and Latin squares, incomplete block designs, factorial experiments, the sequential approach, and biological assay. The embryo experimentalist who is unable to come to terms with all these will certainly be stimulated to reflect upon his own techniques by the good logic and shrewd comments that Dr. Finney interpolates throughout his text.

A. BRADFORD HILL.

INFANT NUTRITION IN THE TROPICS

Infant Nutrition in the Subtropics and Tropics. By D. B. Jelliffe, M.D., M.R.C.P., D.C.H., D.T.M.&H. (Pp. 237; illustrated. 25s., \$5, Sw. Fr. 15.) Geneva: World Health Organization. 1955.

Children are "feverish, sharp colics bring on convulsions, they are choked by fits of coughing and tormented by worms, evil humours corrupt the blood, germs of various kinds ferment in it, causing dangerous eruptions. Sickness and danger play the chief part in infancy. One half of the children who are born die before their eighth year." This is a quotation from *Emile*, by Jean-Jacques Rousseau, written two centuries ago (1757-60); it sums up the situation in many communities in the tropics and subtropics to-day. Rousseau recognized in his day that much ill-health in childhood could have been eliminated if mothers fed their babies at the breast; they or, if they couldn't or wouldn't feed their offspring, the wet-nurse should be given "food in larger quantities and better of its kind." This is essentially the conclusion reached in the book under review. May the author not have to say, with Rousseau, "How emphati-

cally would I speak if it were not so hopeless to keep struggling in vain on behalf of a real reform!"

The prevention of infant and young child morbidity and mortality in the tropics is partly, at least, a matter of eliminating "worms and germs," but proper feeding of the child and of the mother to enable her to sustain an ample lactation is of equal importance. In some communities, the more unsophisticated ones, the achievement of this objective—proper feeding—is not so much a matter of reform as retention of the best traditional practices. These have to be discovered and examined in the light of local conditions and resources and not in relation to what appears to be successful in Western countries.

Dr. Jelliffe has had experience at first hand of the problems of paediatrics in several parts of the world. His monograph is the first to deal with a subject so much needed, to use his own words, "to shorten the 'phase of bewilderment,' which at present appears to be inevitable before it becomes realized that methods used successfully in the countries of training are often absolutely unsuitable for less technically developed tropical regions, where a very different cultural and dietetic background may exist." The book includes a review of nutritional disease in tropical countries, and a chapter, written in collaboration with Dr. Anne Burgess, on nutrition education in the maternal and child health centre. It is a work with which everyone concerned with nutrition of the young in the tropics should be familiar; may I also recommend it to all who teach nutrition and hygiene to overseas students?

B. S. PLATT.

MESCALIN AND MYSTICISM

Heaven and Hell. By Aldous Huxley. (Pp. 87. 7s. 6d.) London: Chatto and Windus. 1956.

In a book entitled *The Doors of Perception*, published two years ago, Mr. Huxley described his subjective experiences after taking 0.4 g. of mescaline. His visual perceptions were heightened by the drug, and his old grey flannel trousers became a labyrinth of rich and sumptuous patterns, while the legs of a bamboo chair were supernatural in their polished smoothness. He accepts in consequence a theory that the brain and nervous system act as a reducing valve for the totality of impressions which come from the "Mind at Large." Drugs such as mescaline act as a by-pass which circumvents the reducing valve; they allow the ordinary man to see with the eye of an artist and to enter with the mystic into enjoyment of the Absolute. Mescaline, he concludes, is not the ideal drug to replace alcohol and tobacco, but he expects the pharmacologists to produce a better escape—a chemical vacation in our Brave New World—for mankind, whose existence is likely to be so painful, so monotonous, and so limited.

His new book, *Heaven and Hell*, does not affront so thoroughly the orthodox conclusions of scientists and philosophers. He sees, but does not answer, the obvious objection of both physiologist and mystic that chemical changes in the brain induced by drugs or malnutrition are unlikely to represent authentic spiritual experiences. Obesity and holiness may seldom be found together, but it is surely a *non sequitur* to maintain that the subjects of El Greco were saintly because they were ill-nourished. Nor will pharmacologists, more aware than he of the perils of addiction and the variation in individual response, hope that self-transcendence will be achieved by drugs. Occidental man, even if *Homo sapiens*, has more urge to self-expression than to self-transcendence, and he does not share the manifest desire of Huxley the intellectual (who would be Huxley the artist and the mystic) to be other than his best self. Even those who remain unconvinced by the argument of these two little books will take pleasure in Mr. Huxley's erudition, in his ingenious hypotheses, and in the fine clarity of his writing.

D. V. HUBBLE.

BRITISH MEDICAL JOURNAL

LONDON

SATURDAY JULY 14 1956

THE PRESIDENTIAL ADDRESS

Dr. Alexander Hall is the third general practitioner to be elected President of the Association in the past fifty years, and it is as a general practitioner that he surveys the present medical scene against a background of wide experience in that branch of medicine he has "always found interesting and satisfying, if at times a bit exacting." He does not attempt to assess the influence on practice of the great advances in medical science, except to note one important result of this—that new and more precise techniques of diagnosis and treatment increase the time the practitioner must give to his patient's care. Dr. Hall looks first at the conditions in which medical practice is conducted, and asks the pertinent question "whether present conditions can satisfy patient and doctor alike." From his own observation of changed conditions, and from the pronouncements of contemporary authorities, he concludes that "the general-practitioner service is not in good heart, that it needs resuscitation if it is to survive." This is a serious conclusion at which to arrive, and the reader of this year's Presidential address will realize that it has not been reached hastily or without much searching of mind. Dr. Hall, it would seem, sees the introduction of the National Health Service in 1948 as the principal cause behind what he believes to be a lessening of the status of the family doctor. The N.H.S. widened the gap between the family doctor and the consultant that had already appeared before 1948. Organizational expediency then brought in "a more complete cleavage" between the two. The possibility for the general practitioner to become a consultant is now almost non-existent. This is, of course, bound up with increasingly narrower specialization and the gradual disappearance of the general consultant, an effect, largely, of the great advances in medical knowledge. But the gravamen of Dr. Hall's criticism lies in his belief that the conditions of general practice in the N.H.S. do not permit it to "fulfil its proper function in the national service . . . with the result that much of the work which family doctors should normally undertake is passed on to hospital or to local government clinics." What the family doctor needs

¹ Supplement to the British Medical Journal, 1952, 2, 83.

is "time and facilities to use his knowledge and experience"; with these essential desiderata he will willingly "accept further responsibilities in the health services of the country, with satisfaction to both the patient and himself, and with relief to the hard-pressed and costly hospital services." It is good that these things should be said once again, because constant repetition will prevent people from conveniently disregarding the cracks in the structure of medicine to-day. Dr. E. A. Gregg, the Chairman of Council, said to the Representative Meeting last week that it was not the business of the B.M.A. to white-wash the N.H.S., and Dr. Hall certainly makes no attempt to do this.

After an appreciative glance at what has been done by the State and others to alleviate unmerited misfortune, to improve conditions of health, to raise the economic status of workers, Dr. Hall questions whether "the acceptance by the State of more and more of these responsibilities has not induced in the individual a diminished sense of his own personal responsibility to keep himself fit and eager to add his regular daily quota to the work-pool of the nation and to partake in the life of the community." This is an aspect of the Welfare State which causes concern among many thoughtful observers of the social scene. The provision of an apparently free medical service is one of the most important features of the Welfare State. That a State-provided medical service may induce in the beneficiary a diminished sense of personal responsibility is the considered opinion of doctors in other countries, expressed through a pronouncement on social security by the World Medical Association¹ in 1952. Dr. Hall aptly quotes a passage from this: "In what is called the Welfare State, social security schemes loom large, and in these schemes the provision of (apparently) free medical services is important. The more the State does for the individual in this direction, the less is the individual's sense of obligation and responsibility."

This is a social problem of the deepest significance and one which the politician who seeks votes and power will avoid looking at too closely. It is one which, it is interesting to note, the World Medical Association has examined with greater care than, it appears, have many if not most of its national member associations. It may well be linked to Dr. Hall's concluding observation that medicine "is losing its dynamic." Without examining all the possible remedies for a state of affairs which is serious enough if his conclusion is soundly based, Dr. Hall considers that one step should be taken to counter "conditions which encroach on the freedom of medicine"—and that is that the Association should "preserve and

foster the practice of medicine outside the National Health Service. . . . This proposal is, of course, in line with Association policy. "The greater the area of freedom provided by the private practice of medicine," Dr. Hall writes, "the greater will be the encouragement to maintain a general high standard and the stronger the deterrent to the introduction into the National Health Service of terms and conditions of service which we believe will make such standards unattainable." This proposition will be unpopular with those who see the all-powerful and paternal State as the provider of all good things. But it is one that will appeal to those who see the area of individual freedom and individual responsibility gradually being submerged in a collective mediocrity, in "a society harried, hag-ridden by regulations and financially penalized"—these last words taken by Dr. Hall from an article in the *Times Literary Supplement*. In addition to the reasons Dr. Hall gives for the desirability of encouraging private practice there is one that is easily lost sight of in this age of levelling down. Some patients and some doctors are temperamentally averse to "service conditions." The great risk to the public of the N.H.S. is that it will lead to a standardized medicine practised by a standardized doctor on what he may come to regard as a standardized patient. Of all professions medicine needs diversity of opportunity, and a wide margin of freedom to bring out to the full the doctor's sense of personal responsibility to the sick person. Dr. Hall's appeal for the encouragement of private practice must be looked at in this context, and will no doubt receive the practical support of the Association of which he is the President.

MEGAVOLTAGE RADIOTHERAPY

The term megavoltage radiotherapy comprises both supervoltage x-ray therapy—that is, therapy with x rays of a million volts and over—and telecurietherapy with radioactive gamma-ray sources of correspondingly high energies. X rays and gamma rays are identical in nature, but while the x rays are generated by elaborate electrical equipment the gamma rays are obtained from a massive source of radioactive material; at present this is most commonly cobalt-60 mounted in a heavily protected, more or less spherical head, whence the more familiar term "bomb" therapy. Owing to advances in the design of x-ray generators, x-ray beams can now be produced with energies of many millions of volts; the energy of the gamma-ray beam emitted by the cobalt bomb is equivalent to that emitted by an x-ray generator of approximately 3 million volts.

Certain advantages are gained by the use of these high-energy radiations. The rationale of the radiotherapy of cancer is that certain malignant cells are more sensitive to radiations than the cells of the normal tissues, so that a malignant growth may be destroyed by a dose of x rays from which the normal tissues can recover. It was at one time hoped that the margin of sensitivity between malignant and normal tissues might be increased with radiations of higher energy. So far as present experience goes this does not seem to be so. The advantages of megavoltage radiations in cancer therapy result not from any difference in biological response but from certain physical characteristics of the high-energy beam. The first of these is that the megavoltage beam develops its maximum dosage not on the skin surface, as with the ordinary deep therapy beam, but at a distance below it which becomes greater as the voltage of the beam increases. For this reason skin tolerance is no longer a limiting factor in dosage, and except where growth involves the skin itself the patient is spared the distress of serious skin reactions. Secondly, the absorption of megavoltage radiations in tissues of different densities tends to become equalized. For this reason the risk of bone necrosis from the relatively high absorption in bone at deep therapy voltages is minimized, as is also the resulting tendency of the bone to shield the growth from the radiation which is intended to reach it. Thirdly, the greater penetrating power of the megavoltage beam, especially at the greater depths, enables treatment to be planned with a smaller number of fields, with consequent simplification. For this reason accuracy is increased, and the total radiation energy which has to be absorbed by the patient to obtain a given dose on a deep growth is reduced.

The advantages of megavoltage radiotherapy over ordinary deep x-ray therapy (200–250 thousand volts) are well shown in a series of articles recently published.^{1–3} R. Morrison, G. R. Newbery, and T. J. Deeley,¹ working with the Medical Research Council's 8-million-volt x-ray machine at the Hammersmith Hospital, found that the maximum dosage was delivered at about 2 cm. below the skin surface while the skin dose was only about 25% of the maximum. D. Greene and D. E. A. Tranter,² working with the 4-million-volt x-ray machine at the Christie Hospital, Manchester, found that the maximum dose was delivered at from 0.8 to 1.2 cm. below the surface, again with a surface dose of about

¹ Morrison, R., Newbery, G. R., and Deeley, T. J., *Brit. J. Radiol.*, 1956, **29**, 177.

² Orton, K. F., *ibid.*, 1956, **29**, 186.

³ Greene, D., and Tranter, D. E. A., *ibid.*, 1956, **29**, 193.

⁴ Bloomfield, G. W., *J. Fac. Radiol. (Lond.)*, 1956, **7**, 260.

⁵ Williams, I. G., *Brit. J. Surg.*, 1949, **36**, 376.

25% of the maximum. Morrison and his colleagues found that the absorption in bone was reduced by more than half at 8 million volts as compared with 250,000-volt deep x-ray therapy. The figures for the cobalt-60 telecurietherapy unit, equivalent to about 3 million volts, are not very different from those obtained at the Christie Hospital, while at a level as low as 2 million volts the advantages of supervoltage radiotherapy have recently been confirmed by G. W. Bloomfield⁴ by physical measurement and also by clinical observation of 1,500 patients treated during the past five years. "The ease of treatment, the greater comfort of the patient during treatment, and lack of troublesome complications are factors which are soon apparent." As to the comparison of results of supervoltage therapy with those of deep x-ray therapy the same author remarks: "After working with 2-million-volt x-ray therapy we soon found that comparisons are still more difficult, because many patients who would never stay the course of radiotherapy by orthodox methods can yet be treated by supervoltage therapy."

There are, nevertheless, indications that at least in two regions—namely, the bladder and cervix—results of treatment of carcinoma are improved by supervoltage therapy, in the one case by supervoltage therapy alone and in the other in combination with intracavitary radium. The fact that I. G. Williams⁵ was able to report improved response of carcinoma of the rectum to 1-million-volt radiations at St. Bartholomew's Hospital offers hope of further improvement with still higher voltages. Even if the results show no dramatic improvement from megavoltage therapy, the sparing of much discomfort and distress to patients in the course of treatment, and the reduced risks of bone necrosis and other complications, are sufficient to mark a real advance.

POST-PARTUM PSYCHOSIS

The successful treatment of post-partum psychoses with progesterone has recently been reported. H. W. Bower and M. D. Altschule¹ studied a total of 39 cases over six years. With two exceptions only patients who had become psychotic during the first few weeks after delivery were included. Thirty-four patients initially received shock therapy (insulin or electroplexy) and received progesterone with or without shock therapy. Seventeen improved, and the improvement was maintained. Seventeen cases relapsed; one of these committed suicide, and, of the remaining sixteen, five improved with further shock therapy. The other eleven of this group, together with five more patients, received progesterone alone and none relapsed. All these cases except one improved and none relapsed. Progesterone alone did not usually effect a remission but it appeared to do so alone after a relapse following

electric convulsion treatment. Follow-up over a number of years confirmed that remission was maintained. The relapse rate for cases not treated with progesterone was 43.6%, and for those treated with it 6.3%. Progesterone was given in large doses, 100 mg. daily intramuscularly for about ten days and then by mouth in doses of 150 mg. After discharge the hormone was given by mouth for periods varying from weeks to many months.

No hormone estimations on these patients are reported, but the rationale of the treatment, according to the authors, is that the adrenal cortex may be overactive in early but not acute schizophrenic, manic-depressive, and involuntal psychoses, though this is probably not of aetiological importance. Their aim is to depress pituitary-adrenocortical function. They say there are marked adrenal changes during normal pregnancy and the post-partum period; the blood and urinary steroid content are increased during pregnancy and much more immediately after delivery; normal values are found after the sixth day. The placenta may produce both A.C.T.H. and corticoids. Placental progesterone depresses adrenocortical hyperactivity. Placental A.C.T.H. counteracts this. Later the loss of this placental A.C.T.H. may be compensated by a rebound excessive stimulation of the adrenal cortex by the anterior pituitary, and "this might contribute to the development of post-partum psychosis." The large doses of progesterone are designed to depress adrenocortical function via the pituitary.

Other reports about the use of progesterone in cases of post-partum psychosis have come from A. Blumberg and O. Billig² and H. J. Schmidt.³ However, both are reports on single patients who relapsed when menstrual bleeding was resumed. Only very small doses of progesterone were administered, and they could hardly have depressed pituitary-adrenal function. Bower and Altschule do not mention any relation between relapses and reappearance of the menstrual cycle or bleeding. J. Delay and colleagues⁴ repeatedly took endometrial biopsies, and they found that the remission after shock therapy persisted only if the endometrium had resumed a normal appearance; otherwise the patient relapsed. Bleeding is often due to an abnormal condition and does not represent resumption of the normal cycle. Bower and Altschule suggest that the use of progesterone should be considered for patients who show a severe increase of neurotic symptoms in the first week after delivery and in other cases of early psychosis in women. It is worth recalling here that important biochemical and physiological changes in the premenstrual phase have been found in the premenstrual tension syndrome, and that they could be explained by lack of balance between oestrogen and progesterone⁵ and by autonomic disequilibrium.⁶ Improvement with the administration of progesterone has been observed. A greater incidence of deaths occurring in the luteal phase has been reported recently and

¹ Bower, H. W., and Altschule, M. D., *New Engl. J. Med.*, 1956, **254**, 157.

² Blumberg, A., and Billig, O., *Psychiat. Quart.*, 1942, **16**, 454.

³ Schmidt, H. J., *J. Amer. med. Ass.*, 1943, **121**, 190.

⁴ Delay, J., Boitelle, C., and Corteel, A., *Ann. med. Psychol.*, 1948, **106**, 62.

⁵ Morton, J. H., *Amer. J. Obstet. Gynec.*, 1950, **60**, 343.

⁶ Rees, L., *J. ment. Sci.*, 1953, **99**, 62.

⁷ McKinnon, P. C. B., and McKinnon, I. L., *British Medical Journal*, 1956, **1**, 555.

⁸ Hemphill, R. E., *ibid.*, 1952, **2**, 1232.

the possibility of adrenal participation suggested.⁷ Further, progesterone is known to play a part in the metabolism of adrenocorticoids.

It is only when more complete endocrine and biochemical studies become available that the problem will be clarified. In the meantime the results of Bower and Altschule deserve clinical attention, especially in relation to the different varieties of puerperal mental disorder.⁸

SMOKING AND THE CARDIOVASCULAR SYSTEM

Last year we referred in these columns¹ to statistical evidence from Britain and the United States which strongly suggested that cigarette smokers have a significantly higher mortality from coronary disease than do non-smokers or pipe and cigar smokers. Since then several papers have been published on the circulatory effects of smoking both in normal subjects and in patients with coronary disease. We have already drawn attention to deterioration in the ballistocardiographic pattern in some apparently normal subjects after smoking.² F. W. Davis and colleagues³ found this in 7.5% of 252 subjects, I. E. Buff⁴ in 10% of 400, O. Tannenbaum and colleagues⁵ in about 20% of 82 subjects, and H. I. Russek and colleagues⁶ in over 50% of 28 subjects. The percentage in which ballistocardiographic deterioration is found appears to be determined by the method of selection of the "normal" subjects, and the two most important factors which have emerged are age and the presence of cardiac, gastro-intestinal, or cerebral symptoms associated with smoking. Thus in the work of Davis and his colleagues cigarette smoking had no effect on the ballistocardiogram in normal subjects under 40, whereas about 15% of those over 50 showed deterioration. All Buff's subjects were under 40. In the studies of Tannenbaum and his co-workers ballistocardiographic changes occurred in 15% under age 40 and 23% over that age. The subjects selected by Russek and his colleagues all had symptoms of one kind or another after smoking, and this feature was associated with a very high incidence of ballistocardiographic changes. It seems likely that some normal subjects are unusually sensitive to the effects of cigarette smoking, and this sensitivity is not confined to the circulatory system. In coronary disease both Davis *et al.*³ and Russek *et al.*⁶ found that after smoking the ballistocardiogram deteriorated in about 50% of cases. In comparing these figures with those for normal subjects it is probably relevant that the patients fall in older age groups, and it may be important that the ballistocardiogram was abnormal before smoking in a high percentage of cases—56% in the 190 cases investigated by Davis *et al.*

The cigarette ballistocardiogram test is purely empiric, as Davis and his colleagues were careful to point out, and there is no direct evidence that the changes in the

ballistocardiogram are due to alterations in the coronary circulation or the myocardium. It is known that the form of the ballistocardiogram can be altered by changes in the peripheral circulation, and sometimes the changes due to smoking can be reversed or prevented by the administration of whisky.⁶ Many will agree with the conclusion of Russek *et al.* that "there is as little evidence that alcohol increases the coronary blood flow as there is that tobacco reduces it." So far, therefore, it has not been possible to identify physiological changes in the coronary circulation as a result of cigarette smoking which would account for the statistically higher incidence of coronary disease in smokers. But the immediate response to smoking a single cigarette may be little guide to the long-term effects of heavy cigarette smoking. Curiously, no one seems to have thought of trying the effect on the ballistocardiogram of smoking a pipe or a cigar.

TREATMENT OF MEASLES

Though measles must be one of the commonest diseases in the world that doctors are called upon to treat, the best way of preventing the onset of complications is still in some doubt. The main issue is whether to administer sulphonamides or antibiotics as a routine prophylactic measure or whether to await the onset of a complication before starting specific treatment of it. To the many published contributions to this discussion an unusual addition has now been made in the form of a report by a study group of the College of General Practitioners.¹ The group, consisting of 132 members and associates of the College, set out as their primary aim "to collect a series of cases of measles, treated at home, large enough to determine whether sulphonamides or penicillin, given as a routine, produced a beneficial or an adverse effect upon the subsequent course of the disease." Their main conclusion is that "the prophylactic use of antibacterial drugs can confer little benefit on a healthy child undergoing an attack of measles of ordinary severity, and indeed it may do harm. In mild cases it is likewise unnecessary, but severe cases can obtain some benefit." The group was assisted by Professor A. D. Gardner, of Oxford, and Dr. M. R. Sampford of the Agricultural Research Council's statistical unit at Aberdeen.

In the final analysis the number of cases used was 4,728, observed from the beginning of 1954 to May 31, 1955. They were spread over urban, rural, and mixed practices, and composed a series that does not seem to have had any particularly exceptional features. Among these a group of 1,767 patients who received no prophylactic treatment can be compared with two other groups; one of these received routine sulphonamide prophylaxis (1,619 cases) and the other routine antibiotic prophylaxis (255 cases). The cases were classified into mild, average, and severe. Among the mild cases there was no significant difference between the three treatment groups, but among the average and severe

cases those on antibiotic prophylaxis did significantly better. Unfortunately only nine patients with a severe attack of the disease were among those put on routine antibiotic prophylaxis, a small number from which to reach any conclusions. Among the patients with an average attack, 171 received antibiotic prophylaxis as against 871 who received none; 14.5% of the antibiotic group and 19.0% of the control group developed complications, a difference that is not very great. But, while some slight benefit may follow the giving of prophylactic antibiotics, the dangers of their widespread administration are too well known to make the final decision an obvious one.

If prophylactic penicillin is to be given at all, it would seem better not to give it as a routine but to selected cases. These would be children specially liable to complications or children on whom the effect of complications might be particularly harmful. An interesting feature of the report is an attempt to identify a group of children as "catarrhal." These were defined as children who seemed to their doctor to have more than their fair share of respiratory infection. They comprised about 22% of the series, and the figures show that they did indeed suffer more severely from measles than the remainder. The catarrhal group included 9.9% severe cases against 6.5% in the non-catarrhal group, and 22.7% of mild cases against 33.6%. Whether such children should receive prophylactic penicillin remains nevertheless questionable. Recently the dangers of upsetting the body's bacterial flora by antibiotics during the treatment of measles was the subject of comment in these columns,² for a report³ from the U.S.A. had drawn attention to this risk. Infections with *H. influenzae* were found to be unusually frequent, but are not reported in the series from the College of General Practitioners. If the routine use of antibiotics is, as the report says, "largely unnecessary," the routine use of sulphonamides is found to have nothing to recommend it; indeed, it "increases rather than reduces the total complications rate."

THE BABINSKI RESPONSE

The plantar reflex described by J. Babinski⁴ in 1896 is probably the most famous physical sign in clinical neurology, and there is justification for believing it to be one of the most reliable. It must be stressed that this sign, which is known as the "Babinski" or "extensor plantar" response, and which is evoked by stimulation of the outer side of the sole of the foot, does not only consist of dorsiflexion of the great toe; in addition there must be flexion and abduction or "fanning" of the remaining toes. Both features must be present for the reflex to be abnormal; either alone may be elicited in a small proportion of normal individuals. As P. W. Nathan and M. C. Smith point out in a recent review,⁵ Babinski's claim that the sign "appears" to indicate a disturbance of function of the pyramidal tract has been misconstrued and distorted by subsequent writers, so that many now believe an anatomical lesion of the

corticospinal tract to be present whenever the Babinski response is demonstrated. That this is far from the truth is shown by many reports in the literature. Several cases have been described in which there were clearly defined lesions of the corticospinal tracts and yet the sign was absent; nor could it sometimes be obtained even after total division of the spinal cord. Conversely, there are also reports of cases in which the sign was clearly demonstrated and yet the corticospinal tracts were normal histologically; and it is, of course, well recognized that the response may be elicited in normal subjects during sleep, hypoglycaemia, or anaesthesia.

Additional useful evidence is provided by Nathan and Smith from their personal observations in 38 cases of antero-lateral cordotomy. They found that the Babinski response was often evoked in patients who were later found to have histologically normal corticospinal tracts; that apparently identical lesions on the two sides of the spinal cord could be associated with a normal plantar response on one side and a Babinski response on the other; and, indeed, that there was no particular relation between the anatomical state of the corticospinal tracts and the form of the Babinski response. However, it must be remembered that profound disturbances in function of nervous pathways may occur without recognizable histological change; furthermore, many patients with demonstrable lesions of the corticospinal tract do show this sign, which clearly indicates a serious abnormality in functioning of the central nervous system. It would be unfortunate if this work were to arouse doubts concerning the clinical value of a sign of such great and established worth, but Nathan and Smith have done a service by warning us that it is a mistake to be too rigid in interpreting the significance of physical signs, particularly so far as the anatomical integrity of individual nervous pathways is concerned.

WORLD HEALTH

An impressive story of progress and achievement in the improvement of health all over the world is related in two recent publications.^{1,2} In three fundamentally important fields—communicable diseases, national public health services, and the education and training of doctors and medical auxiliaries—the results, as described by the World Health Organization,¹ are shown to be strikingly favourable. Malaria has been attacked by a new strategy, aiming at eradication rather than control and relying on rapid and complete spraying of a defined area to combat the development of insecticide-resistance. The outlook on tuberculosis is undergoing a revolutionary change owing to the introduction of effective chemotherapy, for there is now a possibility of replacing the hitherto expensive programme of maintaining special hospitals by one making the best use of relatively inexpensive domiciliary treatment. The introduction of a poliomyelitis vaccine has raised questions about when and how to give it, and in many parts of the world these problems are being investigated by

¹ *British Medical Journal*, 1955, 1, 91.

² *Ibid.*, 1955, 2, 114.

³ Davis, F. W., Scarborough, W. R., Mason, R. E., Singewald, M. L., and Baker, B. M., *Amer. Heart J.*, 1956, 51, 165.

⁴ Buff, I. E., *J. Amer. med. Ass.*, 1955, 157, 569.

⁵ Tannenbaum, O., Vesell, H., and Schack, J., *Circulation*, 1955, 12, 783.

⁶ Russek, H. I., Zohman, B. L., and Dorset, V. J., *J. Amer. med. Ass.*, 1955, 157, 563.

¹ *The Complications of Measles*, June, 1956 (obtainable for 2s. from the College of General Practitioners, 11, Black Friars Lane, London, E.C.4).

² *British Medical Journal*, 1956, 1, 734.

³ Weinstein, L., *New Eng. J. Med.*, 1955, 253, 679.

⁴ Babinski, J., *C.R. Soc. Biol. (Paris)*, 1896, 3, 207.

⁵ Nathan, P. W., and Smith, M. C., *J. Neurol. Neurosurg. Psychiat.*, 1955, 18, 250.

¹ *The Work of W.H.O.*, 1955, Geneva, 1956.

² *Health in the United Kingdom Dependencies*, 1956, H.M.S.O., London.

surveys, some already completed, others still in progress. The Central Office of Information is also able to record² impressive progress in the United Kingdom Dependencies, as a result of the vigorous attack on leprosy, yellow-fever, and tropical blindness. For example, the remarkable decline in the incidence of leprosy in Eastern Nigeria is well described elsewhere in this issue by Dr. T. F. Davey and his colleagues. Further, the proportion of patients with leprosy discharged free of symptoms has been on a scale inconceivable a decade ago; and, as a result of the measures taken to destroy the vector, yellow-fever is now virtually confined to sporadic cases among unvaccinated persons.

The public health services in many countries are still not fully developed and both W.H.O. and the medical services in colonial territories have collaborated with other organizations, including U.N.I.C.E.F., the Food and Agriculture Organization, and the Rockefeller Foundation, in plans for establishing health services and training schools in these areas. The World Health Organization takes a particular interest in the health education of the public, and over 70 participants took part in its seminar on nutrition education and health education held last October at Baguio in the Philippines. Undernutrition will become less of a problem as knowledge improves. Working parties have been carrying out nutritional and agricultural surveys in United Kingdom Dependencies, including the Gambia, Malaya, Northern Rhodesia, Nigeria, and other territories, and are helping to combat ignorance and prejudice about diet and to encourage the best use of the land. Often the diet can be improved by adding to it local products of high nutritive value, such as shark oil and red palm oil, formerly often wasted, and the prevalent deficiency of protein can sometimes be counteracted by encouraging a greater consumption of fish and of vegetable protein.

REMEDIES FOR SCURF

Scurf of scalp, dandruff, or pityriasis capitis is almost a universal complaint. Little more is known about it than Sabouraud contributed fifty years ago. It is a source of interest and anxiety to most of those who suffer severely from the complaint and has for long been a matter of profitable concern to manufacturing chemists and hairdressers. Much misdirected energy and enthusiasm have been applied to the treatment of scurf not only by the layman. The finding of a scurfy scalp has always coloured the diagnosis and influenced the treatment of skin diseases, though it may often be quite irrelevant. Vigorous treatment of scurf may sometimes be responsible for loss of hair which is wrongly attributed to the presence of dandruff. It is true that scurf and baldness sometimes go together, but it is doubtful if the one is often directly responsible for the other. Certain organisms normally resident on the skin, harmless and saprophytic, are believed to play some part in the aetiology of pityriasis capitis—a scaling of the epidermis of the scalp consequent upon a low-grade infective

dermatitis. To eradicate these organisms permanently from the skin is not possible, for they are normal—and probably purposeful—residents. It is some altered state of the soil, of the skin itself, that would seem to be the major aetiological factor, and most people are familiar with the exacerbations of scurf of scalp that follow an infective or toxic illness, especially of the upper respiratory tract, or accompany a state of debility or stress. Though simple local hygiene will usually control the tendency to scurf, it is well to remember these further aetiological possibilities when the trouble becomes worse or more persistent.

Fashions in the treatment of such a common and incurable affection naturally vary with time and circumstance. Some advocate daily washing with soap and water, as of the normal skin, and this may prove effective. On the other hand, infrequent washing of the scalp does not necessarily aggravate a tendency to scurf, for when the layer of sebum on the skin becomes thick enough it remains constant, and is only replaced if the surface film is washed off. Such a film of sebum is of itself to some extent a protection against dandruff. In the past some authorities have recommended the application of cholesterol in treatment, and it is incorporated in some proprietary remedies. Sulphur and salicylic acid, mercury, and tar all have their advocates, but perhaps the most valuable recent addition to therapy has been the introduction of detergents such as cetrimide, which may be used alone or be incorporated in shampoos, soaps, or lotions. For some time selenium sulphide has had a considerable vogue and is indeed a very effective application. It is the modern equivalent of a very old remedy, cinnabar or red mercuric sulphide, which was commonly used in a strength of 1% with sulphur (2%) in a pomade or ointment. Mercury so used is probably a safer drug than selenium for this purpose. Either may cause occasional irritation of the skin or the development of allergic sensitiveness. There has recently been a report¹ from the U.S.A. of diffuse loss of hair from the repeated use of selenium sulphide shampoos at short intervals. Six patients suffered in this way when the shampoo was used at weekly intervals, but recovered on stopping the shampoo or using it at longer intervals. The observation merits attention in view of the wide use of this chemical to-day: the absence of dermatitis suggests that the loss of hair was due to a direct toxic effect.

CHAIRMAN OF B.M.A. COUNCIL

At the first meeting of the new Council on Monday, July 9, Dr. S. Wand was elected Chairman for the ensuing three years. Dr. E. A. Gregg, Chairman of Council for the past seven years, had previously announced his decision to retire from this onerous and responsible position. At the Representative Meeting on Monday Dr. I. D. Grant, Chairman of the Representative Body, made a most felicitous speech on the outstanding services Dr. Gregg has rendered the Association both at home and in other countries, and at the conclusion the Representatives rose and gave Dr. Gregg an ovation.

British Medical Association

ANNUAL MEETING, BRIGHTON, 1956

SUMMARY OF PROCEEDINGS

THE SECTIONS

SECTION OF GENERAL PRACTICE

Monday, July 9

Education of the General Practitioner

With the president of the section, Dr. T. A. MORRISON (Brighton), in the chair, Dr. RAYMOND WHITEHEAD (Manchester) opened a discussion on the "Education of the General Practitioner." He stressed that medical education was a continual process, from entry into medical school to the end of professional life, but that successive stages make progressively greater demands on the student's initiative. The undergraduate has his full-time curriculum planned by his teachers. The intern registrar and trainee could choose their particular field and place of practice but pursue an apprenticeship under the guidance of their chiefs, learning all the time from their methods and experience. The final stage of postgraduate education and maintenance of efficiency, as it affects the principal in practice, was entirely his own private affair.

Dr. Whitehead then discussed the methods of undergraduate teaching in this country and abroad, and noted the value of giving students some insight into general practice so that they might obtain a more balanced view of medical care and needs.

Turning to postgraduate education, he said that this is increased by carrying out research and working for higher degrees. There was much scope for both of these projects in general practice. A problem common to all doctors was that of keeping up to date. The fundamental method of that of continuing self-education was reading, and doing so and of continuing self-education was reading, and here he stressed the importance of reading up one's own cases. To be able to do this the doctor must have a small and suitable private library of his own. In addition he should make a regular study of periodicals, extracting and filing articles and annotations of interest. Next to reading, social and professional contacts with colleagues at home and abroad were the best ways of keeping up to date.

Young Practitioner's View

Dr. C. P. D. GRANT (Glasgow), the next speaker, gave his personal experiences as a young general practitioner of some four years' standing, following valuable years as a hospital resident and in H.M. Forces. On starting in general practice he found that, while his academic knowledge was adequate for the "hospital diseases," he was quite unfamiliar with the common diseases of general practice, which were quite different from those that he had encountered in his medical school. In hospitals the patient was treated as a "case" rather than as an individual with his own personality and social background, and too much stress was laid on the necessity and value of investigations to discover and substantiate a diagnosis.

Teaching was carried out by specialists who had little knowledge of general practice, into which at least 50% of their students would eventually enter. More teaching was necessary on the common everyday diseases rather than the rarities. There was a need for students to obtain some insight into general practice, but it should be realized that general practice was an art that could not be taught but had to be lived to be learnt.

An introduction into general practice would be best carried out by a general practitioner attached to the teaching team who could give lectures, attend rounds, and arrange for

students to be taken in by practitioners for short periods. Turning to the curriculum, Dr. Grant said that drastic cuts were necessary in the detailed studies of preclinical subjects, and more time should be devoted to practical experience in the handling of patients in the wards and in out-patient departments—again with accentuation on the commonplace rather than in the worship of the rarity.

He was in favour of a compulsory period of attachment to a general practitioner for senior students and a post-graduate trainee period of one year followed by a two-year hospital internship.

Education in the U.S.A.

Dr. ROBERT A. DAVISON (Memphis, Tennessee, U.S.A.) described his experiences as a teacher in the General Practice Clinic at the University of Tennessee. This clinic had been started in 1951 in an attempt to give students some teaching in the wider aspects of disease, which was lacking in the normal curriculum of most medical schools.

In the past there had been insufficient stress on the patient as an individual living in his own social and family environment and too much stress on the patient as a hospital case member. Medical schools had tended to graduate medical scientists and medical biologists rather than doctors. The general practitioner was an important member of the medical team in the battle against disease and was able to manage, on his own, some 85% of the illnesses in the community.

The General Practice Clinic was staffed by two full-time and 35 part-time practitioners. Ancillary staff included a medical-social worker, a laboratory technician, and a secretary. There were 16 private examination rooms, a laboratory, an x-ray unit, a physiotherapy room, a minor surgery room, a waiting-room, and a nurses' duty room. Twelve final-year students attended the clinic on alternate days for a five-and-a-half week period, and examined and followed up their patients. The patients (30 a day) were selected daily by the medical director of the hospital from those referred to out-patients and from poor indigent patients.

To supplement this type of work a "family care programme" was introduced to enable students to come in contact with the family at home. In his scheme each final-year student was given a family to look after during this year, and he acted as the family's own doctor—answering all calls for home visits and seeing members of the family in consultation at the clinic. During this period the student presented cases from his family at an informal conference which was held weekly.

The success of this programme was largely due to the development of good student-patient relationships, and allowing certain degrees of responsibility in the students under the supervision of experienced general practitioners.

Undergraduate and Postgraduate Education in General Practice

Dr. G. O. BARBER (Great Dunmow, Essex) spoke as a general practitioner with many years' experience in teaching students. He felt that the problems of teaching general practice were twofold—first, some teaching was necessary to give all students some information on this important branch of medicine, and, second, a more specialized form of education was necessary for the postgraduate who was taking up general practice as his career.

All students needed to be taught, from the earliest days of their clinical training till graduation, that there was a unity of medicine and that medical care was best carried out by a team which must, of necessity, include the family doctor as well as the hospital consultant. The treatment which the patient received in hospital was but an episode in the course of disease and the general practitioner played an equally important role.

Three methods of teaching the rudiments of general practice were popular in Great Britain. Lectures could be given to students, at various periods of their curriculum, by an experienced practitioner. Students could be sent to spend

¹ Grover, R. W., *J. Amer. med. Ass.*, 1956, 160, 1397.

a period with a general practitioner to watch and assist him at his work. Some general practice units were attached to teaching hospitals, notably at Edinburgh, and in this form of teaching students can be given more responsibility in the care of the patient. The third method was to invite a family doctor to accompany the consultant on his teaching rounds so that his views might be presented to the students. It was essential for the practitioner to get back into the hospital if improvements in education were to be made.

Postgraduate teaching of the future general practitioner should be based on the twin self-disciplines of thought and action. Discipline of thought required an adaptation of basic medical methods to the special field of general practice. Discipline of action must train the doctor to cope with the presenting situation and not merely to refer all difficult cases to hospital. The whole system of trainee assistantships must be re-examined. A whole year spent with one practitioner was probably too long, and a system of group training to include a variety of practices was suggested.

The future must depend on team-work between practitioner and hospital for the good of the patient, and it was up to the practitioner to raise and maintain his standards of work and to pass on some of the fire of his ideals to the doctors of the future.

In the subsequent discussion Dr. J. K. PATERSON (Huntingdon), winner of the Claire Wand Prize for 1956, said that to be a good doctor one first had to be a man, and the period spent in H.M. Forces was an important one as a training in lifemanship.

Dr. R. F. L. LOGAN (Manchester) described the development of the Derbyshire Health Centre at the University of Manchester, where students were attached to one of four general practitioners working together in a group practice.

Dr. ANNIS GILLIE (London) supported the view that regular hospital contact was vital to postgraduate training.

ERADICATION OF TUBERCULOSIS

ANNUAL CONFERENCE OF THE BRITISH TUBERCULOSIS ASSOCIATION

Although only one of the papers read at the annual conference of the British Tuberculosis Association in Bristol last week mentioned eradication of the disease in its title, most of the contributions were concerned with how this might be done. On the clinical side collapse therapy and the results of resection were reviewed; on the preventive side the role of B.C.G. and vole bacillus vaccine was debated. The latter discussion was based on the M.R.C. report, published in this *Journal* last February,¹ describing a controlled trial of these vaccines in adolescents. We discussed this subject in a leading article two weeks ago.² The other major subject at the conference was the clinical and social rehabilitation of the tuberculous patient.

A Nation-wide Campaign

What it might involve were Britain to undertake an all-out drive to eradicate tuberculosis was the subject of a paper by Dr. A. L. COCHRANE, of the Medical Research Council's pneumoconiosis research unit. His views were based on evidence from two surveys the unit is making, one in an area which might be taken as typical of one of the worst in the country in its tuberculosis record (the Rhondda Fach), and the other in an area regarded as one of the best (the Vale of Glamorgan). He divided the campaign into three phases.

Many would agree, said Dr. Cochrane, that the first logical step was to radiograph the whole community. But on how this should be done opinions were divided. Personally he favoured compulsion, though he recognized there were objections. The only alternative to compulsion was expensive and tedious surveys with home-visiting carried out on a very large scale, and even then the results fell short of

100%. The surveys in the Rhondda Fach and the Vale of Glamorgan had shown a much higher prevalence of pulmonary tuberculosis in the urban than in the rural areas, so the first attack should be made on the towns. From the administrative point of view it was important to estimate the proportion of unknown to known cases such surveys would disclose. Curiously, the Vale of Glamorgan—the low-prevalence area—yielded the higher proportion: two unknown cases were uncovered for every known case. Possibly a low notification rate gave a false sense of security.

Prevention of Fresh Cases

Radiographing the whole community would not win the battle, however. Fresh cases would occur. Their pattern had been studied by repeating the x-ray survey in the Rhondda Fach two and a half years after the first survey, and the results agreed well with those obtained by Springett in 1951. The surprising thing was that it was not the elderly males who were most attacked. The vast majority of new cases were in the younger age groups. It was here that the search for cases in the second phase of the campaign would have to be concentrated.

After referring to the importance of B.C.G. in preventing these new infections in younger people, Dr. Cochrane said he thought it would be mistaken to rely on B.C.G. alone. Evidence from the Rhondda Fach made it virtually certain that the overwhelming factor in the new cases was still contact with an infectious case. It could be assumed that practically all the cases found in the x-ray surveys would be hospitalized, but what proportion of them would leave hospital still sputum-positive? In the Rhondda Fach they had not been able to make anything like all the cases sputum-negative on discharge. Admittedly there were special factors there, such as the association with progressive massive fibrosis, but there was a real need to discover how closely the number of sputum-positive patients living at home in a community was correlated with its notification rate for new cases; he thought the correlation would be fairly close.

If conditions in the Vale of Glamorgan could be regarded as representing a somewhat later stage of the tuberculosis epidemic than in the Rhondda Fach, it could be said that as the attack rate fell tuberculosis would disappear in women of all ages and in the young men but not in the elderly men. The explanation for this, which Dr. Cochrane thought must now be accepted as a fact, was that there was a greater tendency for the apparently healed lesion to break down in the elderly male than in the elderly female. In the last phase this group of elderly males would probably be very difficult to deal with.

Other Contributions

The first two papers were by workers from Bristol. Dr. R. C. WOFINDEN, the M.O.H., paid a tribute to William Budd, the great Bristol epidemiologist of the last century, and Dr. J. S. WESTWATER spoke on "Tuberculosis in the Fourth Dimension." The contributors to the symposium on collapse therapy on the second day of the meeting were Dr. A. T. M. ROBERTS (Bristol) on artificial pneumothorax, Dr. H. G. TRIMBLE (California, U.S.A.) on artificial pneumoperitoneum, Mr. R. H. R. BELSEY (Bristol) on surgical collapse, and Dr. F. H. YOUNG (London), who discussed the choice of method for the individual patient. In the afternoon Mr. F. R. EDWARDS (Liverpool) discussed the results of resection on the basis of a 5-9 year follow-up of 400 patients, Dr. BERYL CORNER (Bristol) spoke on congenital tuberculosis, and Dr. A. M. SUTHERLAND (Glasgow) on tuberculosis of the endometrium. The third day was occupied by discussion of the Medical Research Council report on B.C.G. and vole bacillus vaccine, presented by Dr. P. D'ARCY HART, Dr. T. M. POLLOCK, and Dr. I. SUTHERLAND, members of the M.R.C. committee which prepared the report. Afterwards Dr. MARY FARQUHARSON (Lewisham) gave a physician's view of it, and Professor W. GAISFORD (Manchester) did the same from the paediatric angle. Dr. KNUD TOLDERLUND, of the State Serum Institute, Copenhagen, then followed with a paper on the preparation

and control of B.C.G. vaccine. During the discussion on anti-tuberculous vaccines some hope was expressed that a non-living antigen might soon become a practicable alternative to the use of attenuated live bacilli.

The last morning was spent in discussing rehabilitation. Dr. A. F. FOSTER-CARTER (Frimley) discussed the clinical problem, Brigadier T. F. KENNEDY, P.M.O. of Remploy Ltd., spoke on "Remploy and the Employment of the Tuberculous," and Dr. L. MACPHERSON (New Brunswick, Canada) described the rehabilitation programme in Canada.

The conference was attended by over 150 clinicians, including guests from the United States, Canada, Scandinavia, India, Pakistan, and Nepal.

RESEARCH ON CANCER

BRITISH EMPIRE CANCER CAMPAIGN

At the 33rd annual meeting of the British Empire Cancer Campaign on July 10 at the House of Lords, under the presidency of the DUKE OF GLOUCESTER, Mr. H. J. B. ATKINS, director of the department of surgery at Guy's Hospital, proposed the acceptance of the Report and Balance Sheet. The Report gives a most comprehensive review of the researches carried out during 1955 in some thirty different centres—university, hospital, and other institutions at home and abroad—and by individuals supported by the Campaign. With the guidance of its scientific advisory committee, the Campaign made available during the year some £400,000 for research. Work has been done on fundamental questions of the nature of growth—both normal and abnormal—on the search for the causes of cancer, and also on the development of methods of therapy of immediate application. But it is noteworthy that in the fields of both chemotherapy and radiotherapy research has been designed to produce fundamental information as well as more effective methods of treatment.

Lung Cancer

A considerable amount of research has been devoted to the important problem of tobacco smoking and atmospheric pollution in relation to lung cancer. While attempts to produce tumours in experimental animals by the application of tar condensed from cigarettes have failed, work is reported from the Strangeways Research Laboratory, Cambridge, of the growth-promoting action of tobacco tars on bridge, of the growth-promoting action of tobacco tars on fragments of human foetal lung growing *in vitro*. A study of lung-cancer death rates in rural and urban areas is reported. The rural death rate from cancer of the lung increased in proportion to cigarettes smoked, but in the urban area studied—Liverpool—it is estimated that about half the deaths of men from lung cancer arose from cigarette smoking and about three-quarters of the remaining half were due to a factor which is only slightly present in the rural area. The death rates among non-smokers for urban and rural areas were reported to be in a ratio of about 9 : 1, which corresponded roughly to the ratio between the concentrations of 3:4-benzpyrene found in the city and country air.

Biochemical Changes in Cancer

Continued searching for specific biochemical differences between malignant and normal cells is producing an increasing harvest of information, but what these differences may mean is still obscure. Enzymes such as catalase are reported to be greatly diminished in the livers of animals bearing tumours. β -glucuronidase is reported to be of high activity in the livers and kidneys of a cancer-resistant strain of mice, and the activity of this enzyme has been observed to be considerably raised in the urine of the patients with cancer of the kidney, stomach, prostate, and testis and with cancer of the breast, thyroid, larynx, and oesophagus. Investigations are reported on the content of sulphatases in certain neoplasms.

Studies related to the fundamental biosynthesis of protein have revealed a high content of mucoprotein in the serum

and urine of cancer patients, and in certain cases of leukaemia a mucoprotein has been found capable of bringing about an increase in the number of total myeloid cells in guinea-pig bone marrow. Much work has been done on the investigation of nucleic acids, which seem to be so intimately involved in the organization and reproduction of the cell. All preparations of deoxyribonucleic acid (D.N.A.) from tumours so far examined contain ribonucleic acid (R.N.A.) which is not combined with the D.N.A. and is easily removed by the action of ribonuclease and by alkali. It appears that the presence of R.N.A. in the tumour is due to abnormalities in the behaviour of the ribonucleoproteins, analyses of which show marked variation from the expected ratios of guanine to adenine.

An interesting study using interference microscopy has revealed a difference in the adhesive nature of the cell surface of normal and malignant cells. Isolated tumour cells show no adhesion of a permanent nature when their pseudopodia touch another cell. This is thought to suggest a chemical change in the nature of the cell surface, associated with the malignant transformation.

Chemotherapy and Growth Inhibition

The report describes the preparation and testing of a wide range of cytotoxic growth-inhibiting drugs. As examples of studies with chemotherapeutic agents designed to produce fundamental information, those of comparisons of the mutagenic properties of the nitrogen mustards on the one hand and of the effect of the same type of drug against bacteriophage are good examples; another is the use of the nitrogen mustard HN₂ containing isotopically labelled ¹⁵N to study the changes in the plasma proteins. Triethylene melamine, which has been used clinically, has been used in the investigation of anaerobic glycolysis in tumour cells.

The long-term results of busulphan ("myleran") in the treatment of chronic leukaemia are reported, and a description is given of maintenance therapy over long periods. It is reported that increasing numbers of patients have now been treated continuously with busulphan for three or four years and for the most part have been leading normal lives throughout.

The preliminary reports of the powerful growth-inhibitory activity of 1-chloro-2-methanesulphonoxymethane are interesting, for this is a very simple compound and offers considerable scope for investigation of its mechanism of action.

Radiotherapy

The proposal to introduce a new unit for clinical dosimetry, the rad, is described. Since the biological effects of radiation stem from the energy absorbed by a cell and are independent of the energy passing through it, the new unit, the rad, is being specifically defined as the energy imparted per unit mass of irradiated tissue, and will meet the need arising from the inadequacy of the roentgen. Its introduction will require that all dose charts should be recomputed.

There are descriptions of pneumatic transfer apparatus for 1,000 Curie cobalt-60 units, and of new supervoltage installations including a 4 MeV machine. There is also a description of a 15 MeV machine which so far has been used only for experimental research. Some improvements of radiotherapy technique include convergent-beam therapy for the irradiation of small targets such as the pyriform fossa, the pituitary, or the middle ear, and the horizontal rotation method which has given satisfactory results in five cases in carcinoma of the oesophagus.

In the belief that many of the biological effects of radiation arise in part from the radicals H and OH which are produced when water is exposed to ionizing radiation, further effort has been directed to determining the number of these radicals primarily produced by different types of radiations and their rates of reaction with organic molecules. Aerobic solutions of aromatic amino-acids have been irradiated, and it is claimed that the sequence of changes is similar to the enzymatic oxidation of tyrosine.

Irradiation produces complex alterations in the physico-chemical properties of the D.N.A. molecule which result in

¹ *British Medical Journal*, 1956, 1, 413.

² *Ibid.*, 1956, 1, 1534.

When antigen and antibody react in the blood, the platelets are involved and liberate serotonin or 5-hydroxytryptamine, a pharmacologically active amine which is probably responsible for some of the basic symptoms of anaphylaxis. The importance attached to histamine is decreasing, but its presence in allergic lesions of the tuberculin-test type seems linked with invasion by mononuclear cells, which possibly

As Knights: Colonel J. P. Jenkins, O.B.E., T.D., M.R.C.S., L.R.C.P., and Drs. C. S. C. Prance, K. E. Dowd, K. C. McGibbon, and H. R. Mustard. *As Commanders (Brothers):* Surgeon Rear-Admiral R. L. G. Proctor, M.D., F.R.C.P.I., D.P.H., Q.H.P., Brigadier J. N. B. Crawford, M.B.E., M.D., Mr. R. A. Mustard, M.B.E., M.D., F.R.C.S., and Drs. C. A. Bence, T. H. Jenkins, C. G. Mackay, H. D. Hebb, and R. P. Myers. *As Associate Commander (Brother):* Dr. R. T. Paton. *As Officers (Brothers):* Surgeon Captains W. V. Beach, O.B.E., F.R.C.S., and J. L. S. Coulter, D.S.C., M.R.C.S., L.R.C.P., R.N., Major Generals A. Sachs, C.B., C.B.E., M.D., Q.H.P., and C. W. Greenway, C.B., C.B.E., M.R.C.S., L.R.C.P., Q.H.S., Colonel M. De Lacey, O.B.E., T.D., M.B., Messrs. A. B. Wallace, M.B., F.R.C.S.Ed., and D. Owen Clark, M.B.E., M.B., F.R.C.S., Drs. J. E. S. Hamilton, J. Walker, D. Grieve, G. Muir, E. M. MacAlpine, I. H. Davies, S. R. Matthews, A. L. Peers, G. Racicot, J. H. Taylor, A. H. Marsh, S. J. Thompson, T. N. Watt, D. C. Bews, L. J. Calvert, M.C., and P. M. Macdonnell. *As Associate Officers (Brothers):* Drs. J. R. Upton and G. H. A. Clowes. *As Serving Brothers:* Surgeon Commander F. B. B. Weston, M.R.C.S., L.R.C.P., R.N., and Surgeon Commander G. W. Chapman, R.C.N., Colonel J. S. McCannel, O.B.E., M.D., D.P.H., Majors F. J. Downes and W. E. Smith, R.A.M.C., Group Captain J. A. Mahoney, M.D., D.P.H., R.C.A.F., Mr. N. J. L. Margetson, M.B.E., M.D., F.R.C.S., Drs. L. M. Jacobs, I. M. Pirrie, M.C., T.D., D. C. Lavender, A. J. Keevill, M.B.E., A. B. Antoni, C. E. Stainthorpe, A. B. Walker, J. Anderson, A. P. Brown, T. J. Walters, M. W. Williams, T. W. Branch, R. C. M. Pearson, R. D. R. Shanks, C. F. Roza, Bun Pak Sun, C. N. Burnham-Slipper, A. Hamilton, B. H. H. Wooderson, W. A. Coats, S. E. Godwin, W. H. Dunn, T. H. A. Pinniger, M. P. Nightingale, J. R. Burrows, J. H. Baillie, J. F. Brown, J. G. Campbell, B. J. Egan, W. G. MacDonald, and H. S. Wright. *As Associate Serving Brother:* Dr. J. J. Lander. *As Serving Sisters:* Drs. Winifred Porteous, Aureval Sidewick Katherine Scott, and Gladys M. Miall-Smith.

Correspondence

Because of heavy pressure on our space, correspondents are asked to keep their letters short.

Sex Factor in Coronary Artery Disease

SIR,—The letter from Drs. A. R. P. Walker, M. Anderson, and I. Bersohn (*Journal*, May 26, p. 1234), "The Sex Factor in Coronary Artery Disease," gives further substance to the point I have indicated before^{1,2}—namely, that the sex ratio of the incidence is related to the total incidence of the disease in the population and, ultimately, to the diet of the population. Much more evidence to this effect is now at hand.

There can no longer be any doubt that coronary heart disease is excessively rare among the negro peoples in Africa, and all the evidence is that this is to be explained by the mode of life, particularly the diet, and not by a racial peculiarity.³ In our own work in Capetown last year⁴ it was clear that the frequency of coronary heart disease among the Bantu is only a small fraction of that among the local Europeans, with the Cape coloured people (racially unrelated to the Bantu) intermediate. These differences corresponded with a similar gradation in the average serum cholesterol and beta lipoprotein values in samples of these populations and with the fat content of the habitual diets. Within the racial groups the same relationship between diet and serum cholesterol was found. In spite of the belief of some racists, Bantu can apparently be transformed into Europeans, at least in regard to the blood lipids, by giving them European-type diets. Further, Bronte-Stewart and his colleagues⁵ have now shown in controlled experiments that the serum cholesterol in the Bantu responds like the white man to manipulations of the diet fat. Finally, we note that newborn Bantu babies do not differ from their local European counterparts in serum cholesterol concentration.⁶ Their mothers, however, differ greatly, as would be predicted on the grounds of their diets, irrespective of race.

It is not possible to dismiss the rarity of coronary heart disease in the African negro on the theory that it is genetically determined. I am informed that coronary heart disease is now appearing among the more prosperous negroes in the Gold Coast where economic and political conditions allow some of the population to change their diets towards the European pattern. Negroes in the United States are certainly not free from the disease. In a large charity hospital admitting both white patients and negroes in New Orleans, Burch and Voorhies⁷ reported the ratio between the races for the incidence of coronary heart disease to be around 4 to 1 for the period 1928 to 1937. However, over two-thirds of the cases among white patients were diagnosed from clinical and electrocardiographic evidence and less than one-third by necropsy, whereas all but four of the diagnoses among negroes were made by the pathologist. This reflects a bias in medical examination at that time when, in all respects, the negroes in the United States were far more under-privileged than now.

More recently, among 450 young U.S. soldiers with myocardial infarction, there were 63 negroes, or 7.4%. At that time negroes comprised about 10% of the entire U.S. Army.⁸ At present, Dr. Jeremiah Stamler finds that the age-specific death rate among negroes in Chicago is roughly equal to, or even exceeds, that for white people in the same community (statistical studies on the incidence of heart disease in Chicago; to be published).

Further information about the negro in the U.S. is provided by the study, just published,⁹ on 519 myocardial infarctions in a large hospital in Alabama where the negroes still do not fully approximate to the local whites in economic status, though their mode of life does not remotely resemble that of Dr. Walker's Bantu. The incidence of myocardial infarction among these negroes is estimated to be 52% of that among the white people served by this hospital. The sex ratio of infarctions among the white patients was 2.9 to 1 while among the negroes it was 1.2 to 1. However, it was observed that, whereas obesity was not unduly common among the negro men or among the white patients of either sex, all of the female negro patients were obese, which might explain the high frequency of infarction among the negro women.

Data on the Japanese in Hawaii and Japan add confirmation. Severe atherosclerosis and coronary heart disease are certainly rare in Japan. Dr. Noboru Kimura's analysis of 10,000 necropsies shows far less frequent severe atherosclerosis of the coronaries among Japanese in Kyushu than among Minnesotans of the same age, the ratio of incidence rates in middle age being of the order of 1 to 10.⁹ But, whereas in middle age the ratio of incidence among men to that in women is four or five to one among Minnesotans, in Kyushu it is scarcely two to one. Recently in Japan I found general agreement among Japanese cardiologists that Dr. Kimura's figures are comparable to their experience in other parts of Japan, and we ourselves had abundant opportunity to see that coronary heart disease is really not a common disease in that country (Drs. Paul Dudley White and B. Bronte-Stewart participated in the clinical studies). Dr. Kimura's data, as well as the analysis of a large morbidity survey by Dr. Akira Kusakawa,³ are in such good general agreement with the Japanese vital statistics on heart disease that the latter may serve as an indication of the true mortality situation in Japan.

The table gives data from the U.S. and Japanese vital statistics for 1949. The analysis of more recent data is in progress, but apparently the essential picture will be similar. For middle age, where the problem is perhaps more important, the mortality rates ascribed to coronary heart disease (including angina pectoris) are far higher in the U.S. than in Japan, and there is greater disparity between the men than between the women of the two countries.

Death Rates per 100,000 for 1949

Age	Population	Arteriosclerotic Heart Disease		Cerebrovascular Disease		Ratios Between Sexes	
		Men (1)	Women (2)	Men (3)	Women (4)	(1)/(2)	(1)+(3)/(2)+(4)
45-49	U.S. white	231.8	42.8	34.5	37.5	5.4	3.3
	Japan	24.1	13.5	89.8	98.6	1.8	1.0
55-59	U.S. white	637.9	176.7	123.4	109.2	3.8	2.7
	Japan	60.3	31.2	375.0	311.1	1.9	1.3
65-69	U.S. white	1,402.8	659.4	415.0	349.0	2.1	1.8
	Japan	125.1	77.5	1,216.2	934.1	1.6	1.3

From personal experience in Japan I believe their vital statistics may somewhat underestimate their incidence of coronary heart disease or, alternatively, our U.S. physicians may err in the opposite direction. In Japan some sudden deaths, where there was neither necropsy nor opportunity for adequate medical examination before death, are labelled "strokes" when in the U.S. or the U.K. they would be classed as coronary deaths. The physician is always influenced by his knowledge of the pattern of the disease frequency in his country, and there is no doubt that coronary occlusions are more prominent with us while cerebrovascular lesions are more common in Japan. In any case, such bias cannot explain the sex differential. The table gives the death rates ascribed to cerebrovascular lesions and the ratios of death rates between the sexes when both ascribed causes of death are combined.

As in the case of the negro, it is not possible to attribute the rarity of coronary heart disease in Japan to racial peculiarity. Coronary heart disease is not rare among Japanese long resident in the United States, where, for the most part, they live (and eat) as do other Americans. According to the U.S. vital statistics, 71% of all heart disease deaths among Japanese in this country were ascribed to coronary heart disease in 1953. The sex ratio of these coronary deaths was 4.6 to 1.

In Hawaii this spring Dr. Nils P. Larsen was able to convince us that the large population of Japanese there, who are moving far towards the American mode of life in regard to the diet, are also beginning to imitate Americans in regard to the frequency of severe atherosclerosis and coronary heart disease. For example, Dr. Larsen's necropsies on Japanese long resident in Hawaii disclosed severe atherosclerosis in 30% of the men aged 50 to 59. This is still only half the incidence observed in necropsies on white men of that age in Hawaii, but it is close to five times the corresponding incidence observed in necropsies in Kyushu. We ourselves saw a number of Japanese patients with coronary heart disease during a brief visit to Honolulu, and others were seen during a hasty trip to the sugar plantations. But during five weeks of work in Kyushu in the large university hospital and in various small hospitals and clinics we found no classical cases. The only recent specimen of a heart with a large fatal occlusion in the pathology department was from a doctor who had returned to Japan after 20 years of practice in Honolulu.

It is particularly significant that the diet in Japan is, and has been throughout history, extremely low in fats (less than 15% of calories from this source) but that the average diet of the Japanese in Hawaii is much closer to the U.S. pattern of 40+% fat

calories. Preliminary estimates suggest an average of about 30% fat calories for the Japanese men we studied in Hawaii. Further, the serum cholesterol averages of the population samples we studied corresponded to these dietary differences.

The most important conclusion from all of these comparisons is that masculinity itself is not a basic cause of coronary heart disease nor is immunity conferred by female sex hormones. Vital statistics, necropsy data, and clinical observations all agree that American females are more susceptible to coronary heart disease than are males of the same age in Japan or among the Bantu and other negroid peoples in Africa. We could also include on the one side the females of other countries where coronary heart disease is rife—e.g., some northern European countries—and, on the other, the males in some other populations—e.g., poor people in Spain and the general population of southern Italy. Should we conclude that men in Italy and Spain, as well as in Japan and among Bantu in Africa, are charged with female sex hormones and are lacking in masculinity?

None of this is to suggest that sex hormones have no importance. Sex hormones are always important, and that includes the problem of atherogenesis. But it appears that the female sex hormones offer their greatest protection—and that is limited—only in the face of such extraordinary atherogenic forces as are generated by the current mode of life of the most prosperous western society. Perhaps the female has a greater natural affinity for fat (in the diet as well as in her person) than does the male. At any rate they seem to be less affected by, or are more resistant to, a high-fat diet. But in the American and British contemporary scene it is clear that even female sex hormones are not enough to provide full protection. In the United States we are now recording some 5,000 coronary deaths a year among women under the age of 50 years. In Britain, too, I notice in the 1954 Registrar-General's report that some hundreds of relatively young women are dying each year with the diagnosis of "arteriosclerotic heart disease." If we take the sensible step of adding the figures for International List numbers 420 and 422, as the Registrar-General conveniently does for us for 1954, the sex ratio of death rates for such "degenerative" heart disease turns out to be 5.1 to 1 for the age range 45 to 49 in England and Wales.—I am, etc.,

ANCEL KEYS.

Minnesota.

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SIR,—We have read the letter by Drs. Alexander R. P. Walker, Marianne Andersson, and I. Bersohn (*Journal*, May 26, p. 1234) regarding the lack of importance of the sex factor in coronary artery disease among South African natives. These authors pointed out that "in a population relatively free from coronary artery disease differences in the severity of atherosclerotic lesions and in mortality rates from the disease between the sexes are not in evidence," whereas "in populations where the death rate is very high from the disease the corresponding figures are far higher in males than in females until old age."

In regard to this subject, we would like to call attention to the report of a recent study of the ratio of the incidence of acute myocardial infarction among 8,183 adults (90% were white) who came to necropsy at Washington University in St. Louis between 1910 and 1954.¹ In this population which underwent necropsy and which had a high incidence of acute myocardial infarction we found that a change has occurred in the relative incidence of the disease in the two sexes. In the period 1910-39 the incidence of acute myocardial infarction among men was twice as great as among women. In the period 1940-54 the corresponding incidence

among men was not significantly greater than it was among women. In the oldest age-groups the corresponding incidence was actually considerably higher among women than among men. The overall incidence of acute myocardial infarction was considerably higher among both men and women in the period 1940-54 than it was in the period 1910-39. However, even in the period 1910-39 the incidence was higher than that reported among the Bantu in South Africa.

It does not seem to us that our figures or those of Drs. Walker, Andersson, and Bersohn provide enough basis for sound generalizations. However, if we may be allowed to speculate along the same lines with the above authors, it appears to us from the figures available now that the sex factor operates extensively only at an intermediate level of incidence. When the incidence of coronary artery disease and its complications is very low the sex factor is not evident; at intermediate levels it is prominent; but at high levels it diminishes. It must be emphasized that this is only speculation and that many other variable factors are probably operating to produce the final results.

It is of interest to add that in a study now in progress² we have found an exceedingly low incidence of acute myocardial infarction among American negroes. Among approximately 3,000 necropsies performed on negro adults at a St. Louis City hospital we have found only 25 (12 men and 13 women) with acute myocardial infarction. Thus it appears that the racial characteristics or habits responsible for the low incidence of coronary arterial disease among negroes in Africa have been transferred to their descendants in America.—We are, etc.,

WILBUR A. THOMAS.
KYU TAIK LEE.

St. Louis, Missouri, U.S.A.

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Mortality from Coronary Disease

SIR,—I was very interested in Dr. W. J. Martin's figures showing the distribution in England and Wales of mortality from coronary disease (*Journal*, June 30, p. 1523). It would appear that the figures for rural districts were always lower than those for urban districts. Would it be fair to assume that more animal fat (butter, eggs, bacon, meat) is consumed in the former areas as compared with the latter? Do farmers and rural males smoke less than their counterparts in the cities? These are two important questions for which Dr. Martin may have the answers.—I am, etc.,

Hull.

L. I. HARDY.

Silicone Barrier Cream

SIR,—Your correspondent Mr. M. H. Payne (*Journal*, June 23, p. 1487) has referred to the high cost of silicone barrier creams, and gives a formula for such a product. Many such formulae have been published, most of which suffer the same disadvantage—that is, they are water washable emulsions. When applied to the skin the water content may evaporate, but because of the content of emulsifying agent the resultant film is readily dispersed in water. They are thus unable to give protection for very long against aqueous solutions. It seems to me to be fundamental that any film which is to protect the skin from aqueous solutions must be free from oil-in-water emulsifying agents. This entails the use of a transitory emulsifying agent—that is, one which breaks down on application to the skin. Such emulsifying agents are well known to the manufacturers of emulsion polishes.

The cost of 5s. per pound (0.45 kg.) is of course only the cost of the materials. It would be unfair to compare this cost with the total cost of manufactured silicone creams. This is especially true when one remembers that the labour cost for the manufacture of small quantities is very high.—I am, etc.,

D. J. WINGROVE,
Chief Chemist, Lactagol Limited.

Mitcham, Surrey.

Athlete's Foot

SIR,—I was interested to read the comments (*Journal*, June 23, p. 1486) on my previous letter on athlete's foot (*Journal*, May 26, p. 1239). However, I feel there is some misunderstanding.

The treatment described was for athlete's foot, a condition of hyperhidrosis and maceration of the feet, of which tinea is only one causative organism. Scrapings were not taken, as facilities were not available for examination, and as all cases improved on this treatment this factor seems quite irrelevant. I fear Dr. G. R. Addlestone has made the mistake of making half an investigation and basing his very conservative treatment on his findings. Did he assume that there was no causative organism in the 90% of cases in which he did not isolate filaments of tinea? Did he take swabs and make cultures in these cases? Surely it must follow that where there is maceration of the skin, with death and decay, some organism is usually implicated. Those who have smelt the feet of these cases would hardly disagree. In which case the use of a fungicidal and bactericidal agent such as formalin will logically accelerate the healing of such an infection. This method of treatment is not specific against tinea pedis; neither are most of the proprietary preparations.

An Army medical officer is a powerful agent on matters of health. He can and should "advise" commanding officers in matters like "kit layout," and ensure that all socks are shown in a fit state to be worn (not unworn), thus ensuring the soldier is equipped for foot hygiene. In fact, in no unit where the M.O. has his eye on the hygiene of the unit is such "bull" as unworn socks tolerated. I believe the standard scale of issue of socks is four pairs and not three, as stated by Dr. Addlestone.

Naturally, in all cases treated, whatever the application used, foot hygiene was instituted. I would again stress that drug treatment is useless without foot hygiene. I would agree with Dr. M. D. A. Heller that powder could be applied direct to the feet when the skin is unbroken, but surely where there is maceration there is broken skin. Also I can assure him that it is a fact of simple pathology—or was when I was a student—that insoluble foreign bodies do delay healing.—I am, etc.,

Poole, Dorset.

D. HOOKER.

SIR,—In vesicular tinea pedis and scaly or hyperkeratotic tinea the fungi, usually *Trichophyton mentagrophytes* and *T. rubrum* respectively, produce an inflammatory reaction in the skin as evidence of their activity, and fungicides cure the conditions. *T. interdigitale* is found in a proportion of cases of interdigital maceration due to hyperhidrosis. Dr. G. R. Addlestone (*Journal*, June 23, p. 1486) found "filaments, etc., of tinea pedis" in less than 10% of soldiers with "athlete's foot." The appearance of the interdigital skin is the same in those cases in which the fungus is found as in the others, and the signs of inflammation are absent.

Is there any evidence that *T. interdigitale* produces disease, and is not merely a harmless saprophyte growing in a favourable environment? The presence of fungi has been demonstrated on clinically normal feet by Baer *et al.*¹ and the workers they quote. It is possible that all cases of interdigital maceration will respond to adequate hygiene and attention to hyperhidrosis, and that the use of a fungicide is unnecessary even when *T. interdigitale* has been shown to be present. I would be interested to learn of any experimental evidence on this point.—I am, etc.,

Cardiff.

R. B. PAYNE.

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Antibody to Synovial Tissue

SIR,—In your report (*Journal*, June 16, p. 1421) of a recent meeting of the Heberden Society we were quoted as having said that an antibody prepared by immunization with synovial tissue reacted with reticulin, whereas an antibody to renal glomeruli did not. In fact we reported that antibody to glomeruli had been found to react with two groups

of tissue elements—basement membranes and material present in the media of vessels forming one group, and reticulin the second. Antibody to synovial tissue, on the other hand, reacted only with the second.—We are, etc.,

D. G. SCOTT.

ALAN G. S. HILL.

Aylesbury.

Atypical Weil's Disease

SIR,—In your issue of June 9 (p. 1342) a typical case of leptospirosis is described, not without justification, as an atypical case of Weil's disease. The purpose of this letter is to urge the abandonment of the thoroughly unsatisfactory name "Weil's disease" and its replacement in scientific publications by the more accurate term leptospirosis, to indicate an infection with organisms of the genus *Leptospira*.

In 1886 Adolph Weil, Professor of Internal Medicine at Heidelberg University, described four cases of infectious jaundice.¹ The most prominent feature of the disease that bears his name was jaundice, a complication that is now known to occur in less than 10% of cases of leptospirosis. The name cannot, therefore, accurately describe more than a tenth of the cases of leptospirosis.

In 1915 Inada and Ido showed that the disease was due, in Japan, to infection with *L. icterohaemorrhagiae*,² and the term Weil's disease came to be used for such an infection. This was probably wrong. In Bavaria an analysis of 719 cases of leptospirosis occurring between 1937 and 1947 showed that 663 (92%) were due to infection with *L. grippityphosa* and only 29 (4%) to infection with *L. icterohaemorrhagiae*.³ The disease described by Weil was very probably due to *L. grippityphosa*, and as this infection has never been reported in the British Isles⁴ it follows that "Weil's disease" cannot occur in the British Isles, although, of course, leptospirosis can and does.

These considerations apart, many medical historians dispute the claims of Weil to be the first to describe this type of infectious jaundice, and the French believe Baron Larrey's description of jaundice occurring among Napoleon's troops during the siege of Cairo in 1800 to have anteceded Weil's by 86 years.⁵ Actually it is doubtful whether Larrey was describing the same condition, but the claims of others, including Landouzy (put forward by Martin and Pettit⁶), Marsden, and Dupres (put forward by Broom⁷) cannot be as lightly dismissed.

If we accept the name Weil's disease to denote infection with *L. icterohaemorrhagiae* we must also accept a host of confusing names which denote infection with other leptospires—e.g., mud fever, swamp fever, harvest fever, rice-field fever, sugar-cane fever, swineherd fever, etc. To refer to the leptospiroses by these synonyms in a scientific publication is, in my view, to be deprecated.

At the beginning of this letter I said this was a typical case of leptospirosis, and indeed so it is to anyone who is aware of the possibility of such a diagnosis. Any case of unexplained fever accompanied by prostration, severe pain in the limbs, injection of conjunctivae, or signs of meningeal irritation should be considered a possible case of leptospirosis until proved otherwise. Vomiting and diarrhoea are not uncommon. Nor is the confusional state which your correspondent considered so exceptional.

There is one outstanding omission from the case report. The patient's occupation is not stated. Leptospirosis is an occupational disease, and an association with rats or water contaminated with infected rat urine would have proved an invaluable clue to the early diagnosis of the disease.—I am, etc.,

London, S.W.1.

H. R. MILLER.

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Tuberculosis and Mass Radiography

SIR,—Dr. C. Rubinstein (*Journal*, June 16, p. 1429) quotes several remarks in my letter (*Journal*, April 14, p. 858), which was a plea against Professor J. Crofton's, Dr. G. Lissant Cox's, and Dr. A. L. Cochrane's advocacy of legal compulsion in mass radiography (*Journal*, March 24, p. 684). Their original joint letter has evoked but desultory response in your columns, including my "still, small voice"—the only one, hitherto, raised in unequivocal opposition to compulsion. The necessary delay, to which Dr. Rubinstein refers, in receiving the *B.M.J.* in Australia is matched by delay in our importing its Australian counterpart. We are grateful to him for the brief statistical summary of results of compulsory mass radiography surveys in New South Wales since 1953, and for reference to his paper¹ which I look forward to studying carefully and without bias. The figures he quotes do little, however, to convert me to the idea of compulsion. Do the numerical results given in his letter answer any "question as to their value," or merely reinforce the axiom that if, anywhere, you take a mass radiography unit out among a lot of people, you will find a lot of tubercle?

New South Wales and Sydney must be congratulated on their relatively low incidence of pulmonary tuberculosis, as found by mass radiography. The rate (1.3 per 1,000 persons in the city, and 0.6 per 1,000 persons in rural districts) as calculated from Dr. Rubinstein's figures, is about half that which would be revealed in the U.K. It interests me that, despite legal sanction and an acceptance rate of nearly 90% in the first survey, a repeat survey in Sydney nevertheless yielded a rate of 0.7 per 1,000. Compulsion had evidently not emptied the "infecto-pool," which, reduced within three years by about half, is still a large reservoir. Incidentally, as each of our British units does well to x-ray 50,000 persons, on average, annually, it is surprising to learn, by analysis of Dr. Rubinstein's figures, that the annual "output" of an Australian unit is 113,300. We would welcome his advice on means of doubling or more our "output," as that would solve some of our immediate problems.

I agree that the older male age-groups now bear the brunt of pulmonary tuberculosis and constitute most of the infecto-pool, and that we must concentrate radiographically and in other ways on them. As I said in my first letter, most middle-aged men who are phthisical have symptoms; in many, one or a series of sputum tests suffice to confirm the disease, chest x-raying being done later. Dr. Rubinstein was, indeed, fortunate to be able to con- sider firm tuberculosis bacteriologically in all 1,170 new cases found in Sydney, a finding suggesting either that they were in the main not so-called "early" cases or that Sydney has an unsurpassable bacteriological service.

That Australia is a country "where compulsion of any kind is vigorously resented" seems to be contradicted by the acceptance by Sydney and New South Wales of one kind of compulsion—namely, chest x-raying. I am at a loss, too, to understand, now that legal powers exist, why there were no prosecutions of non-attenders. Surely the 10% to 12% of defaulters were not all people out of town on business or holiday, or ill at home or in hospital, or who had escaped the compulsive net for any other miscellaneous reason. Compulsion is abortive and mythical unless, where there are transgressors of the law, the legal punitive machinery is operated. Can Dr. Rubinstein (or anyone) tell us how, granted we get legal sanction, we can enforce John Smith, Hull docker or Barnsley collier, perhaps hundreds or thousands of his kind, to come before our x-ray camera if he is unwilling, or if, resistant he is carried there, how we may take an adequate x-ray picture of his chest? It seems to me that, once legal compulsion is invoked, these are some of the fundamental problems that we shall face.

At the Commonwealth Health and Tuberculosis Conference held in London in summer, 1955, sponsored by the National Association for the Prevention of Tuberculosis, a day was devoted to discussing mass radiography, its present and future policy.² Several references were made to use of compulsory powers, mainly by speakers in the debates following the reading of the principal papers. Dr. E. Eilertsen, of Bergen, told the Conference that Norway had done mass radiography on a compulsory basis for 7 years, the results "rather satisfactory but of course not ideal." Dr. P. Kerley, 10% to 15% of the population default. Dr. P. Kerley, chairman at a joint meeting, in summing up, said: "Com-

pulsion neither in Norway nor in Australia has got to the hard core; the 10% who will not come in so many instances are the carriers of infection." Only a few speakers at the Conference were explicitly on the side of compulsion, and, of those, two were industrial medical officers, whose work lay among well-organized, not very large, groups of people, one living and working in Borneo.—I am, etc.,

Hull.

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² *Transactions of the Fourth Commonwealth Health and Tuberculosis Conference 1955*. London.

R. HARDY.

Unit for Alcoholics

SIR,—I read with interest Dr. M. M. Glatt's letter (*Journal*, June 23, p. 1483) relating to the establishment of a special unit for alcoholics. Such units are clearly very desirable. In no way would I wish to detract from the splendid pioneering work carried out on behalf of alcoholics at Warlingham Park Hospital, but, in my view, the alcoholic rightly resents being sent to a mental hospital. Dr. Glatt bravely amplifies this opinion in his letter. This does not apply of course to the psychotic alcoholic, who represents a comparatively small percentage of all alcoholics.

The essential preliminary to the establishment of a special alcoholic clinic is the attitude of our profession itself towards the full acceptance of the concept of alcoholism as a disease entity. How often has one encountered considerable apathy, pessimism, if not downright antagonism, to these unfortunate members of society. This mistaken approach to the alcoholic patient is mainly due to complete lack of knowledge of the problem, and the all-too-ready assumption that the condition is largely determined by moral failure. It seems to me that, unless there is a definite change of heart, it is pertinent to ask who might be considered eligible to undertake the great responsibility of organizing such a unit for alcoholics.

I heartily endorse Dr. Glatt's opinion as to the invaluable help which the group therapy of Alcoholics Anonymous provides, but surely this does not mean that we should lose sight of the fact that alcoholism is primarily a medical problem, and the first essential of good medical practice is diagnosis.—I am, etc.,

Harrow Weald, Middlesex.

LINCOLN WILLIAMS.

SIR,—I am impelled to comment on Dr. M. M. Glatt's letter on a unit for alcoholics (*Journal*, June 23, p. 1483) as a medical practitioner who is also an alcoholic—a member of both B.M.A. and A.A. I was a patient in Warlingham Park Hospital last year for a period of three months—incidentally one of five doctors amongst approximately 20 patients. Most of us had undergone periods of treatment in other hospitals previously and had sought admission to Warlingham as a last-ditch attempt to deal with our common problem. I am very happy to say that in rather more than 60% of us the results have, up to now, been successful.

Up to very recently the prognosis for the alcohol addict was often regarded as hopeless. To what can one attribute the spectacular success of Warlingham Park in this field during the past four years? In other hospitals the alcoholic felt "alone." At Warlingham Park Hospital the main emphasis of treatment is on group therapy and a very close association with the Alcoholics Anonymous fellowship. One finds oneself one of an integrated group of other alcoholics with the same problems and the same experiences and all speaking the same language. One attends an average of five meetings of Alcoholics Anonymous weekly—three of them outside the hospital. All this apart from almost daily group therapy meetings in the hospital. The monthly magazine of the alcoholic group and regular reunion meetings help to keep up the feeling of "belonging" also.

I know that during my period as a patient very frequent requests were made for admission. These could only be met by adding the patient's name to an ever-lengthening waiting list. Nowadays, perhaps because of my close association with A.A., I am constantly being asked to arrange hospital admissions for alcoholic patients.

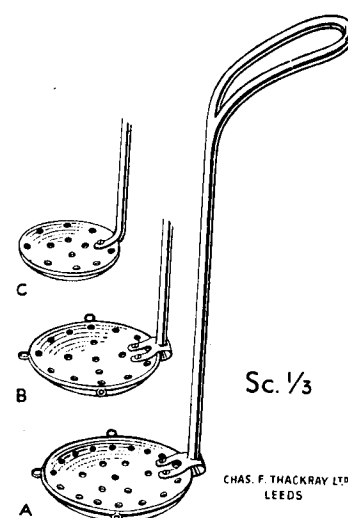
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This is a big problem. It would appear that arrangements in the United States of America are far ahead of those in this country. Could not specialized regional units be established in the country, in close association with Alcoholics Anonymous?—I am, etc.,

"LYN."

Jig for Inserting Radon Seeds into Bladder

SIR,—In certain types of carcinoma of the urinary bladder the implantation of radon seeds is the treatment of choice, but sometimes it is not easy to maintain the desired pattern during the insertion. It was felt that a method to give greater accuracy was required, and for this some form of jig seemed indicated. As many bladder tumours are of roughly circular outline it was decided to use jigs of circular shape. These required to be transparent to ensure accurate positioning and be slightly concave to fit the bladder wall. A suitable pattern has now been evolved. In general it resembles the ladle type of sugar sifter, and is made in three sizes. The smallest is 3 cm. in diameter and is perforated



to permit insertion of 12 seeds; the middle size is 4 cm. across and perforated for 17 seeds; and the largest is a 5-cm. circle planned for the insertion of 23 seeds. The bowls are made of perspex, suitably curved and perforated by holes large enough to accept freely the standard type of radon seed introducer. The holes are drilled at right angles to the surface to give a suitable distribution of the radon seeds, generally 1 cm. apart. The type of seed which has been used

is 0.7 mc., 10 mm. long, filtration 0.5 Au. The number used gives a dose of 5,800–5,900 r at 0.5 cm. from the plane. The bowl is attached to a handle of suitable length by a clamp in the smallest size, but in the larger sizes the perspex is contained by a metal ring attached to the handle. On this ring are three eyes by which the jig may be temporarily stitched to the bladder wall to prevent sliding or rotation during the insertion. After removal of the projecting bulk of the tumour by diathermy knife the radon seeds are introduced by standard seed introducers, which require to be of adequate length. Sometimes a straight introducer can be used, but it is necessary that the termination of the introducer be at right angles to the plane of the jig. Frequently, therefore, a curved introducer is required, and this should have a sufficiently long and open curve to achieve this relationship.

Sterilization of these instruments has been effected by immersion for half an hour in a solution of "roccal" 1 in 40 with 2 g. sodium nitrate added to each pint. They have been immersed in this solution for a period of four hours without ill effect. Boiling or immersion in phenols or cresols, even for a short time, is quite unsuitable, as these methods all have a deleterious effect on the plastic material used. This apparatus has now been employed by more than one surgeon, and has proved simple and effective in use. The only criticism is that a fairly large incision in the bladder wall is required to introduce the 5-cm. circular jig.

The original set was made for us by Messrs. C. F. Thackray Ltd., Park Street, Leeds, to whom we are indebted for the care and interest they have shown and for the illustration.—We are, etc.,

A. IAN L. MAITLAND.
T. MARTIN YOUNG.

Glasgow, W.1.

Worrying Reports

SIR,—Dr. T. H. H. Green complains (*Journal*, June 30, p. 1547) that patients suffering from dangerous or incurable diseases are worried by reading of these diseases in the popular press. His remedy would be to muzzle the press, presumably requiring an Act of Parliament and yet another committee to compile a list of dangerous diseases. Even then there would be patients so inquisitive as to seek information from medical dictionaries and similar sources.

Surely, the simple remedy is for the practitioner, both in hospital and at home, to exercise discretion in labelling disease for the sufferer and to take care that such terms as subarachnoid haemorrhage and disseminated sclerosis are neither seen nor heard by the patient.—I am, etc.,

Redhill, Surrey

HENRY ATKINSON.

Cigarette Swallower

SIR,—So much has been written in the past few years about the hazards of smoking that I feel I should like to add a humble contribution to the literature by quoting the following personal experience.

A patient consulted me recently complaining of an extremely sore throat. The previous evening he was at home attentively watching a big fight on television. At the crucial moment of the fight one of the less interested members of his family spoke to him. He started to say, "Sh," took a deep breath, forgetting that a cigarette was hanging from the corner of his mouth, and inhaled it. The cigarette end, about 1½ in. (3.8 cm.) long, lodged in his throat and he immediately "gagged," thereby expelling it. Unfortunately the stub stuck to the uvula and required repeated retching before it, too, was coughed up. On examination, he had two ulcers of the uvula and small first-degree burns of the soft palate and right fauces. These lesions were extremely painful, but responded well to treatment (painting with pig. iod. co., thymol mouth washes, and antiseptic lozenges).

I would like to add that this patient has now given up smoking—perhaps he should have given up T.V.—I am, etc.,

London, E.7.

M. LUBEL.

Unconscious Mental Activity?

SIR,—Much has been written recently about Freud and psycho-analysis in view of the centenary of his birth. E. Stengel (*Journal*, May 5, p. 1000) states that "it [psycho-analysis] is superior to other psychological treatments," and that "psycho-analysis proper is unrivalled as a tool of investigation into the mental life of individuals."

One feels that these statements cannot be left unchallenged. In your own appraisal of Freud and his ideas (p. 1027) you state that "many scientists have maintained that psycho-analysis can never be studied by the method of scientific experiment. . . ." I think one can go further and say that most of Freud's "hypotheses" are not really hypotheses in the scientific meaning of the word, but they are statements with little meaning—as they cannot be translated into scientific language or thought. For example, in psycho-analytical language a boy is born with an innate "Oedipus complex" in which he desires his mother and wants to get rid of his father as a rival. The thought of castration, however, forces him to give up this attitude. This idea, however, is "unconscious," so the boy does not know about it. This type of logic is incomprehensible from a scientific point of view. It is against all known scientific knowledge that a child can be born with "ideas" that exist in an undefinable entity known as the "unconscious mind." You also state that "hitherto there have hardly been any attempts" to study psycho-analysis experimentally. But it is difficult to visualize what type of experiment one can perform to verify the existence of an "unconscious mind" or the "super-ego" and the "id," etc.

Cohen and Nagel¹ state that a hypothesis can only be of value if it is capable of verification and it "must be stated in terms of

determinable empirical operations." They continue, "Many theories which have a wide popular appeal fail to meet the conditions specified. Thus the theory that whatever happens is the work of . . . the will of the unconscious self is unsatisfactory from the point of view we are now considering. For that theory is not 'verified' if after the happening we can interpret the event as the work . . . of the unconscious self. In fact the theory is so poorly formulated that we cannot state what its logical consequences are, and therefore what should be the nature of some future event. The theory does not enable us to predict. It is not verifiable. It does not differentiate between itself and any apparent contrary theory, such as that whatever happens is fortuitous."

To expand further on this point: Shaffer² states that "(1) A first serious shortcoming of psycho-analysis is that it is based on unreliable data. In recent years psychologists have tended less and less to use introspection as a method of research. (2) Especially incredible to scientific thinkers are the psycho-analytical concepts of inherited ideas, 'the collective unconscious,' and of fixed symbols. There is no conceivable biological mechanism by which an idea, a thought or symbol can be inherited. (3) Factually psycho-analysis has hardly a leg to stand on."

In contrast to psycho-analysis, however, the study of psychology was first put on to a scientific basis by I. P. Pavlov, when he studied conditioned reflexes, and later expanded by Watson, Hull, and Shaffer in the U.S.A. They explain human behaviour in terms of "stimuli," "responses," "drive," "adaptation," etc. These terms—in contrast to psycho-analytical jargon—can be defined in terms of "empirical operations," and therefore form the basis of laboratory experiments. One very important difference between this objective psychology and psycho-analysis is that in the former an attempt is made to explain human behaviour in terms of what we know of biology and physiology; whereas psycho-analysis is entirely divorced from the biological sciences and has created for itself a "dream world" of its own. Objective psychology (some have called it "behaviourism") is dynamic and stresses the importance of the individual's environment. Psycho-analysis is largely introspective.

One of the great failures of psycho-analysis is to explain neuroses adequately. Neurotic symptoms are supposed to be "substitutes for the gratification of repressed urges" and related to the Oedipus and castration complexes. However, the objective psychologists have defined neurotic behaviour as "unadaptive learned behaviour which in spite of repeated evocations fails to become extinguished," and this definition is elaborated in a most illuminating way by Wolpe.⁴ A characteristic experiment to produce neurosis is the well-known one by Pavlov, as quoted by Wolpe. "A dog was given food when a luminous circle was projected on to a screen, but never given food at the projection of an ellipse. After positive and negative conditioned responses had been established the ellipse was made more and more closely to resemble a circle. Eventually the dog 'broke down,' showing intense fear and avoidance of the experimental situation."⁴ Neurotic behaviour has also been produced experimentally in children.⁵ In other words normal and neurotic behaviour can be explained in terms of conditioning and habit formation without involving such imaginary entities as the "unconscious" castration complex, etc.

In conclusion I feel that psycho-analysis has outlived its usefulness and will be replaced by the scientific study of psychology along the lines developed by Pavlov.—I am, etc.,

Johannesburg.

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- 3 Shaffer, L. E., *The Psychology of Adjustment*, 1936. Houghton Mifflin Co., Boston.
- 4 Wolpe, J., *S. Afr. med. J.*, 1950, 24, 613.

SIR,—I agree with Dr. F. A. Pickworth (*Journal*, June 9, p. 1364) that the expression "unconscious mental processes," in spite of long usage, still has the semblance of a contradiction in terms, and it is partly on account of the intellectual indigestion that this and other psychoanalytic phraseology causes that Freudian psychology in particular and dynamic psychology in general are still regarded even now by many educated people, including many medical men and professional psychologists, with disdainful scepticism, sometimes amounting to open rejection. As Dr. E. Stengel (*Journal*, June 30, p. 1544) points out, the problem is a semantic one and its resolution comparatively simple.

The following points would seem to be relevant: (1) In everyday speech the term "mind" is commonly used as being synonymous with "conscious thinking." My "consciousness" is my "mind"—that which is "conscious" is "mental." (2) It may reasonably be argued that "conscious" or "mental" processes are physiological processes occurring within the brain. In other words, it may be said that mental—i.e., "conscious"—events constitute a special class of brain events. (3) At the same time, in psycho-analytically orientated circles "the unconscious" is also thought of as being "mental" and forming part of the individual's "mind" or "psyche." However, "the unconscious," although it may influence and be influenced by consciousness, is not (it hardly need be said) itself conscious—that is, "mental" in the everyday sense. (4) "The unconscious" is therefore, in my view, best regarded as being a dynamic physiological system within the brain, whose structure and mode of functioning can nevertheless be conveniently described to a considerable extent in metaphorical terms derived from the language of consciousness (and it is presumably for this reason that it is thought of as being "mental" by the analytically orientated). (5) Finally, in view of the fact that both conscious thinking and the processes of the unconscious can reasonably be held to occur within the brain, many of the philosophical problems concerning the relationship between "the mind" and "the brain" can be shown to be problems relating to the use of words and be resolved without difficulty.

In the light of what has been said above, we may now offer to Dr. Pickworth the following, in lieu of an "unambiguous redefinition" of Freud's "insight into unconscious mental processes": An understanding, formulated and expressed in metaphorical (one might even say allegorical) language, of that dynamic physiological system of non-conscious brain processes which Freud designated "the unconscious" (whose content and mode of functioning resemble in many respects the content and mode of functioning of that ever-changing organization of brain processes known as "consciousness").—I am, etc.,

Chester.

E. R. BANNER.

Radioactive Iron Studies

SIR,—Dr. G. Wetherley-Mein and others in their article on radioactive iron studies in routine haematological practice (*Journal*, June 23, p. 1445) have failed to mention the physiological basis of their investigations. The results that they have reported are those giving the rate of disappearance of measurable radioactivity from the circulation and its deposition in various organs. These findings depend upon the take-up of the radioactive iron-protein complex by cells of the macrophage system (reticulo-endothelial system of Aschoff¹). The ⁵⁹Fe, either combined with β-globulin or with the metal-binding protein of the recipient's plasma, is removed from the blood mainly by macrophage cells contained in the liver, spleen, and bone marrow. It can be shown microscopically that following intravenous introduction of iron saccharate or of "protein-complex" these substances are contained almost exclusively in the macrophage cells of those organs.

In similar experiments to those reported by the authors, Halpern,² in Paris, has shown that, by injecting a radioactive ⁵⁹iodine-albumin-complex into experimental animals, the rate of clearance is equivalent to that of injected particulate carbon, and that both forms of experiment show an exponential clearance of the substance from the plasma. This rate of clearance is termed by him "the phagocytic index" and is denoted by a straight line, as shown by Wetherley-Mein *et al.*, when the clearance rate and the time are related on semi-logarithmic graph paper. Halpern has also found that the radioactive ⁵⁹I begins to be slowly released from the macrophage cells after some hours and is reintroduced into the circulation, there to be redeposited or excreted, mainly in the urine. Miescher,³ in Basle, using red blood corpuscles labelled with ⁵¹Cr, shows similar

results, although he indicates that the bone-marrow is eventually responsible for a greater concentration of the radioactive combination.

There are various other important factors which must be taken into account when evaluating the results of the reported experiments—namely, the total and relative volume sizes of liver, spleen, and bone-marrow; the vascularity of these organs; and the total blood volume of the body and its velocity. By various photometric and radioactive methods it has been found that in the normal experimental animal, subjected to a standard intravenous injection of colloid or particulate substance, the speed of clearance by the macrophage cells is directly proportional to the sizes of the liver, spleen, etc., and altered by the physical conditions operating in the cardiovascular system. Furthermore, it has been found that this clearance activity by the macrophage system can be experimentally modified by operation (partial hepatectomy, splenectomy), hormones, and drugs,^{4,5} and the introduction of a disease or pathological condition.⁷ The graphs which have been shown in this article indicate that the radiation was recorded from surface measurement. Thus, it is not taken into account that a normal adult liver (1,500 g.) is over seven times the size of the spleen (200 g.) and that these organs are physically modified by the size of each individual patient and by the particular pathological condition—e.g., high radioactivity found in splenomegaly and in myelofibrosis where the authors admit the presence of an "enormous spleen." In addition, the liver takes up the initial amounts of the injected substance, and only after a point of macrophage saturation or local "blockage" does deposition occur to any appreciable extent in the spleen and other organs. Thus, where liver damage is present, the measurements of radioactivity will be decreased in that organ and relatively increased in other areas.

Wetherley-Mein *et al.* have thus indicated another method for the measurement of macrophage activity using radioactive iron-protein complex. They have shown that the activity of the macrophage system has been affected by various pathological conditions. However, from their method and results there is no valid claim that guidance has been given in assessing either normal or abnormal erythropoiesis. In its present form their clinical procedure has no direct bearing on the diagnosis or treatment of blood conditions, and it is not therefore warranted in routine haematological practice.—I am, etc.,

London, W.C.2.

D. L. J. BILBEY.

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2. Halpern, B. N., Bénacerraf, B., Stiffel, C., Guichard, S., and Biozzi, G., *Ann. Inst. Pasteur*, 1955, 89.
3. Miescher, P., *Klin. Wschr.*, 1956, 34, 129.
4. Nicol, T., Helmy, I. D., and Abou-Zikry, A., *Brit. J. Surg.*, 1952, 40, 166.
5. — and Snell, R. S., *Nature (Lond.)*, 1954, 174, 554.
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Treatment of the Cord in the Newborn

SIR,—I was interested in Dr. A. B. Murray's memorandum (*Journal*, June 30, p. 1530) on treatment of the cord. I have recently reviewed our routine care of the newborn, together with some of the results obtained over six years (1950-5 inclusive) in two maternity units, and the following points have some bearing on the problem.

In unit A, with about 1,300 deliveries a year, we have continued to treat the cord in the "traditional" way, using powder, sterile dressing, and crêpe bandage. Small premature babies who are nursed naked and certain cerebral and asphyxiated full-term infants form exceptions to this rule. In unit B, with some 950 deliveries, a clamp which occludes the free end of the cord was adopted three and a half years ago.

During the six years under review no case of liver infection or, except in infants with gross congenital abnormalities, of death due to either streptococcal or staphylococcal organisms has been found among some 13,101 babies nursed in the two units. There was no evidence to suggest that

three cases of neonatal meningitis in premature babies had been acquired through cord infection, although this route may have been responsible for two cases of osteomyelitis developing soon after discharge in infants who had appeared healthy in hospital. Both the methods of cord treatment therefore appear to have been reasonably satisfactory in preventing serious infection, although the clamp has certain disadvantages, since it cannot be used with safety on a thick cord, it occasionally causes chafing of the skin, and some infants need an additional dressing as the cord separates.

The presence of resistant staphylococci and the recrudescence of streptococcal infection reported from some centres¹ make Dr. Murray's work timely. It may well be that the traditional method of treating the cord and navel is sound provided the binder is loose enough to allow abdominal respiration. Should we not regard the cord and umbilicus as open surgical wounds until healing is complete? Before reading of Dr. Murray's investigation we had decided to look into the problem here, particularly with regard to the care of the cord in the smaller premature babies.—I am, etc.,

Oxford.

VICTORIA SMALLPEICE.

REFERENCE

1. Gibson, J. and Calman, R. M., *Lancet*, 1953, 1, 320.

Obituary

Mr. R. R. KERR, honorary consulting surgeon to the Victoria Memorial Jewish Hospital, Manchester, died suddenly on May 31 at Cannes, where he was on holiday with his wife and daughter. Roy Russell Kerr was born at Winnipeg, Canada, in 1888 of parents of Scottish descent. Early in his life his father, Francis Ferguson Kerr, a schoolmaster, went to Edinburgh to study medicine, which he practised later in Horwich and Prestwich, Lancashire. In 1904 Roy Kerr took up the study of medicine at Edinburgh University, graduating M.B., Ch.B. in 1909. After a year as house-surgeon to Professor Alexis Thomson in Edinburgh, he entered general practice at Heaton Park, Prestwich, near his parents' home, but at the outbreak of war in 1914 he joined the R.A.M.C. He served in a hospital ship and also as a battalion medical officer on the Western Front. A year later he transferred to the Royal Navy and saw service in light cruisers in the South Atlantic. He used his spare time at sea to some purpose, and was given leave to sit his Primary Fellowship, which he passed successfully in 1917. He took the final Fellowship in 1920. After demobilization Mr. Kerr was elected honorary surgeon to the Victoria Memorial Jewish Hospital, Manchester, which he served well for some 28 years, watching it grow from a very minor to a first-class modern hospital. He resigned when the National Health Service came into being rather than serve under the new dispensation. His chief work, which he carried out to the end, was medico-legal. He was an excellent witness, clear, concise, and absolutely fair. He enjoyed the confidence of the judges, both in the county courts, where he was a constant attender, and in the assize courts, where he usually had several cases in each session. Essentially an individualist who held his opinions strongly and was always ready to state them dogmatically, he was at the same time a very kindly, lovable man who was trusted and revered by his patients. He had a very human tolerance for the failings of others and was generous with help to all who needed it. Roy Kerr's home life was a very happy one. He loved his home, his farm, his apple trees, and above all his family. Everything he tackled he did with zest. He died suddenly, as perhaps he would have wished, but he had recently appeared so full of life and energy that his death has come as a severe shock to his family and friends. To his widow, two daughters, and two sons, both doctors, his many friends will wish to extend their sympathy and express their sense of loss of a very true friend and a vivid and colourful personality.—E. S. B. H. and J. H. K.

Medico-Legal

TAXATION OF VALUE OF INSURANCE POLICIES GIVEN TO VOLUNTARY HOSPITAL STAFF

[FROM OUR MEDICO-LEGAL CORRESPONDENT]

In 1937 the board of management of the Hospital of St. Cross at Rugby adopted a scheme designed to give recognition to the services of its voluntary medical staff by taking out on their lives endowment policies in the name of the board with premiums paid by the board. The sum assured was to be paid to the insured members of the staff when they reached the age of 60, and the scheme provided that if the hospital ceased to be voluntary and the management was taken over by the State the policies were to become the sole property of those in whose favour the board had taken them out. After nationalization the policies were assigned by deed from the board to the individuals insured, who thereupon had the option of continuing to pay the premiums themselves or accepting the surrender value of the policies.

Dr. Ronald Edward Smith, who was one of the voluntary staff included under the scheme, elected to pay the premiums and keep his policy on foot. Thereafter the surrender value, by then amounting to £650, was included by the Inspector of Taxes in his assessment for income tax under Schedule D. Dr. Smith appealed against this assessment to the General Commissioners on the ground that the surrender value was not part of the annual profits or gains accruing to him from his profession of medical practitioner, and the Commissioners allowed his appeal against the assessment. The Crown thereupon appealed against the Commissioners' decision.

This appeal was heard by Mr. Justice Vaisey, who delivered his reserved judgment on July 4.¹ His Lordship observed that the problem was a familiar one, exemplified by the cases relating to cricketers' benefits and clergymen's Easter or Whitsuntide offerings. Even a voluntary payment of his office or employment, like a clergyman's Easter offering or a cricketer's benefit. If, however, it was in the nature of a personal gift, as in the case of a "testimonial" or a contribution for a specific purpose such as to provide a holiday, it was not taxable. The test was put by Lord Loreburn in *Cooper v. Blakiston*² thus: "Where a sum of money is given to an incumbent substantially in respect of his services as incumbent, it accrues to him by reason of his office. What you choose to call it matters little. The point is, what was it in reality?" Applying this test, he held that Dr. Smith's services at the hospital were not within the scope of his profession, and accordingly the surrender value accrued to him by reason of the exercise of his profession.

His Lordship therefore allowed the Crown's appeal and remitted the case to the Commissioners to decide what was the proper year of assessment.

NULLITY REFUSED IN SPIKE OF IMPOTENCE

[FROM OUR MEDICO-LEGAL CORRESPONDENT]

It is a fundamental principle in all civilized jurisprudence that you cannot have your cake and eat it. This principle was well illustrated in its application to the law of nullity in a case decided by Lord Strachan in the Court of Session on June 29, 1956.³

In 1952 a nurse married a man who was, as they both knew, impotent as a result of war wounds, and whose impotence was incurable. She was largely influenced in her decision to marry him by sympathy arising from her

¹ *The Times*, July 5, 1956.

² [1909] A.C. 104.

³ *Scotsman*, June 30, 1956.

knowledge of his condition, and to some extent by the sense of dedication to duty instilled by her profession. She knew that by marrying him she would be giving up the chance of having children of her own, but she had a certain amount of affection for him and thought she could have quite a happy life with him. As she wanted children she intended to adopt a baby. The marriage was against the advice of her mother and of the surgeon who had performed a series of operations on the husband.

After the marriage came disillusion. The husband turned out to be unstable in character, a gambler, and unable to keep a job for any time. When they got a house of their own the wife tried to adopt a child, but apparently the husband was regarded as unsuitable as an adopter. She became subject to fits of depression which she could not explain, and after four years of marriage became so unhappy that she finally left him in July, 1955. She then instituted an action for declarator of nullity on the ground of her husband's impotence.

Lord Strachan, in dismissing the action, said that he was willing to assume that the wife married with the highest motives. Her position now was that she had changed her mind because the marriage proved to be unhappy. The absence of a sexual life had had an effect on her which she had not expected, and she had been mistaken about her husband's character. In the circumstances to free her from the rule of personal bar, which applied because of her knowledge of his impotence, would be to recognize that a woman in her position might solemnly enter a marriage with the option to annul it if it should not prove to be successful. This was not consistent with either public policy or equity. She had made her choice and accepted her husband with knowledge of his defect and must be held to her bargain.

Medical Notes in Parliament

B.C.G. Vaccination

Dr. A. D. D. BROUGHTON (Batley and Morley, Lab.) asked the Minister of Health if he would make British B.C.G. vaccine available for 5-year-old children, and also for newly born infants of tuberculous parents, now that there was evidence of this vaccine producing a high degree of immunity against tuberculosis without causing ill effects; and whether, in view of the recent favourable report¹ of the Medical Research Council on the efficiency of a British B.C.G. vaccine, he would extend the scheme for the vaccination of 14-year-old children to cover all children of that age. Mr. TURTON replied on July 4 that local health authorities were already able to offer B.C.G. vaccination to any person known to have been in contact with tuberculous infection and to all 13-year-old children. He was about to ask authorities to consider making fuller use of their powers in relation to 13-year-old children, but he did not consider it advisable to go further than this at the moment.

Days Lost Through Bronchitis

Dr. BARNET STROSS (Stoke-on-Trent, Central, Lab.) asked the Minister of Labour for the number of working days lost due to chronic bronchitis for each year since 1951. Mr. IAIN MACLEOD stated on July 2 that these figures were not available. He understood that statistics available for 1953-4, which did not distinguish chronic forms, showed that bronchitis generally was certified as the cause of incapacity for claimants under the national insurance scheme for rather more than 25½ million weekdays. This might be taken as an approximate measure of the number of working days lost through bronchitis in that year.

School Eyesight Tests

Mr. J. NIXON BROWNE, Under-Secretary, Scottish Office, told Miss MARGARET HERBISON (Lanarkshire, North, Lab.) on July 3 that the Secretary of State was seeking in con-

¹ *British Medical Journal*, February 25, 1956, p. 413.

sultation with the education authorities to assess the practicability and value of testing the eyesight of children at an earlier age than was at present adopted. Miss HERBISON urged him to consider carrying out the recommendations made by opticians in Scotland. Many people were never found by school testing to need spectacles, and yet did do so. Mr. Browne said these matters were under active consideration.

Building Cuts

The MINISTER OF HEALTH stated in answer to Mr. A. BLENKINSOP (Newcastle-upon-Tyne, East, Lab.) on July 2 that since April 1 loan sanctions had been postponed on schemes for providing accommodation for elderly persons to the value of £900,000, including nine new buildings, and had been issued or promised on schemes to the value of £980,000, including 13 new buildings. Mr. BLENKINSOP described this as a shocking statement, and said it was hypocritical for the Minister to go about the country urging local authorities to go ahead with providing accommodation for the elderly and infirm when he was not providing the cash to enable it to be done. Mr. TURTON said that was not so. In view of the amount of current building work, in which the hospital programme played a not unimportant part, it had been necessary to restrict new loan sanctions to essential needs of the old people, and choose the most urgent projects. This would mean that the loan sanctions given before April, and the ones he had just mentioned, would constitute the present building programme for old people's hostels. In the autumn the matter would be reviewed again.

Mr. C. GIBSON (Clapham, Lab.) asked how many maternity and health centres had been refused consent, or a starting date denied, as a result of the cut of £340,000 in the capital estimates of local health authorities. Miss PAT HORNSBY-SMITH, Parliamentary Secretary, said there were one health centre and ten maternity and child welfare clinics. Mr. GIBSON argued that it was bad economy to cut down on necessary health services. Miss HORNSBY-SMITH replied that all departments had had to make some contribution to the Government's policy. These schemes had not the highest priority, and they had not been able to sanction them.

Civil Defence Economies

The MINISTER OF HEALTH stated in reply to Mr. V. COLLINS (Shoreditch and Finsbury, Lab.) on July 6 that the detailed figures of the economy cut of £573,000 in the Health Service under the heading of Civil Defence were:

Expansion of Blood Transfusion Service ..	£ 5,000
Acquisition and initial repair of former hatted hospitals and camps for which there is no peacetime use ..	20,000
National Hospital Service Reserve (slowing down production and issue of uniforms) ..	140,000
Purchase of training equipment for the ambulance service ..	20,000
Grants to local authorities ..	10,000
Purchase and storage of materials for reserve ..	378,000
Total ..	573,000

Crash Helmets

Mr. E. W. SHORT (Newcastle-upon-Tyne, Central, Lab.) was informed by Mr. HUGH MOLSON, Parliamentary Secretary, Ministry of Transport, on July 4, that 1,146 motorcyclists were killed in road accidents in 1955. Of these 747 were reported not to have been wearing crash helmets. It was not known how many of these died from head injuries. He added that the Road Research Laboratory estimated that one in three motorcyclists used crash helmets. It was thought to be largely because of that that there had been a reduction in the proportion of deaths from accidents to motorcyclists.

Doctors' Pay Claims

Lieut.-Col. M. LIPTON (Brixton, Lab.) asked the Minister of Health on July 9 what claims for increased pay for

doctors he had received from the British Medical Association and other bodies, and what action he was taking. Mr. TURTON stated that a memorandum outlining a claim for increased remuneration for general practitioners and hospital staff had been submitted to the Secretary of State for Scotland and himself. He was not yet in a position to make any statement about it.

Parking Charges for Doctors' Cars

Dr. BARNET STROSS (Stoke-on-Trent, Central, Lab.) asked the Minister whether he was aware that medical practitioners in the course of their work would be subject to payment when parking meters were installed; and what allowances would be made to Health Service doctors to offset this charge. Mr. TURTON replied that the remuneration of doctors providing general medical services under the Health Service already took account of practice expenses generally, and he did not propose any special action in respect of this particular matter. Dr. STROSS urged that it would be unfair that men who had to visit frequently in these areas should have to pay these charges. Mr. TURTON pointed out that the regulations for parking meters had not yet been formulated. Mr. ERNEST DAVIES (Enfield, East, Lab.) asked him to make representations to the Minister of Transport that there should be some flexibility, so that general practitioners waiting on patients would not incur parking meter charges. Dr. STROSS said the Minister of Transport had already written to him stating that he could not make any relaxation—the charges would be made.

Atomic Radiation

Mr. LESLIE HALE (Oldham, West, Lab.) asked the Minister of Health what research the Medical Research Council were conducting into the effects of atomic rain which had recently fallen after the atomic explosions in the Far East. Mr. TURTON said that the Medical Research Council were conducting research on the biological effects of exposure to increased levels of radiation. This would cover any effects arising from radioactivity deposited in rain. Mr. HALE suggested that in view of the information now coming forward of the serious effects of strontium upon the bone structure, especially in children, and of the varied distribution, shown by its existence in animals, it was important that every possible method should be adopted for checking as soon as possible, and asked what were the possibilities. Mr. TURTON replied that the Medical Research Council were supporting a substantial and increasing programme of research on the biological effects of radiation from various sources, and would continue to do so. Dr. EDITH SUMMERSKILL (Warrington, Lab.): In view of the important report of the Medical Research Council of the effect of nuclear radiation on man, is the Minister going to treat this seriously and make a statement before the recess? Mr. TURTON: The researches are going on. I hope Dr. Summerskill will not exaggerate the report of the Medical Research Council, which said that the present and foreseeable hazards from the very small increase in the world-wide atmospheric radioactivity caused by test explosions were negligible, and would not be expected to produce any detectable ill effects. Dr. SUMMERSKILL: I would like the Minister to read that part of the report which says if bombs are dropped in the next 30 years at the same rate as they are being dropped now, the effect of strontium on the bone structure will be very serious. Mr. TURTON: I have given a summary, it is quite true that the report did mention the danger from radio strontium if the explosions went on during the lifetime of those living now, and that is being studied with other matters.

Mr. HALE also asked what research body was specifically charged with the study of the genetic effects of nuclear and thermo-nuclear explosions; and what material was collected during the allied occupation on the number of deformed and defective children born after the explosions at Nagasaki and Hiroshima. Mr. TURTON replied that research on the genetic effects of exposure to radiation from all sources was

being undertaken by the Medical Research Council, and studies were also in progress in various university and other research departments. The United States Atomic Bomb Casualty Commission had since 1947 been collecting information on the subsequent history of persons exposed to the atomic bombs in Hiroshima and Nagasaki, and a preliminary report had been published on the children born to such persons.

Fluoridation of Water Supplies

Mr. J. GRIMOND (Orkney and Shetland, Lib.) asked what was the present policy of the Government over the introduction of fluorine in water supplies. Mr. TURTON told him that it continued to be that recommended by the United Kingdom Mission to the United States of America and announced in the House in December, 1953—namely, that studies should be made in some selected communities of the various aspects of the fluoridation of water supplies before a decision was made whether it should be generally adopted in this country. Mr. GRIMOND said there seemed to be some doubt about the ultimate benefit, or otherwise, of this policy. When would the results of the investigations be known? Mr. TURTON said the experiment would have to continue for some time before any conclusions could be drawn.

Mental Deficients Review

Mr. A. BLENKINSOP (Newcastle-upon-Tyne, East, Lab.) asked how many people were detained under the Mental Deficiency Acts on December 31, 1955, in whose cases the circumstances rendering them subject to be dealt with were that they were found neglected, and how many of these cases had been reviewed by the Board of Control since the judgment in the case of *Regina v. Board of Control, ex parte Ruthy*. Mr. TURTON stated that the information was not available in the form requested. In response to inquiries made in February and March of this year by the Board of Control, 5,732 mentally defective patients were reported as having been found neglected by a judicial authority and dealt with under the Mental Deficiency Acts while in the care of public or charitable bodies. About 2,000 cases had been reviewed to date.

Board of Control

Dr. DONALD JOHNSON (Carlisle, Con.) asked the Minister of Health if he was aware of the confusion in the public mind created by the fact that the Board of Control, previously located independently, had now an identical address with the Ministry of Health; and if he would arrange for adequate recognition of the separate existence of the Board as an independent body. Mr. TURTON said he thought the separate existence of the Board as an independent body was widely recognized. It was convenient for administration that the Ministry and the Board should be in the same building. Dr. JOHNSON asked if it could be made clear that the functions of the Board were to protect the liberty of the subject. Admirably intentioned though the Board might be, it had given the impression recently that it was both lethargic and inefficient in dealing with matters relating to the individual. Mr. TURTON: I can assure Dr. Johnson that proximity to me does not induce lethargy or inefficiency.

Hospital Consultants

Dame IRENE WARD (Tynemouth, Con.) asked the Minister of Health if he was satisfied with the machinery for reviewing the establishments of hospital consultants at each stage of the proceedings; what steps were taken to avoid unfairness and to pay regard to local conditions; and what action was taken by regional boards to find alternative employment for consultants declared redundant and to preserve their pension rights. Mr. TURTON replied that the hospital boards paid full regard to local conditions. In the rare case of redundancy a moral obligation rested on them to give the consultant the greatest possible assistance in finding another post. A consultant who considered that his appointment was being terminated unfairly had a right to have the board's decision reviewed by him.

INFECTIOUS DISEASES AND VITAL STATISTICS

Summary for British Isles for week ending June 23 (No. 25) and corresponding week 1955.

Figures of cases are for the countries shown and London administrative county. Figures of deaths and births are for the 160 great towns in England and Wales (London included). London administrative county, the 17 principal towns in Scotland, the 10 principal towns in Northern Ireland, and the 14 principal towns in Eire.

A blank space denotes disease not notifiable or no return available. The table is based on information supplied by the Registrars-General of England and Wales, Scotland, N. Ireland, and Eire, the Ministry of Health and Local Government of N. Ireland, and the Department of Health of Eire.

CASES in Countries and London	1956					1955				
	Eng. & Wales	London	Scot.	N. Ire.	Eire	Eng. & Wales	London	Scot.	N. Ire.	Eire
Diphtheria ..	5	0	4	0	2	18	4	3	0	
Dysentery ..	1,519	256	225	16	2	862	72	368	25	1
Encephalitis, acute ..	6	2		0		3	0		0	
Enteric fever:										
Typhoid ..	2	0	0	1		1	0	0	0	
Paratyphoid ..	18	0	0	0		23	0	1	0	
Food-poisoning ..	255	13		0		278	23		0	
Infective enteritis or diarrhoea under 2 years ..				10	25				22	18
Measles* ..	3,224	280	254	67	280	20,515	506	181	138	333
Meningococcal infection ..	29	1	16	0	1	28	4	9	1	
Ophthalmia neonatorum ..	48	3	5	0		34	4	6	0	
Pneumonia† ..	248	14	128	2		358	20	144	2	5
Poliomyelitis, acute:										
Paralytic ..	38	5	4	2	4	34	4	5	0	1
Non-paralytic ..	25	4				20	4			
Puerperal fever‡ ..	197	28	14	0		233	30	6	5	1
Scarlet fever ..	661	62	67	33	22	541	27	63	40	20
Tuberculosis:										
Respiratory ..	705	91	137	27		746	90	137	29	
Non-respiratory ..	107	7	14	4		90	8	30	3	
Whooping-cough ..	2,164	104	250	54	124	1,823	95	117	82	46

DEATHS in Great Towns	1956					1955				
	Eng. & Wales	London	Scot.	N. Ire.	Eire	Eng. & Wales	London	Scot.	N. Ire.	Eire
Diphtheria ..	0	0	1	0	0	0	0	0	0	0
Dysentery ..	0	0		0		1	0		0	
Encephalitis, acute ..		1		0			0			0
Enteric fever ..	0	0	0	0		0	0	0	0	
Infective enteritis or diarrhoea under 2 years ..	3	0	1	0	0	3	0	0	0	2
Influenza ..	1	0	0	0	0	3	0	1	0	1
Measles ..		0	0	0	1		0	1	0	0
Meningococcal infection ..		1	0				0	0		
Pneumonia ..	164	19	14	10	5	165	23	10	5	3
Poliomyelitis, acute ..	2	0			0	2	0			0
Scarlet fever ..		0	0	0	0		0	0	0	0
Tuberculosis:										
Respiratory ..	46	7	8	2	6	67	8	9	0	9
Non-respiratory ..		3	0	0	0		0	2	0	3
Whooping-cough ..	3	0	0	0	0		0	0	0	0
Deaths 0-1 year ..	189	19	25	2	11	180	16	34	7	8
Deaths (excluding stillbirths) ..	4,600	636	520	90	157	4,617	591	541	83	174
LIVE BIRTHS ..	8,005	1251	926	236	427	7,654	1086	953	208	502
STILLBIRTHS ..	231	33	30			183	17	24		

* Measles not notifiable in Scotland, whence returns are approximate.

† Includes primary and influenza pneumonia.

‡ Includes puerperal pyrexia.

Infectious Diseases

Graphs of Infectious Diseases

MENINGOCOCCAL INFECTION

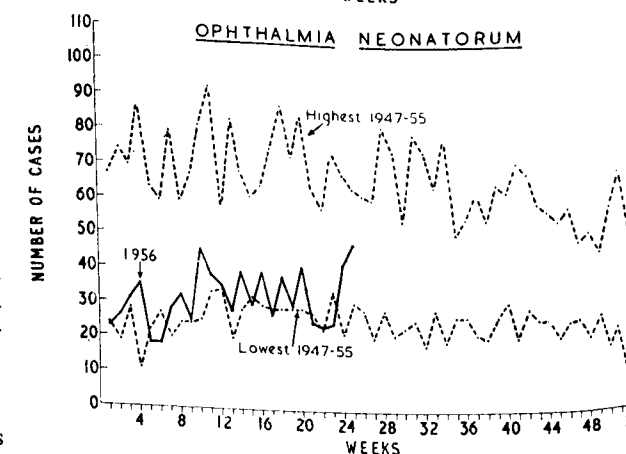
NUMBER OF CASES

WEEKS

Highest 1947-55

Lowest 1947-55

1956

**Week Ending June 30**

Notifications of infectious diseases in England and Wales during the week included: scarlet fever 642, whooping-cough 2,372, diphtheria 8, measles 3,740, acute pneumonia 267, acute poliomyelitis 81, dysentery 1,466, paratyphoid fever 3, typhoid fever 5.

Scotland in First Quarter

The birth rate during the first quarter of 1956 was 19.2 per 1,000 of the population. This was 0.9 above the rate for the March quarter of 1955 and 0.8 above the average of the 5 preceding first quarters. The infant mortality rate was 31 per 1,000 registered live births, being 7 below the 5 years' average and the lowest rate recorded in any first quarter. The death rate was 15.0 per 1,000 population and was 0.1 below the average of the 5 preceding March quarters. Deaths ascribed to respiratory tuberculosis numbered 244 and 26 to other forms of tuberculosis; the death rates were 19 and 2 per 100,000 of the population, and these rates were 15 and 3, respectively, below the 5 years' average. There

Medical News

Scottish Antituberculosis Campaign.—On June 27 Dr. KENNETH COWAN, C.M.O. of the Department of Health for Scotland, discussed with medical officers of health his department's antituberculosis plans. The basis of the plan was that there should be a very large x-ray campaign in each city and in most populous areas throughout Scotland, he said. Each of these campaigns would be bigger than anything previously attempted, and the one in Glasgow would be the largest in Europe. It would be essential to success for voluntary organizations and the general public to co-operate to the full. Everyone over 14 should come for x-ray examination, including housewives and old people. The campaign, which will last for two years, will begin next March.

Ciba Foundation Report.—During 1955 the Ciba Foundation again lived up to its declared purpose—"the promotion of international co-operation in medical and chemical research." It provided free accommodation at its premises at 41, Portland Place, for nearly 800 visitors from some thirty countries, who were in London in connexion with their scientific work. Seven international congresses were held, the proceedings of four of which have been published as books. In addition there were discussion meetings, clinical forums, and scientific film sessions. Bursaries were granted to British medical graduates to allow them to work for short periods in France, and seven international awards were made for research on ageing. The new library was opened about half-way through the year, and access to it is granted to non-visitors, whenever possible, on application to either the director or the librarian of the Foundation (telephone: Museum 9456).

I.M.A. President.—Dr. J. C. McFEELEY, medical officer of health to No. 3 City Dispensary District, Dublin, was elected president of the Irish Medical Association at the annual meeting at Bundoran.

Dr. Scheele Resigns.—After being sworn in for his third 4-year term as surgeon-general of the U.S. Public Health Service only this April, Dr. LEONARD A. SCHEELER unexpectedly resigned his office on June 29. He leaves on August 1 to become president of the Warner-Chilcott Laboratories, the ethical drug division of the Warner-Lambert Pharmaceutical Company. Dr. Scheele, who is 48, became well known internationally last year in connexion with the U.S. anti-polio myelitis vaccination programme. It is understood that his new post carries a very much higher salary than the office of surgeon-general, and Dr. Scheele gives as his reason for resignation the need to provide "more properly for the future security of my family."

Abstracts on Demyelinating Diseases.—The U.S. National Multiple Sclerosis Society, a lay association dedicated to the advancement of research on disseminated sclerosis, announces a new monthly abstracting journal in English, covering world medical literature on demyelinating diseases. The society has made a grant of \$15,000 for this purpose to the Excerpta Medica Foundation, of Amsterdam, which is to produce the journal. Each issue will contain 100-150 abstracts. Dr. J. G. GREENFIELD, of the National Hospital, Queen Square, is named as one of the editorial board. The first issue is expected shortly.

Tropical Research Fellowship.—The Council of the Royal Society has awarded the Tropical Research Fellowship (Medical Sciences) to Dr. D. G. JAMISON, of Corpus Christi

College, Oxford, for his work on the histopathology of leprosy, with particular reference to the relationship of the mycobacteria to cutaneous nerve fibres.

Royal Society and Nuffield Foundation.—Nine Commonwealth Bursaries, announced this month, include awards to Dr. W. R. ADEY, lecturer in anatomy at Melbourne, for the study of temporal lobe epilepsy at neurosurgical centres in Britain; and to Mr. J. HARLEY-MASON, lecturer in chemistry at Cambridge, for the study of plants of potential chemical and medical interest in Jamaica.

COMING EVENTS

World Federation for Mental Health.—Ninth annual meeting will be held in Berlin, August 12-17. The subject will be "Mental Hygiene in Infirmary, Home, and School." Details from the general secretary, 19, Manchester Street, London, W.1.

British Veterinary Association.—Annual congress will be held at Leamington Spa, September 16-22. Details from the general secretary, 7, Mansfield Street, Portland Place, London, W.1.

Fourth International Conference on Instruments and Measurements.—Stockholm, September 17 to 19. There will be sections on nuclear instrumentation, automatic process control, computers, physical methods for chemical analysis, spectroscopy, optics, and general instrumentation. Details from Mr. S. Malmström, Association of Engineering Physicists, Stockholm.

Fourth International Congress of Internal Medicine.—The two main themes for the congress, which is to be held from September 19 to 23 in Madrid, will be: "The Role of the Adrenals in the Pathogenesis and Evolution of Internal Diseases" and "Bronchial Asthma and Emphysema." There will also be short contributions on miscellaneous medical subjects. Further details from the congress secretariat, Hortaleza, 90, Madrid.

Royal Statistical Society: Medical Section.—One-day conference, open to non-members, September 28 at County Hall, Westminster Bridge. Subjects include statistics in clinical obstetrics (Professor DUGALD BAIRD), genetical effects of radiation on human populations (Professor L. S. PENROSE, F.R.S.), cancer in relation to environment (Dr. P. STOCKS), and ionizing radiations in human leukaemia (Dr. W. M. COURT BROWN). Professor A. BRADFORD HILL, F.R.S., will give the opening address. Applications for tickets to the secretary, Royal Statistical Society, 21, Bentinck Street, London, W.1.

American Public Health Association.—The 84th annual meeting will be held at Atlantic City, N.J., U.S.A., November 12-16. Details from the association, 1790, Broadway, New York.

Chartered Society of Physiotherapy.—Annual congress will be held at St. Pancras Town Hall, London, N.W.1, October 4-6. Sir RUSSELL BRAIN, P.R.C.P., will deliver the Founders' Lecture. Registered medical practitioners will be welcome and can obtain tickets by application to the secretary of the Society, Tavistock House (South), Tavistock Square, London, W.C.1.

NEW ISSUES

British Journal of Ophthalmology.—The new issue (Vol. 40, No. 5) is now available. The contents include:

ANATOMICAL STUDIES OF THE TRABECULAR MESHWORK OF THE NORMAL HUMAN EYE. Norman Ashton, Alfred Brini, and Redmond Smith. CORRELATION OF THE SYSTEMIC AND INTRA-OCULAR EFFECTS OF DIAMOX. Dorothy A. Campbell, Eva L. Tonks, and Mary Jones. CONTACT LENSES IN TREATMENT OF KERATOCONUS. Frederick Ridley. ELECTRO-OCULOGRAPHY AS A FUNCTIONAL TEST IN PATHOLOGICAL CONDITIONS OF THE FUNDUS. II. BASE-VALUE AND DROP DURING DARK ADAPTATION. J. François, G. Verriest, and A. De Rouck.

Issued monthly; annual subscription £4 4s.; single copy 8s. 6d.; obtainable from the Publishing Manager, B.M.A. House, Tavistock Square, London, W.C.1.

Archives of Disease in Childhood.—The new issue (Vol. 31, No. 157) is now available. The contents include:

SOCIAL FACTORS IN THE AETIOLOGY OF NEPHRITIS IN CHILDHOOD. Norman S. Clark. THE PROGNOSIS OF NEPHRITIS IN CHILDHOOD. Norman S. Clark. DEVELOPMENTAL APHASIA OBSERVED IN A DEPARTMENT OF CHILD PSYCHIATRY. T. T. S. Ingram and J. F. Reid. RESORCIN POISONING. A. A. Cunningham. CORTISONE THERAPY IN ERYTHROGENESIS IMPERFECTA. Rowland J. Calvert and Thomas Robson. AN UNUSUAL ILLNESS IN YOUNG CHILDREN ASSOCIATED WITH AN ENTERIC VIRUS. Mary Crawford, A. D. Macrae, and J. N. O'Reilly. CHROMATOGRAPHIC SEPARATION OF REDUCING SUGARS IN THE URINES OF NEWBORN BABIES. J. C. Haworth and David McCredie. OBSTRUCTIVE HYDROCEPHALUS IN CHILDHOOD. D. S. Gordon and A. R. Taylor. HYDRANENCEPHALY. Kenneth C. Watson. THE INCIDENCE OF INCOMPLETE DESCENT OF THE TESTICLE AT BIRTH. C. G. Scorer. THE SIGNIFICANCE OF HYPOGLYCAEMIA IN THE NEWBORN INFANT OF THE DIABETIC WOMAN. James W. Farquhar. THE EFFECT OF LARGE DOSES OF SYNKAVIT IN THE NEWBORN. Thomas C. Meyer and Joan Angus. CONGENITAL LOBAR EMPHYSEMA. A. Holzel, E. Bennett, and B. F. Vaughan. COR TRIANGULUM: CONGENITAL STENOSIS OF THE COMMON PULMONARY VEIN. Frank W. Nash and Donald MacKinnon. INFERIOR VENA CAVAL AND HEPATIC VEIN THROMBOSIS: THE CHIARI SYNDROME IN CHILDHOOD. M. A. Kibel and H. B. Marsden. HYPERVITAMINOSIS A. J. D. Pickup. SUCCESSFUL TREATMENT OF A PERFORATED ROKITANSKY-CUSHING ULCER. T. A. Sale. CONGENITAL ABSENCE OF THE ABDOMINAL MUSCLES WITH ASSOCIATED ABNORMALITIES OF THE GENITO-URINARY TRACT. Peter Roberts.

Issued six times a year; annual subscription £3 3s.; single copy 12s. 6d.; obtainable from the Publishing Manager, B.M.A. House, Tavistock Square, London, W.C.1.

SOCIETIES AND LECTURES

A fee is charged or a ticket is required for attending lectures marked ●. Application should be made first to the institution concerned.

Tuesday, July 17

● ROYAL COLLEGE OF OBSTETRICIANS AND GYNAECOLOGISTS.—At Barnes Hall, Royal Society of Medicine, 5 p.m., William Meredith Fletcher Shaw Memorial Lecture for 1956 by Mr. Naguib Mahfouz: Urinary Fistulae in Women.

SOUTH-WEST LONDON MEDICAL SOCIETY.—At Bolingbroke Hospital, 8.30 p.m., annual general meeting.

Wednesday, July 18

POSTGRADUATE MEDICAL SCHOOL OF LONDON.—2 p.m., Dr. R. W. Riddell: special lecture on mycology.

Thursday, July 19

INSTITUTE OF PSYCHIATRY.—5 p.m., Professor K. A. C. Elliott (McGill University): Metabolism of Human Cerebral Tissues.

ROYAL SOCIETY OF HEALTH.—At St. Mary's Hall, Bayley Lane, Coventry, 10.30 a.m., Dr. J. Ardley: Topical Aspects of Poliomyelitis; Mr. D. C. Norcliffe: Role of the Public Health Inspector in the Campaign for Clean Air.

Friday, July 20

INSTITUTE OF CHILD HEALTH.—5 p.m., Dr. Sidney Farber (Boston, U.S.A.): Progress in the Chemotherapy of Disseminated Cancer in Children.

MEDICAL SOCIETY FOR THE STUDY OF VENEREAL DISEASES.—At 11, Chandos Street, W., 6.45 for 7.30 p.m., annual general meeting.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.—4 p.m., Charles Tomes Lecture by Mr. B. W. Fickling: Oral Surgery Involving the Maxillary Sinus.

BIRTHS, MARRIAGES, AND DEATHS

BIRTHS

Fallon.—On June 29, 1956, to Valerie (formerly Kirkham), M.P.S., and Ronald J. Fallon, M.D., of 4, Dousland House, Dousland, near Yelverton, Devon, a daughter—Stephanie Anne.

Wilson.—On June 29, 1956, at the Christopher Nursing Home, Wigan, Lancs, to Dr. Ruth Audrey (Jane), wife of Bill Weatherston Wilson, F.R.C.S., a son.

MARRIAGES

Byth—Hunter.—On June 20, 1956, at Middle Church, Perth, Dr. George Lawrence Byth, to Kathleen Margaret Hunter, M.A., Dip.Ed., R.G.N.

DEATHS

Bremner.—On June 27, 1956, at his home, 89, St. John's Way, London, N., Walter Charles Palmer Bremner, M.D., aged 89.

Bruce.—On June 26, 1956, at Woodlee, Carstairs, Lanarks, Charles David Bruce, M.B., Ch.B., D.Psych.

Clouston.—On June 25, 1956, at Ipswich and East Suffolk Hospital, Eric Crosby Townsend Clouston, M.R.C.S., L.R.C.P., of "Swanslea," Westerfield, near Ipswich, Suffolk, formerly of Lavenham, Suffolk.

Courtauld.—On June 27, 1956, at Perceps, Greenstead Green, Halstead, Essex, Richard Minton Courtauld, M.D., D.P.H., aged 78.

Dobbin.—On June 25, 1956, at the London Clinic, Clarence John Valentine Dobbin, M.R.C.S., L.R.C.P.

Douglas.—On June 26, 1956, at Midhurst, Sussex, Kenneth Mackinnon Douglas, M.D., F.R.C.S.Ed., formerly of 19, Chester Street, Edinburgh, aged 93.

Fox.—On June 24, 1956, in Freedom Fields Hospital, Plymouth, Devon, George Raymond Fox, F.R.C.S., J.P., of Rockrose, Downderry, Cornwall, aged 86.

Jenkins.—On June 18, 1956, Naunton Reginald Jenkins, M.R.C.S., L.R.C.P., D.P.H., of Brentwood, Park Street, Bridgend, Glam.

Riches.—On June 26, 1956, at his home, 7, Lansdowne Road, Worthing, Sussex, Reginald George Riches, M.R.C.S., L.R.C.P., D.P.M., aged 70.

Any Questions?

We publish below a selection of those questions and answers which seem of general interest. It is regretted that it is not possible to supply answers to all questions submitted.

Hay Fever

Q.—Each succeeding year the hay fever from which one of my patients suffers appears to get more severe. What prophylaxis and treatment are advised?

A.—For mild hay fever, troublesome but not incapacitating, antihistamines, nasal drops, eye drops, the wearing of dark glasses, and whenever possible the avoidance of exposure to heavy concentrations of pollen are advised.

For incapacitating hay fever which has failed to respond to the above treatment or which is accompanied by pollen asthma, pre-seasonal hyposensitization is advised. Introduced in 1911 by the late Dr. Noon and by Dr. John Freeman, of St. Mary's Hospital, London, this treatment has for very many years been internationally accepted as the most satisfactory treatment for troublesome hay fever. It is not completely without risk, and untoward reactions are not uncommon. Expert advice is necessary, and very careful attention to the details of treatment and dosage is essential. It should be begun not later than March. The results are excellent or good in approximately 80%, and moderate or poor in some 20%.

Experience with hormonal therapy is as yet too short to enable the exact role of cortisone and corticotrophin in the treatment of hay fever to be defined. It would appear that these hormones give better symptomatic relief than antihistamines. Their use is justified when all other measures have failed in cases where a complete examination (including a radiograph of the chest) has excluded those illnesses which are known to contraindicate the use of cortisone and corticotrophin.

REFERENCE

¹ Frankland, A. W., and Augustin, R., *Lancet*, 1954, 1, 1055.

Man's Teeth

Q.—From a study of human dentition alone, on what kind of raw food would man be expected to exist?

A.—The teeth of many types of mammal have conspicuous anatomical features which can be interpreted as having arisen, during evolution, as a result of selection and isolation acting to produce a mechanism adapted to cutting and grinding a particular type of food. For instance, the last upper premolar and first lower molar of carnivores form a shear for cutting bones. In addition, their long and sharp canines are suitable for tearing flesh. On the other hand, herbivores lack canine teeth and their molars have a complex pattern of ridges which interlock with those of the corresponding teeth in the other jaw to make an efficient arrangement for chopping and grinding herbage.

Although in such cases there may be an obvious correlation between the anatomical features of the teeth and the particular type of food eaten, it does not necessarily follow that the diet of other animals can be inferred from a few apparently adaptive dental features. For example, big canines, *per se*, do not necessarily indicate a carnivore. Such teeth are also found, for instance, in many monkeys and apes, in which they engage with the lower first premolar to form a shear that is used for cutting leaves and fruits.

In man, the teeth are uncomplicated organs for biting and grinding, and their anatomical features would seem to give little information about the type of food to which early man was accustomed.

On the other hand, the degree to which the tooth crown is worn down enables some inferences to be drawn about the texture of the food that is normally eaten. The diet

of many monkeys and apes contains much abrasive material, which wears away the enamel to expose the underlying dentine. In some aged animals the cusp pattern disappears and is replaced by a single pool of exposed dentine which covers most of the crown. The teeth of many types of man, extending from prehistoric times and still including some primitive groups, wear down in much the same way as do those of monkeys and apes. Wear is not pronounced in the teeth of modern civilized man, and it seems reasonable therefore to infer that the diet of primitive man contained far more abrasive material than is customary in modern civilized races.

Corneal Ulceration in Virus Diseases

Q.—What are the aetiology, treatment, and prognosis in corneal ulceration complicating an influenzal laryngitis? The ocular symptoms developed during the first week.

A.—Corneal ulceration is not recognized as a complication of influenzal laryngitis. It is more likely that the same underlying general condition produced both laryngitis and corneal ulceration. Corneal ulceration is a recognized complication of a number of virus diseases, such as measles, herpes ophthalmicus, and the more recently recognized congeries of virus conjunctivitis, which include such affections as epidemic keratoconjunctivitis and pharyngoconjunctival fever. It may well be that the laryngitis in this case was part of this latter condition.

Hypotensive Drugs in Symptomatic Hypertension

Q.—Should patients with symptomatic hypertension be given hypotensive drugs? If so, what kind of regime is advised and to what extent is the prognosis improved?

A.—Since the average life of a hypertensive subject after recognition of the condition is about 15 years, with a considerable scatter on either side of this mean, it is unjustifiable to add difficulties and anxieties by starting drug treatment. The best policy is to wait until there is an indication that complications are developing—retinal, cardiac, cerebral, or renal—before beginning treatment. If the patient is anxious about himself in the asymptomatic phase a little phenobarbitone helps him to accept reassurance.

With the long life-expectation of most hypertensives, it will require a very prolonged period of observation before it is known whether hypotensive drugs really improve prognosis, and particularly whether they reduce the incidence of complicating atherosclerosis. The most widely used hypotensive drugs—methonium and its allies, reserpine, and hydralazine—are all unpleasant in their side-effects. A new, safe, and less troublesome drug will be needed before asymptomatic patients can be subjected to a therapeutic trial which may last a decade or two.

Head-banging

Q.—In order to go to sleep some small children resort to head-banging. How should this habit be managed when it persists into later childhood?

A.—Some regard head-banging as a disturbance of behaviour of the same type as a nervous tic or bed-wetting, especially if it persists after the age of 4 years.

Sooner or later the habit will cease, and usually it does so by the age of 3 or 4. It may, however, be associated with other emotional disturbances, and its management must depend largely on the child's character and general behaviour. Sedatives are useless in the treatment of head-banging. Firm handling, for instance at a boarding school, may produce a quick symptomatic cure, but it may also have a serious effect on the child's development and be frankly dangerous if there is other evidence of emotional instability. Psychotherapy may be advisable on account of this, but is not very effective in the cure of simple head-banging. Hypnosis is not considered a wise form of treatment in childhood. In fact it is generally best to try to pay no attention to the head-banging itself if the

child is not hurting himself, and to do what is possible to minimize the disturbance to the rest of the household. There may also be, within the home, reasons for the head-banging which a little extra sympathy and understanding may help to elicit.

Wart Charming

Q.—What is the technique of wart charming?

A.—The process whereby warts, the result of a virus infection, can be affected by psychogenic influences, as occurs in wart charming, is not understood. It would seem that nervous impulses from the cerebrum must affect the skin, in some way producing conditions unsuitable for the growth of warts. Perhaps there is an alteration in the blood supply or in the moisture of the skin. Certainly sweating predisposes to warts.

The technique of wart charming is as varied as it is ancient. It is often based on a form of magic, the intention being to transfer the warts to some other person or animal or object. Thus the warts may be touched by a lump of raw beefsteak, which is then buried at midnight at a cross-roads in the light of a full moon. The warts disappear, having been transferred to the meat. The moon was thought to have considerable influence on warts. Sir Kenelm Digby in the seventeenth century had an infallible cure. The hands were washed by the light of moonbeams in a polished silver basin in which was no water.

Alternatively, warts might be transferred to an animal such as a black slug or a toad. If someone who has no warts kills the toad, then he will get as many warts as the toad has spots.

Sir James Frazer, in *The Golden Bough*, mentions a fourth-century cure for warts. You touch your warts with as many little stones as you have warts. Then wrap the stones in an ivy leaf and throw them away. Whoever picks them up will get the warts and you will be rid of them. The wart charmer in Ireland would visit a village, make a careful note in his hat of the number of your warts, and take them with him on his departure. The buying of warts by a friend is still, at times, found efficacious. X-radiation in small doses and hypnotism are other techniques now practised in wart charming.

Side-effects of Rauwolfia Alkaloids

Q.—What are the recognized side-effects of rauwolfia alkaloids? One of my hypertensive patients suffers severely from rhinitis during treatment with them. Is symptomatic treatment advised for the rhinitis or a switch to some other hypotensive drug—preferably not hexamethonium?

A.—The important side-effects of rauwolfia alkaloids are: mental depression (occasionally leading to frank psychosis and suicide), Parkinsonism, looseness of the bowels, and nasal congestion. It is assumed that the rhinitis in this question refers to nasal congestion. As a first step dosage should be reduced below 0.5 mg. daily. If this does not suffice a nasal inhaler may be used: 2-amino-heptane sulphate in 1½% solution is one of the most useful inhalants.

Ganglion-blocking agents are the most effective blood-pressure-reducing substances and other recommended drugs are unreliable. Hydralazine is being frequently used at present in an attempt to reduce pressure, but it also is not without its dangers and side-effects. With a small background dosage of a rauwolfia alkaloid patients often tolerate a blood-pressure-reducing dose of methonium or pentolinium with much less difficulty than was the case in the days when methonium was used alone.

Threatened Abortion and Vaginal Examination

Q.—Is vaginal examination contraindicated in threatened abortion, even if the diagnosis is uncertain?

A.—The objection to vaginal examination in threatened abortion is that it may excite uterine contractions and aggravate the condition. A more cogent argument is that if

after the digital examination the miscarriage becomes inevitable the patient is likely to believe that the doctor's action was responsible. Nevertheless there is much to be said for vaginal inspection and gentle digital examination after reassuring the patient that these procedures are innocuous. Use of the speculum may show that the bleeding is not coming from within the uterus but is due to some cause unrelated to the pregnancy, such as a cervical polyp. The products of conception may be seen protruding through the os, indicating that the abortion is already inevitable. The cervix may be seen to be pointing forwards, suggesting that the uterus may be retroverted, a point which can be confirmed by palpation. Further, in many cases it is only by vaginal examination that the presumptive diagnosis of threatened abortion can be confirmed and other conditions such as ectopic gestation or metropathia excluded.

NOTES AND COMMENTS

Rupture of Tympanic Membrane during Syringing.—Dr. G. YOUNG (Glasgow) writes: It is worth while directing attention to a condition which comes under the above heading ("Any Questions?" June 9, p. 1377). On a number of occasions I have been asked to see patients whose drumhead is said to have been ruptured during syringing. The complaint had been hardness-of-hearing, usually without pain, and the meatus was found to be obstructed by a collection of wax. During the process of syringing, probably without previous softening of the meatal content, when the mass has emerged the patient has complained of severe pain, possibly of vertigo, and there may have been some bleeding. The inference is that the drumhead has been ruptured. On careful drying-out of the meatus, however, it is found that there is a small perforation in the attic region, with possibly a small granulation protruding, and that the process of syringing has uncapped the first visible evidence of attic cholesteatosis. It is to be noted that the patient will deny, probably rightly, that there has ever been any aural discharge previously.

Hazards of Dental Fillings under Local Analgesia.—Dr. T. T. SCHOFIELD, F.D.S. R.C.S. (London), writes: It is to be hoped that the person replying to the question on the hazards of dental fillings under local analgesia ("Any Questions?" June 16, p. 1440) is not a practising dentist. To suggest that the patient's response to pain should replace the operator's knowledge of the minute anatomy of a tooth is deplorable. Most local anaesthetics in dental use incorporate a vasoconstrictor which offsets to a large degree any hyperaemia due to the heat of normal cutting. Our clear duty, as in all branches of medicine, is to relieve, and not inflict, pain.

OUR EXPERT replies: My answer does not suggest that local analgesia should not be used for cavity preparation, only that the dangers which may result from its use should be recognized and avoided. Local analgesia should in fact be used whenever the discomfort which it causes is less than the pain caused by the preparation of the cavity.

Books of "Any Questions?"—The second and third volumes of "Any Questions?" are available, price 7s. 6d. (postage 6d.), from the Publishing Manager, B.M.A. House, Tavistock Square, London, W.C.1, or through any bookseller. Each contains some 200 selected expert answers, and the third volume a cumulative index to the three published books.

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BRITISH MEDICAL JOURNAL

LONDON SATURDAY JULY 21 1956

THE PURPOSE OF MEDICAL EDUCATION*

BY

G. W. PICKERING, M.D., F.R.C.P.

Professor of Medicine, University of London; Director, Medical Unit, St. Mary's Hospital, London, W.2

It has been remarked by an intelligent observer from across the seas that no country has produced so many excellent analyses of the present defects of medical education as has Britain, and no country has done less to implement them. It seems to me that this arises partly from our national conservatism, but chiefly because we have devoted too little thought to the true purpose of medical education, and thus omitted to select a yardstick against which to measure the virtues and defects of our system. My object here is to outline what I conceive to be the purpose of medical education and to discuss in general terms why this purpose has not been achieved. I can best introduce my subject by quoting from the Report of the Royal Commission on the University of London (1913) which, under the chairmanship of Lord Haldane, produced one of the most penetrating documents in the history of medical education.

"We must, in the case of the Faculty of Medicine, as in the case of other Faculties, consider what steps it is necessary to take in order to place the best teaching upon a real university basis. . . . We cannot, however, deal with the Faculty of Medicine on exactly the same lines we have followed in the case of other Faculties, such as those of Arts and Science. In those Faculties, the provision for teaching and the highest university standard may be deficient, but the standard itself is not questioned. In the case of the Faculty of Medicine, we have no test to apply. Except as regards pathology and hygiene the University has not attempted to determine which of the teachers of the subjects classed as Advanced Medical Studies are entitled to the status of Professors or Readers. . . . The question is therefore denied that they ought to do so. . . . The question is therefore forced upon us, whether the standard we have accepted for the teachers in other Faculties ought to be abandoned in the case of the teachers of the most important professional subjects in this Faculty. . . ."

That was 43 years ago. The University of London has changed much since then, and, in fact, led the country in the development of clinical studies along true university lines. Nevertheless, as I hope to show, the chief issue facing us to-day is whether the objects of medical education are the same or different from those of other faculties of the university. Should medicine, in fact, be taught within the university or in a technical college?

Proper Training

The proposition that the purpose of medical education is to turn out properly trained doctors would probably receive general assent. There is, however, dissent about what constitutes a proper training and yet more about

*An address which had to be postponed.

what kind of doctor should be trained. Are we trying to train physicians, surgeons, psychiatrists, and medical scientists in all their special branches as well as general practitioners? Clearly, to do all these things in the scope of one single curriculum is impossible. A man would either spend the major part of his lifetime as a student, and render service to the community only in his dotage, or else be improperly trained. The recognition that this is so is one of the major achievements in the post-war period. It is now agreed that the training of a doctor does not stop at his final professional examination, that postgraduate experience is necessary for all doctors who are to be licensed to practise medicine; and that experience and training should differ according to the career ultimately to be followed. The organization of postgraduate education, and particularly the institution of a compulsory year of hospital practice under supervision, has in fact liberated the undergraduate curriculum to serve its proper purpose. It remains to agree what that proper purpose is.

Postgraduate education is perhaps in its infancy. Since, however, it is chiefly concerned with the acquisition of detailed factual knowledge and of special techniques, it provides a fairly well defined problem about which there is fairly general agreement. While acknowledging the great importance of postgraduate education, I would like to say no more about it and devote the rest of my remarks to the medical curriculum proper, the course leading to the degree of Bachelor of Medicine.

While few would now maintain that the function of the undergraduate curriculum is to train specialists, there are many teachers and administrators who hold that its purpose is to train general practitioners. This, however, seems an inadequate definition. Thus there is an increasing body of opinion which believes that at least part of the special training necessary for a general practitioner should be postgraduate. Again, much of what is included in the present curriculum is quite unnecessary for general practice, and it would be very difficult to justify the vast public expenditure on preclinical departments merely to train general practitioners. In fact, if this were the sole function of medical education, some might doubt whether it was desirable to include medicine within the faculties of universities. It would be cheaper and more efficient to carry out the small amount of pre-clinical training necessary at technical colleges and to revert to the system of apprenticeships. The fallacy of so defining the purpose of medical education would be

clearly demonstrated were we to fashion our educational system on such a definition. Not only would those who intend to specialize have an inadequate background, but the advance of medical science would come to a standstill.

Basic and Special Requirements

The conflict between the needs of future general practitioners on the one hand, and of specialists and research workers on the other, led Lewis to suggest that there should be two medical curricula, a shorter and a longer designed for the two groups. This suggestion has never found much favour and probably never will. As all experienced teachers and examiners know, much may happen to a man during the five years or so of the medical curriculum. A boy may enter loaded with examination honours, and at the end be in the bottom part of the class, qualifying with the greatest difficulty. I also know of one man who had difficulty in matriculating but whose scientific work was so distinguished that he became a Fellow of the Royal Society at 35. It would thus be a thankless task to try to select men at the outset for those two types of education, and I for one would not care to do so. However, an even greater objection would be the creation of two separate grades of doctor with detrimental effects on the unity and the morale of the profession. And here let me venture an aside and remark that in these days of the Welfare State matters affecting morale are of much greater importance than is generally realized. There is an increasing tendency for men to be concerned more with what they can get out of life than what they put into it.

The idea that the medical curriculum should be primarily designed for any particular kind of doctor proves thus unacceptable. It would seem rather that it should be regarded as a basic foundation on which may be built the special requirements of the various specialties. We might say that the function of the medical curriculum is to train the basic doctor, provided that we recognize that the concept of the basic doctor is a mere abstraction.

It would seem, then, that the problem of defining the purpose of medical education resolves itself into two questions: What are the basic requirements that all doctors need, and what are the special requirements severally needed by general practitioners, scientists, and specialists?

Function of University Education

Medical education has grown up within the framework of the universities. No one would dispute that this is the proper place for medicine. The study of man in both health and disease is part of biological science. Scientific knowledge is indivisible, and advance on one front makes possible advances on others. Were medicine to leave the universities, both medicine and science would be immeasurably the poorer. It may be accepted as axiomatic that medical education is part of university education. We may therefore approach our subject by inquiring what is the purpose of university education and whether this purpose needs modification or amplification in the case of medicine.

I would suggest that the function of university education is to train the student's mind so that he can gather data accurately and so that he can learn to form a balanced judgment on those data. Some disciplines use for the training of judgment data that bear little relevance to those with which the student will later deal. Such, for example, are the classics, and there is no doubt that in our ancient universities the quality of teaching and refinement of methods over the ages has made this discipline an excellent introduction to handling the affairs of men both in the civil

services and outside them. In fact, it was once the fashion at the ancient universities to regard all other disciplines as inferior. To my mind this attitude has been of great disservice to our country, for such is specialization at school and in the universities that these future leaders completed their formal education with no more than a smattering of scientific knowledge. In our age, when scientific knowledge and its applications seem likely to determine the future of mankind, it seems at least odd that such ignorance should be tolerated, much less encouraged, amongst our leaders. Nevertheless, whatever its shortcomings, it is to be acknowledged that the discipline of the classical studies fulfils much of the purpose of university education, and that, at best, it is highly successful in sharpening the wits so that the student emerges with a mind that is a much finer instrument than when he started. Most of the other major disciplines of the university—mathematics, law, theology, natural science, and medicine—have a more vocational aspect—that is to say, they use for educational purposes data of the same kind as those with which the student will deal in later life. There is much to be said for this. To quote the report of the Cambridge University Committee on University Education and Business (1945):

"The view that a university course should not be closely related to a man's ultimate career, but should be a general education in non-vocational subjects, is open to various interpretations. If it is meant that a university course should not consist merely of specific instruction designed for earning one's living then no objection can be taken to it. If, on the other hand, the statement is interpreted to mean that a man is best prepared for life by reading subjects wholly unconnected with his career, then a good many objections can be taken to it. Such an interpretation depends ultimately on the assumption that habits of thought are transferable from one subject to another, but there is nothing in experimental psychology to suggest that such transfer will take place automatically. Any subject can be used as a means of training and developing the intelligence, and when intelligence has been developed by exercise, it will be a better instrument for studying other subjects. This, however, is not the same as saying that the clarity in thought attained in one subject is directly transferable to another. In order to secure clarity the ideas involved must be easily manipulated, and an early acquaintance with these ideas is a great aid to proficiency. Further, if the subject is one for which the student has special interest, he will more readily advance by using his innate ability unchecked by lack of interest in the subject-matter."

I would suggest, then, that the primary purpose of the undergraduate medical course within the university is to train the student's mind so that he can collect and verify facts concerning health and disease in man, and so that he can form a balanced judgment on issues that affect both individuals and groups. If this has been achieved in the undergraduate curriculum, then the special requirements of scientific and vocational medicine can be erected, in the postgraduate period, on a firm foundation. Moreover, the student is equipped to learn, so that in his future professional life he will have little difficulty in keeping abreast of advances in thought or knowledge. It is not the function of the undergraduate curriculum to turn out fully fledged general practitioners or specialists, nor to turn out men who have detailed knowledge of aspects of the basic sciences. These are the proper responsibility of the postgraduate period.

Does the Undergraduate Medical Course Fulfil its Purpose?

If this be the purpose of the undergraduate course, it is now proper to inquire whether this purpose is fulfilled. We may look at the content and methods of teaching of the course, the examination system, and the effect on the student, and we may compare these with the discipline of classical studies at our older universities.

The conduct of the two courses could not provide a greater contrast. The student reading classics attends a few lectures in the course of the day; the rest of his time is spent in reading and performing individual exercises which he presents for comment or correction to his tutor. The medical student spends nearly all his time in the lecture theatre and laboratories; in the medical curriculum proper

in the four schools with which I have been associated as student or teacher the student is not, except in rare instances, encouraged to read original papers or to prepare material for his teachers to correct. In every medical school library which I have visited (and I have visited them all in this country), with one single exception, nearly every student is either reading textbooks or his lecture notes.

We find a similar contrast in the examinations. In classics, the examination papers are designed to test the capacity of the student to discriminate; he is given a wide choice of questions so that he can show his mental capacity, using data with which he has become familiar. How different in medicine! The examination papers allow no choice of question, and they seem designed not to test a student's capacity to discriminate but his capacity to reproduce material learned from the pages of textbooks or the notes of lectures. The kind of question which is still current in the final examinations for university degrees in medicine is a question such as, "Describe the symptoms, signs, complications, and treatment of ulcerative colitis." What a comment on six years of university education! And the earlier examinations are no better. When we set examination papers like this it is not surprising that arts teachers regard us as uneducated.

These facts can leave us in no doubt that, as at present conducted, medical education in the universities is not directed to training the student's mind as a discriminating instrument but merely as a temporary storehouse for miscellaneous information collected from textbooks and lecture notes and retained for long enough to be reproduced at the moment of the examination. Nor is there much doubt (though the assessment is, of course, highly subjective and in the nature of a clinical impression) that the effects of the medical curriculum on the student's mind bear this out. Thus the Planning Committee of the Royal College of Physicians made the following comment:

"We are agreed that, quite apart from lack of character and ability that may be avoided by improved recruitment and selection, the average medical graduate has defects which are to be attributed chiefly to the manner of his training. He tends to lack curiosity and initiative; his powers of observation are relatively undeveloped; his ability to arrange and interpret facts is poor; he lacks precision in the use of words. In short, his training, however satisfactory it may have been in the technical sense, has been unsatisfactory as an education. This is a matter of very great importance. The average student leaves his medical school at about the age of 25; during the subsequent thirty or so years of professional life, his ability to learn from his own experience and that of others, and to keep abreast of the stream of advancing medical knowledge, depends entirely on those qualities in which his training has left him defective."

It would seem to me that all the numerous criticisms of the medical curriculum are embraced in the general criticism that it does not fulfil what should be its central purpose of training the student's mind. And I suspect that so little has been done to remedy the worst defects because there has been no yardstick, no clear concept of purpose, by which questions of detail could be subordinated to questions of principle.

Can this Purpose be Achieved?

If the primary purpose of the medical curriculum is to train the student's powers of observation and of critical judgment in the field relevant to medicine, then the achievement of this purpose will require a drastic reorganization of the medical course and a revolution in the attitude of most of the teachers to it. So far as content is concerned, the three great obstacles to education are its enormous content of so-called "facts," its rigidity, and its disorder. Nearly all committees that have considered the curriculum have recognized these three defects, but it is an interesting fact that most of the proposals for reform would actually have accentuated some, at least, of these defects. It is well recognized

*I put "facts" in inverted commas deliberately. As the Dean of Harvard (Dr. Sydney Burwell) put it at a Harvard dinner which I was privileged to attend, "My students are dismayed when I say to them, 'Half of what you are taught as medical students will in 10 years have been shown to be wrong.' And the trouble is, none of your teachers knows which half."

that the growth of scientific knowledge has been accompanied by a corresponding growth in the content of the curriculum: much has been added, little taken away. As a one-time teacher of elementary biology to medical students, I maintain, with some right to an opinion, that compulsory botany for medical students is quite unjustified, though of course a knowledge of it may give, as it has given to me, untold pleasure for a lifetime. Again, there is no justification for the amount of anatomy that is taught in some schools. These are old issues, but there are new dangers.

I have heard extremely intelligent scientists maintain that all doctors need a knowledge of nuclear physics and of electronics. I, personally, can think of few things more useless to the average practitioner, though of course they are essential to certain lines of scientific research. I need hardly remark that neither of the eminent gentlemen who presented these views had a medical degree. These examples illustrate the kind of difficulty that an attempt to reduce the content of the curriculum is likely to meet—the obstinate conservatism of old subjects, the predatory enthusiasm of the new. Each represents powerful vested interests; for the amount of time allocated to a subject in the curriculum is, in a sense, a measure of its prestige; and the more time the larger the staff required and the greater the power and security of the departmental head. I have no doubt that these are very strong motivating forces, though, of course, most teachers are unconscious of them. Hitherto, the student has been sacrificed to these vested interests because there has been no good weapon with which to defend him. A good weapon would be provided by agreement on the purpose of medical education. It would seem to me that the main problem of medical education is this: Will the medical course be arranged primarily in the interests of educating the student, or primarily in the interests of the prestige of the teachers? I say this as a teacher and with a full appreciation of the meaning of the words I use.

Collaboration in Teaching

The chief difficulty in integrating the course so that the field of biological science relating to health and disease in man is presented and treated as a whole, and not in discrete and apparently unrelated parts, has been the insularity of so many teachers and departments. Schemes of research requiring the collaboration of different departments are probably the most important means by which men of different disciplines learn what is new elsewhere and how to talk a common language. Notable attempts at collaboration in teaching have also been made, for example, in pre-clinical science at Birmingham. Clinico-pathological discussions and combined ward rounds are other important methods.

Finally, I would like to make a plea for elasticity. Any attempt at defining a medical undergraduate course is necessarily a compromise, and a purely arbitrary one. There are many ways to Rome. We shall never find out the best way so long as all pilgrims are forced to take the same path.

The measures which we have considered affecting the content of the curriculum are all concerned with reducing the time which is now required for memorization, so that enough time can be found for the student to develop his own mind. This time will not be properly used unless there is a revolutionary change of attitude on the part of his teachers. There must be more seminars and tutorials (in the old sense of tutorial and not in the sense of a cram-class) and fewer lectures; more reading of original papers and less of textbooks; more kindling of the flame of curiosity, and a greater readiness by teachers and taught to admit and remedy ignorance. This will not be easy, since most teachers mould themselves on those who taught them. Nevertheless, I can think of one or two universities where the professors are so enlightened that a change of the kind I have contemplated would not be difficult. There is a generation of young men who have experienced such teaching in the final honour school at Oxford, in Part II of the Tripos at Cambridge, and in B.Sc. classes at other univer-

sities and in other ways. They are aware of what such teaching did for them, and I have no doubt that with a little encouragement they could open a new era in medical education in this country. They have a right to expect, and I hope would receive, support from other faculties in achieving this, the common purpose of university education.

Conclusion

The development of postgraduate education, and, in particular, the institution of the compulsory year of hospital practice under supervision before licence is granted to practise independently, have at last freed the undergraduate course to serve its essential purpose, that of training the student's mind to collect and assess data and to form a judgment on them. The fulfilment of this purpose requires, first and foremost, a change in the attitude of teachers, and, second, a reduction in content and an attempt to integrate the subject matter on which the teaching is based. To quote Karl Pearson: "The true aim of the teacher should be to impart an appreciation of method rather than a knowledge of facts," for method is remembered when facts have been forgotten.

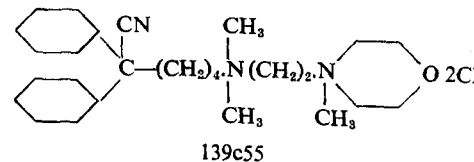
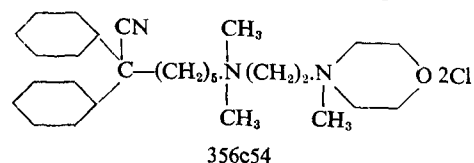
TWO NEW GANGLION-BLOCKING AGENTS IN TREATMENT OF HYPERTENSION

BY

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This clinical communication is based on results obtained in using, since January, 1955, the drug 356c54 and since October, 1955, the drug 139c55, two active members of a recently described group of ganglion-blocking agents (Adamson, Billingham, Green, and Locket, 1956). Chemically, 356c54 is $N^1:N^1:N^2$ -trimethyl- N^1 -(6-cyano-6:6-diphenylhexyl) ethylene-1-ammonium-2-morpholinium dichloride, and 139c55 is the 5-cyano-5:5-diphenylpentyl homologue (also called "presidal").



One very important property possessed by this new group of compounds, seen particularly when they were used in man, was the apparent dissociation between their activity as hypotensive agents and their ability to produce ocular changes and gastro-intestinal disturbances (dry mouth and delay in gastric emptying), a dissociation shown well by 139c55.

For both intravenous and subcutaneous injection we used a solution containing 20 mg. of the dichloride of either drug per ml. After discharge from hospital injections were continued by the patients at home.

Pattern of Activity in Patients after Intravenous or Subcutaneous Injections

In our hypertensive patients, using as our criterion of effectiveness a fall to or below 100 mm. Hg diastolic (measured in the sitting position), the minimal effective single intravenous dose of 356c54 was 2 mg. and the maximum dose necessary (used by us) was 12 mg., whereas the minimal effective single therapeutic dose given subcutaneously was 10 mg. and the maximum dose found necessary was 40 mg. With 139c55 the comparable doses were approximately half these, and the maximal subcutaneous dose used in treatment has been 27.5 mg. (Comparative blood-pressure readings were also always taken in the reclining and erect positions.)

The first detectable pharmacological response occurred after a delay of from 5 to 25 minutes. No immediate response occurred after an intravenous injection, irrespective of the dose given. Usually after an interval of about six minutes blurring of vision occurred. At this stage clinical examination revealed this subjective effect to be accompanied by objective changes in the eyes. Also it was often accompanied or immediately followed by a variable degree of bradycardia. A definite fall in blood pressure occurred within another 10 minutes, but the maximum fall occurred 45 to 60 minutes later. The bradycardia began about 10 to 20 minutes before the onset of any hypotensive effect. When the action of the drug was wearing off, the hypotensive effect gradually disappeared some time before the bradycardia subsided.

When the drugs were given by subcutaneous injection there was a somewhat longer delay, ranging from 10 to 60 minutes but on an average 12 to 15 minutes, before the first signs of pharmacological activity appeared. The pattern of activity was identical with that already described for the intravenous injection, but the duration of the desirable hypotensive action was much longer. With identical hypotension-producing doses the duration of hypotension given by 139c55 was longer than with 356c54—in many cases at least 50% longer and in a few even twice as long. With suitably chosen dosage—that is, that dosage which produces the longest period of hypotension below any desired maximum pressure, with the minimum of side-effects—using 139c55, this hypotension often exceeded 12 hours and on occasion 24 hours, and rarely was less than nine hours, and with 356c54 it was rarely less than seven hours and might even exceed 24 hours, though this latter duration occurred much less often with this drug than with 139c55. The maximum fall in blood pressure was reached some 60 to 120 minutes after the onset, and this level of hypotension persisted for some time before it slowly returned to its pre-treatment height.

Activity After Oral Administration

When an effective dose was given by mouth there could be a considerable delay before a fall in blood pressure began. A dose which was about 12 to 15 times the therapeutically effective subcutaneous dose was the usual effective oral dose, but it has, in an occasional patient, been as low as five times the effective subcutaneous dose and as high as 20 times this dose. The predictability of hypotension after oral administration, though certainly as good as was found in this group of patients using the other commercially available ganglion-blocking agents which could be given orally, in our opinion was not good enough, except in a very occasional case, to justify their use by mouth alone in the treatment of the severest cases. When the single oral dose

is increased to 15 to 20 times the effective subcutaneous dose there is still the same delay before the fall in blood pressure occurs. As with all other ganglion-blocking agents when given by mouth, even with this much larger dose, the degree of hypotensive response could not be accurately predicted, and might be very severe, though in some patients the response remained reasonably constant from day to day. Of the two drugs, 139c55 was far less likely to give any prolonged delay before the onset of hypotension, and it gave a higher frequency of successful responses with a more consistent oral dosage.

Ocular changes preceded the hypotension, but dry mouth was less pronounced than occurred with comparable periods of hypotension produced by subcutaneous injection. At all doses and for all comparable periods of hypotension, dry mouth occurred less often and in much less degree and less persistently with 139c55 than with 356c54. In fact, on many occasions dry mouth did not occur with 139c55 (given either by mouth or by subcutaneous injection) even though an effective degree and duration of hypotension was achieved.

Using special techniques, and with radio-opaque meals and repeated observations, we arrived at certain conclusions concerning the propulsion of intestinal contents in relation to these drugs. It was found that gastric emptying, small-intestine propulsion, and large-intestine propulsion behaved as three almost independent variables, and that all ganglion-blocking agents commonly used in the treatment of hypertension did not affect them all in the same degree. Whereas pentolinium and hexamethonium in therapeutic dosage caused a delay in gastric emptying and marked impairment of propulsion in both the small and the large intestine, 356c54 and 139c55 did not appreciably affect small-intestine propulsion. What was of still greater significance, however, was the observation that with identical hypotensive effects 139c55 produced much less delay in gastric emptying than did 356c54.

We suspected that gastric absorption of the drug did not occur, and this was confirmed experimentally (A. F. Green, 1955, personal communication). Here, then, was the explanation for the delay in the onset of hypotension after oral dosage and also the explanation for the greater success and more constant dosage response when 139c55 was used. By giving the drug on an empty stomach and following it immediately by a meal we obtained the greatest success, in that it enabled most of the ingested drug to enter the small intestine *en masse* and hence provide an effective hypotensive tissue-level of drug after absorption. Delay in gastric emptying was produced by initial small-intestine in gastric emptying was produced by initial small-intestine in that absorption of a minute dose of drug inadequate in that dosage to cause hypotension. Specially coated preparations that prevented gastric solution of the drug were also more successful but were not essential with 139c55. The fall in blood pressure—that is, to below 100 mm. Hg diastolic—lasted at least eight hours on every occasion that oral dosage was effective, and has lasted as long as 30 hours. The usual duration of hypotensive action of 356c54 and 139c55 when given orally was from 12 to 14 hours.

Ocular Effects

The effect on the eyes was usually (not invariably) the first clinical evidence of the action of the drug, appearing within a few minutes of intravenous or subcutaneous injections. The patient complained of blurring of near vision and an inability to read, though distance vision was not affected to any great degree (cycloplegic effect). This visual effect becomes less pronounced in many cases after the drugs have been in continuous use for a few weeks, though initial blurring of the vision within a few minutes of each injection was always noticed. Many patients, particularly older patients, showed a rapid adjustment to this ocular effect and regained their ability to read small type within 30 minutes of the injection. This recovery of vision was particularly marked in the case of 139c55. Visual disturbances could be corrected in considerable degree by

the use of 0.25% to 0.5% pilocarpine or eserine eye-drops. Most patients preferred to use pilocarpine.

Examination of the pupil usually revealed a fixed pupil in the mid-position—that is, neither grossly dilated nor constricted. Measurement has shown that both the drugs produced moderate dilatation of the pupil. Thus a pupil which was 3 to 4 mm. in diameter before the injection dilated to 5 to 6 mm. and was fixed at this diameter, not altering for light or accommodation. Neither fixation of the pupil nor any other demonstrable ocular change implied the absorption of an effective hypotensive dose. Pilocarpine and eserine eye-drops caused marked constriction of this pupil, and homatropine and atropine eye-drops caused further pupillary dilatation.

The most common order of appearance of the changes described was pupillary fixation, bradycardia, and hypotension, and the usual order of disappearance was hypotension, bradycardia, and pupillary fixation.

Effect on Gastro-intestinal Tract

With 356c54 dryness of the mouth was usually present, but varied greatly in degree. With 139c55 dryness of the mouth was often absent and for all grades of hypotension was always less pronounced than with 356c54.

The oral administration of a 15-mg. tablet of neostigmine bromide would occasionally relieve this xerostomia, but in many cases only at the expense of the production of abdominal colic.

Nausea and vomiting did not occur, nor severe constipation. Mild constipation was occasionally present. The absence of appreciable effect upon the small-intestine propulsion, even when using large oral and subcutaneous doses, has been one of the most interesting and useful features of these drugs.

Constipation, when it occurred, was easily remedied by the administration of liquid paraffin or the use of a saline—for example, magnesium oxide emulsion. It appeared to be due to a combination in varying degree of delayed gastric emptying and delayed passage along the large bowel. Oral neostigmine bromide produced more discomfort than purgation.

Fractional test meals have shown an effective cessation of free hydrochloric acid. Histamine injection during this phase of achlorhydria always elicited a free acid response lasting about 30 minutes.

Action on Cardiovascular System

Large doses of both drugs could produce postural syncope. If, one and a half hours after receiving a subcutaneous injection, standing erect and motionless caused dizziness, it was regarded by us as an indication that an effective therapeutic dose had been administered. Blood-pressure readings as usually taken—that is, sitting in a chair or lying reclining in bed—could be used as an indication of the absorption of an effective dose of drug. Standing erect always produced an additional fall of blood pressure, rarely promptly, but usually after a few minutes' delay. The return of this low blood pressure to its previous higher level on readopting the supine or sitting position also occurred only after some minutes' delay. We were always able to lower the blood pressure to below 150/100, and all the patients (except Case 6) in our series of trials had a diastolic pressure before treatment of at least 130 mm. Hg most of the time, and in several it was constantly in the range of 160–190 mm. Hg when not in receipt of treatment.

Bradycardia was present in some degree in most cases, occurring before the fall in blood pressure, and usually outlasting the hypotension. It was directly related to the heart rate before the injection of the drug. An initial rate of 90–100 a minute might fall to 70–80, and an initial rate of 70–80 might drop to 60–65. This rate never fell below 60 a minute.

Angina of effort ceased to occur during effective hypotensive treatment. In one patient severe angina of effort

and constant decubitus angina following two previous coronary thromboses ceased to occur whilst the patient was in receipt of this drug alone and without restriction of activity. In another, angina of effort which had been present for a year ceased to occur for the entire period of treatment (seven months) with these ganglion-blocking agents.

Episodes of severe paroxysmal nocturnal dyspnoea (in one patient these had occurred almost every night for two months with two severe episodes of pulmonary oedema) invariably ceased to occur after the use of daily injections of these drugs.

The electrocardiogram (using as a routine 12 leads—1, 2, 3, aVR, aVL, aVF, and V_1 to V_6) did not reveal any acute changes during the hypotensive phase—that is, it remained identical both before and during the hypotension. Several patients who had been receiving treatment (Cases 3, 5, 10, and 11) showed a reversion to a more normal electrocardiogram: inverted T waves in V leads became biphasic or upright, whereas previously they had been completely and persistently inverted. In one patient the duration of the QRS complex was reduced from 0.14 to 0.09–0.1 second. Three patients showed a gross reduction in the maximum transverse diameter of the heart over this trial period. In one case it was reduced by more than 2.5 cm. and in the others by at least 1.5 cm.

Action of Other Drugs

Subcutaneous injection of atropine (0.5 mg.) diminished the bradycardia, made the vision worse by dilating the pupil, and increased the dryness of the mouth, but it had no effect on the level of the hypotension. Conversely, tachycardia caused by an initial injection of atropine was always slowed within half an hour by injection of an effective dose of 356c54.

Intramuscular injection of 50 mg. of promethazine either before or during the action of 356c54 had no effect on the hypotension, merely making the patients sleepy. Occasional alcoholic drinks (sherry) did not seem to affect the hypotension. Injection of neostigmine had little effect on the bradycardia and none on the hypotension, but possibly made the mouth less dry, though abdominal colic almost invariably occurred.

Renal Function

Measurements of the para-aminohippurate and endogenous creatinine clearances before and during the fall in blood pressure, and also when the hypotension was present, revealed no gross change in any of these values. At the height of the hypotension antidiuresis was pronounced, the urine-minute volume in one case falling from 4 ml. to as low as 0.5 ml. This antidiuretic effect ceased to be noticeable clinically when twice-daily injections were persisted with. Advanced renal insufficiency did not cease to progress in spite of prolonged control of the hypertension and relief of all hypertensive phenomena—that is, incapacitating headache, vomiting, and visual deterioration (see Case 10). With increasing renal deterioration we found increasing resistance to all hypotension-inducing agents.

Tolerance

During the initial few weeks of treatment by subcutaneous injections some adjustment of the dose was necessary in most cases. Once this effective dose was achieved it did not become necessary to increase the dose by more than one-third in any patient, even with progressive renal failure (Case 10). Usually the increase was necessary in severe cases of hypertension stabilized initially on a small daily dose. In some severe cases which at first appeared to require a large daily dose it was possible, and desirable, to reduce the dose after the initial period of treatment, since we could, using this small dose, nevertheless maintain the same degree of hypotension as was initially obtained.

Case 1

A man aged 38 first attended in November, 1953, complaining of headaches and recent poor vision, and more

recently of recurrent attacks of paroxysmal dyspnoea. Examination revealed bilateral papilloedema with retinal haemorrhages. His blood pressure at the time was 220–240/140–160. Urine contained a small quantity of albumin. Blood urea was 30 mg. per 100 ml.; urea clearance 70% of average normal. Treatment consisted of injections of pentolinium tartrate, a salt-free diet, and digitalization. Nevertheless, left ventricular failure and paroxysmal nocturnal dyspnoea repeatedly occurred. The addition of *Veratrum viride* extract caused vomiting, with no improvement. The addition of rauwolfia alkaloids in September, 1954, did not improve the clinical picture. Early in November swelling of the ankles appeared and he also complained of recurrent episodes of light-headedness. His blood pressure was 240/130–160. In mid-November 3 mg. daily of the rauwolfia alkaloid rescinnamine was added. Morning sickness developed and bowel frequency increased to three times daily. All other treatment was stopped at this stage. After two weeks the dose of rescinnamine was reduced to 2.5 mg. daily because he complained of feeling unwell generally and restless, without being able to be more specific about the symptoms. He was sleeping poorly, his bowels were open three or four times daily, and he had severe occipital headaches. Nevertheless, the episodes of left ventricular failure and nocturnal dyspnoea had ceased and his blood pressure was now in the range of 190–205/120–125. Fundus oculi remained unchanged. His general mental and physical condition remained unsatisfactory.

On January 6, 1955, the rescinnamine was stopped and pentolinium injections were recommenced. After two weeks he was transferred to 288c53 (a ganglion-blocking agent). On March 11 he was transferred to 356c54, receiving a single daily injection of 20 mg. Treatment was accompanied by rapid improvement in his physical condition and sense of well-being. In April this injection was reduced to 17.5 mg. daily. This dose remained effective and kept his blood pressure down to 125–160/75–100 for at least eight hours daily. Early in August a recurrence of severe "bursting headaches" and increase in diastolic pressure to 140 necessitated an increase to 22.5 mg. and later to 25 mg. He remained well on this dose. In November he was changed to 15 mg. of 139c55; this was increased to 20 mg. by January, 1956, and in February was reduced to 18.5 mg. daily. This has kept his diastolic pressure below 100 for at least nine hours daily and below 85 for at least seven hours daily.

Since March, 1955, he has continued to work actively in his business, and this has necessitated constant journeying between Oldham and London. His papilloedema has now apparently faded. Since his transfer to 139c55 he has been able to read newspapers and books with little disability.

Case 2

A woman aged 52 was admitted to hospital with recent cerebral thrombosis. On examination gross bilateral papilloedema with exudates and haemorrhages was found. Her blood pressure on admission was more than 260/180, and remained in this region even with bed rest.

After trying various oral preparations for her hypertension without any effect, in January, 1955, she was put on to a regime necessitating the injection of ganglion-blocking agents, and on March 18 was transferred to 356c54. The initial controlling dose of 40 mg. once daily was reduced later to 30 mg. She remained fit and well on this and attended regularly as an out-patient. Owing to lack of personal cleanliness she, in August, developed infection at the sites of injection. This responded to treatment, but she then ceased to attend and received no drug for three weeks. She was readmitted in stupor due to a further cerebral catastrophe. Immediate recommencement of the drug resulted in a rapid recovery of function and she remained well until October, when she defaulted again.

In this patient 30 to 40 mg. of 356c54 produced a fall in diastolic pressure to below 100 which endured for more than 10 hours.

Early in November she was readmitted after a further acute cerebral episode and was rapidly controlled with 20 mg. of 139c55 daily. On this dose her diastolic pressure remained below 100 for at least 11 hours. She defaulted again in February, 1956, but was persuaded to attend again by her doctor, and on this occasion after two weeks without treatment her blood pressure range was 290–300+/170–190. As expected she had gross papilloedema and was physically and mentally extensively disabled. Further treatment by injection was not considered suitable.

Case 3

This patient, a woman aged 23, when first seen on January 18, 1955, was four months pregnant, and was complaining of breathlessness on effort. Her blood pressure was over 260/160. Ocular fundi, however, did not show papilloedema, nor were there exudates or haemorrhages, but thin almost invisible arteries and engorged veins. Heart examination revealed a presystolic gallop. There was an enlarged left ventricle in the skiagram. Electrocardiograms showed a "left ventricular strain" pattern, and the urine contained a small quantity of albumin. Blood urea was 43 mg. per 100 ml.

This patient, who admitted to some breathlessness on effort, was very reluctant to submit to any treatment. She was, however, persuaded to enter hospital for a rest. At rest in bed her systolic pressure varied between 220 and 300 and her diastolic between 140 and 165 but was never below 140. At this stage various ganglion-blocking agents were tried, and with these we could obtain a fall in blood pressure which lasted for five and a half hours. Routine and specialized investigation, including an aortogram, revealed a small ischaemic right kidney, and nephrectomy was undertaken at the end of February. No fall in blood pressure occurred after this nephrectomy, and histological examination revealed extensive malignant hypertensive changes in the kidneys. At the patient's request no further treatment for her hypertension was given, and she was discharged after this operation.

When seen again as an out-patient at the end of March she had not received any treatment for her hypertension since leaving hospital. She was now 26 weeks pregnant. Her blood pressure was 260/130 on this occasion.

At the end of April she was admitted urgently because of recurrent attacks of left ventricular failure, and a week of recurrent attacks of left ventricular failure, and a week later she produced a macerated foetus. Her blood pressure later she produced a macerated foetus. In May treatment (at rest in bed) was 260–300/130–170. In May treatment with 356c54 was begun. The daily dose was 35 mg. On this dose she was discharged home. She remained well, and after three months her electrocardiogram was more normal and skiagrams revealed a considerable reduction in heart size. In August the dose of drug was reduced and she felt well—so well, in fact, that in September she decided to discontinue all our treatment and receive treatment from a naturopath. We are awaiting the result of the herbalist's regime with interest. Her blood pressure without treatment when last seen by us was 270/140. The consequences of lack of any effective treatment had been fully explained to the husband on several occasions, as well as to the patient. In February, 1956, she still had the same blood pressure and felt quite well.

Case 4

This patient, a woman aged 56, was an unstable hypertensive. Her diastolic pressure varied from 110 to 150, irrespective of rest in bed. She was an emotional person. Electrocardiograms showed left axis deviation only. Because of breathlessness and recent occasional attacks of paroxysmal nocturnal dyspnoea and recurrent occipital headaches, she was admitted for treatment. Early in April she was discharged home receiving 20 mg. of 356c54 daily. On this dose her blood pressure fell from 200–260/110–150 to 120–170/70–95.

When seen on April 29 as an out-patient her blood pressure was 135/90 (sitting) and 120/70 (standing) when taken

four and a half hours after the injection. On May 6 her daughter informed us that she was not desirous of continuing injections. On May 20 her blood pressure was 210/120. She said she felt well. No treatment had been received for two weeks. She continued to attend regularly. On October 7 her blood pressure was 230/130. She was still feeling well and had received no treatment since the last visit. She was now getting occasional episodes of paroxysmal nocturnal dyspnoea, and by the end of November these were occurring every night in spite of the use of mercurials and digitalization. In March, 1956, this patient was receiving treatment from her own doctor for congestive heart failure.

Case 5

A man aged 57 was known to have had a high blood pressure and left ventricular enlargement for many years. At the time of admission he was regularly attending as an out-patient the hypertension clinic of a London teaching hospital.

On April 10, 1955, he was admitted almost *in extremis* with acute left ventricular failure and pulmonary oedema. His blood pressure range was 210–260/170. His blood urea was 53 mg. per 100 ml. He gave a history of having had several acute episodes of paroxysmal nocturnal dyspnoea during the weeks before the present very severe episode. He had not worked for two months. He was taking hydralazine and reserpine at the time of admission. By April 12 he had had several further attacks of left ventricular failure whilst in hospital in spite of a low-salt diet and the use of mercurials. His teloradiogram showed much enlargement of the heart, mainly of the left ventricle. His lungs were considerably engorged. At the cardiac apex in the mid-axilla a presystolic gallop was easily audible. His blood pressure was 210–220/160–170. His retinae showed gross arteriosclerotic changes but without papilloedema.

On April 15 356c54 was begun, and on May 4 he was discharged home to receive 20 mg. twice daily. He has had no further attacks of nocturnal dyspnoea since April 15 in spite of cessation of a salt-free diet and mercurials, and treatment with ganglion-blocking agent only. On May 11 the doses were reduced to 17.5 mg. in the morning and 20 mg. at night, and on July 13 this was reduced to one dose daily of 20 mg.

On August 3 he felt well and was advised to return to work. On this day his blood pressure was 160–170/110–115 some four hours after one injection of 20 mg. In November he was transferred to 139c55, with a much better control of the blood pressure.

When last seen (March, 1956) he remained well, though he still complained of shortness of breath on effort. He was receiving 21 mg. of 139c55 daily subcutaneously but omitting the Sunday dose. His blood pressure four hours after the injection was 160/105 sitting and 120/40 after standing four minutes. His electrocardiogram had now reverted to a more normal appearance and his heart was much reduced in size. No further attacks of paroxysmal nocturnal dyspnoea had occurred since April 15.

Case 6

A woman aged 55, first seen on January 25, 1955, was admitted to hospital on April 25 with a long-standing history of hypertension, two past attacks of coronary thrombosis (with electrocardiographic confirmation of severe coronary damage), and angina of effort since June, 1953. The angina had steadily worsened, and now even the most moderate of efforts caused pain. Decubitus angina occurred every night and on some nights attacks of left ventricular failure. Her blood pressure was 200–220/120–130. She had a presystolic apical gallop and a resting pulse rate of 110 a minute. No improvement occurred with reserpine (1.5 mg. daily) or rauwolfia alkaloids (8 mg. daily) combined with methimazole and nitroglycerin. On May 13 356c54 was begun with 10 mg. injected night and morning. No further attacks of left ventricular failure or decubitus angina occurred. Her resting pulse rate was 76 a minute.

On May 16 the dose was increased to 12.5 mg. night and morning. She felt well and was up and about. No further attacks of angina of effort occurred during either the day or the night, nor any attacks of paroxysmal nocturnal dyspnoea. Her blood pressure was 120/60 and her pulse rate 70 a minute for most of the day.

When seen on June 16 and 23 she was well, her blood pressure remained fairly steady at 120/70, and her pulse at 64 a minute for most of the day.

On June 30 she died suddenly. Necropsy revealed a fresh and recent coronary thrombosis and myocardial infarction.

Case 7

A woman aged 58 was first admitted to the eye department in 1954 because of severe frontal headaches. Her blood pressure was 230-250/150-160. She was admitted to medical wards in January, 1955, with an acute confusional episode due either to hypertensive encephalopathy or to cerebral thrombosis. Her retinae showed numerous ecchymoses and gross arteriosclerotic retinopathy, but no papilloedema.

In May she complained of vertigo and occasional mild attacks of paroxysmal nocturnal dyspnoea. Her blood pressure range was 210-250/130-140. She had been receiving 10 mg. of rauwolfia total alkaloids daily for three and a half months, with a slight effect on her blood pressure and little on her symptoms.

On July 4 356c54 was commenced, with 15 mg. daily by subcutaneous injection. On July 25 the dose was cut to 12.5 mg. Her blood pressure on this date, taken two hours after the injection, was 140/100. This effective hypotension lasted for only four and a half hours, so the dose was increased to 15 mg. daily.

On August 8 her blood pressure was 140/90 and pulse rate 60 a minute, taken five hours after the 15-mg. injection. She continued to attend and remained well. She was transferred to 10 mg. of 139c55 in early December and remained well on this small daily dose with a more prolonged control of her blood pressure. In mid-February, at her request as she was so well, all treatment was stopped. Two weeks later she was fit and well, blood pressure 240/145. A week later she had an acute cerebral catastrophe, was admitted to hospital in coma, and died the following day, the cause being a large cerebral haemorrhage, proved at necropsy.

Case 8

This patient, a woman aged 28, was admitted on June 21, 1955. At her first pregnancy, seven years earlier, she had been told she had "blood pressure." The pregnancy went to term and she was delivered of a normal child of 8 lb. (3.6 kg.). She was kept in hospital for the last 12 weeks of this pregnancy. On May 30, 1955, she had a stillbirth at 28 weeks and was kept in hospital for 10 days. Since her discharge she had felt vaguely unwell, with no energy, weak legs, attacks of vomiting and dyspnoea, and paroxysmal nocturnal dyspnoea. Her vision was blurred and poor, and appeared to be steadily deteriorating.

On examination her blood pressure was 220-300/150-160. Her urine contained albumin, blood urea was 38 mg. per 100 ml., and her urea clearance was 110% of average normal. Her fundi showed bilateral papilloedema with numerous exudates, both "soft" and hard, and numerous haemorrhages. Her heart was enlarged and her electrocardiogram showed left axis deviation and a left ventricular strain pattern.

On July 7 treatment with 30 mg. of 356c54 was begun. This was later increased to 32.5 mg. Her blood pressure range of 220-260/140-160 fell, so that six hours after an injection the readings were 180/130 (measured sitting) and 120/90-100 (standing). The patient characteristically always showed a marked postural fall in blood pressure on standing and only a moderate fall in the reclining or sitting position, and practically none in the supine position.

On July 18, with a marked fall in blood pressure on standing that lasted more than eight hours, she was allowed

home. Occasional postural syncope occurred on standing upright and motionless for more than a few minutes.

A week later she was feeling well. No fainting attacks had occurred since her last visit, and she was doing her housework.

On August 9 her blood pressure was 230/170-180 (sitting) and 110/85 (standing) three hours after injection had been given. In December she was transferred to 139c55 and has remained on 20 mg. of this drug daily. When last seen (March, 1956) she was working; her vision was still poor, and her blood pressure four hours after the injection was 180/120-130 (sitting) and 160/<100 (standing).

Case 9

This patient, a woman aged 59, was admitted on July 26, 1955. We had known her as an old severe hypertensive for more than five years. Rauwolfia alkaloids caused a fall of 10 to 20 mm. in diastolic pressure only. She had gross cerebral damage (two past cerebral thromboses) and also was practically blind from recurrent vitreous and retinal haemorrhages. She showed a mild organic dementia.

On August 8 20 mg. of 356c54 was given subcutaneously. Her blood pressure range was 210-260/130-140 before injection, and one and a half hours after injection it was 150/110 and remained at the level of 150-170/100-105 for 18 hours. On August 9 a further 20 mg. was given subcutaneously. Her blood pressure fell to 120/80 in one and a half hours and remained—in bed—below 140/90 for seven and a half hours; it returned to pre-injection level at 11 hours. She was readmitted in November and was transferred to 139c55, 11 mg. This produced a fall in systolic pressure to below 120 for longer than 12 hours. In this patient 100 mg. of 139c55 by mouth produced hypotension for more than 14 hours with a systolic pressure below 140.

Case 10

A man aged 32 was admitted to hospital on August 9, 1955, with a three-months history of headaches. Two months before admission the headaches became intensely severe and would awaken him at night. For the two weeks before admission they were accompanied by episodes of vomiting. These attacks were particularly severe on awakening in the morning. For two weeks his vision had been poor.

He was admitted to the neurological service because of bilateral papilloedema, exudates, and haemorrhage. His blood pressure was in excess of 260/150-160. Blood urea was 65 mg. per 100 ml. and his urine showed albumin (6 parts of albumin per 1,000 parts of urine) and casts. He was transferred to the medical service on August 20 in view of increasing severity of symptoms. The diagnosis was "probably malignant hypertension, possibly secondary to chronic nephritis." Treatment with 356c54 was begun immediately, the dose being 27.5 mg. twice daily. There was an immediate amelioration of symptoms. Later the dose was reduced to 27.5 mg. a day, and on October 29 he was discharged home. The retinal changes were considerably improved and the electrocardiogram showed upright T waves in leads V₄, V₅, and V₆ (previously T inverted in these leads). However, the renal function has ceased to improve, and the blood urea has remained steadily between 90 and 110 mg. per 100 ml.; urea clearance, 9 ml.; creatinine clearance, 11 to 12 ml. (serum creatinine 6 to 6.4 mg. per 100 ml.); P.A.H. clearance, 40 to 50 ml.

During the next months his condition remained static. At the end of November haemoptysis, cough, and a small area of pulmonary consolidation necessitated his readmission. He was then transferred to 139c55. Originally controlled by 15 mg., the dose was steadily increased to 20 mg. daily by the end of December. At this time his blood urea had risen to 120-140 mg. per 100 ml. and his serum creatinine to 10 to 12 mg. per 100 ml. His hypertension was now not causing any symptoms and his papilloedema appeared to have subsided. At this time 200 to 250 mg. of 139c55 given by mouth produced 12 to 14 hours' hypotension one day in

three. He was discharged home on this dose, but steady deterioration of renal function and the onset of gross oedema of his lower limbs and abdomen (not due to congestive failure) necessitated his readmission in January, 1956. His blood urea was in the region of 200 to 230 mg. per 100 ml., his urea clearance below 5% of average normal, his serum creatinine 16 mg. per 100 ml., and his creatinine clearance about 8 ml. At this time he required 27.5 mg. of 139c55 subcutaneously to produce hypotension for six hours with a blood pressure below 150/100.

Incidentally, during this period 50 mg. of mecamlamine by mouth had no effect on his hypotension but caused vomiting and intractable constipation, and injections of up to 70 mg. of pentolinium had no hypotensive effect. In view of the intractability of his disease all hypotensive agents were stopped. Dietetic measures and treatment directed specifically for his oedema and less hopefully directed towards his heart were without any success, and his attacks of left ventricular failure necessitated liberal use of morphine. He died towards the end of March. Necropsy revealed evidence suggestive of chronic nephritis with superimposed changes of malignant hypertension.

Case 11

A man aged 51 was admitted to hospital on September 8, 1955, having collapsed at work. The left side of his body was flaccid, the left great toe upgoing, and he was cyanosed and frothing at the mouth. His blood pressure was in excess of 260/140. His fundi showed bilateral papilloedema and recent haemorrhages. Blood urea was 41 mg. per 100 ml.; urea clearance, 50-75% of standard clearance; creatinine clearance, 58 ml. a minute; trace only of albumin in urine. He gave a past history of increasing shortness of breath for 12 months and had been receiving treatment for angina of effort during this period. Treatment with 356c54 was begun and he was discharged home on October 29, receiving 20 mg. twice daily.

Towards the end of November he was transferred to 12.5 mg. of 139c55. His blood pressure was controlled all the waking day with this dose, and postural symptoms were usually present for the second and third hours after the injection. Dyspnoea had practically disappeared, and angina of effort did not occur. Urea clearance has remained normal. His fundi have improved considerably. Papilloedema has subsided and haemorrhages were rarely seen. ST depression and T-wave inversion in chest leads were less pronounced, the T wave being biphasic or upright. The heart size had been considerably reduced. In March, 1956, his blood pressure four hours after his injection was 105/55 (sitting).

Case 12

A man aged 57 was admitted to hospital on February 10, 1956, with a history of incapacitating headaches for 10 weeks, steadily increasing visual deterioration for eight weeks, and frequent vomiting, particularly on awakening in the morning, for three weeks.

On clinical examination his blood pressure was 210-270/135-160. His fundi showed gross bilateral papilloedema and numerous exudates and haemorrhages. Extensive macular haemorrhages appeared to be the main cause of his visual impairment. His urine contained albumin. His blood urea was 40 mg. per 100 ml.; urea clearance in excess of 80% average normal; and creatinine clearance 90-100 ml. a minute. Treatment with 139c55 was begun and he was stabilized on a daily dose of 12.5 mg. and discharged home. When last seen (April 4) his blood pressure, sitting in a chair seven hours after a subcutaneous injection of 12.5 mg. of 139c55, was 90-110/50-80, his papilloedema had subsided considerably, no retinal haemorrhages could be seen but numerous exudates, and his vision remained very poor. He was feeling quite well.

Case 13

A woman aged 55 was admitted to hospital on February 18, 1956, complaining of recurrent attacks of paroxysmal

nocturnal dyspnoea and severe shortness of breath. She had been attending as an out-patient regularly since 1950. Her blood pressure since that date has varied between 210 and 300 systolic and 140 and 180 diastolic during most of this period. On the occasion of this admission her diastolic pressure was 170 mm. Hg (± 15 mm. Hg). Her urine contained 1+ albumin, and renal-function tests were normal. Her fundi showed bilateral papilloedema with a few small haemorrhages and exudates. She was put on to 139c55, a daily injection of 15 mg. consistently producing a fall of blood pressure for more than 10 hours, during which period the diastolic pressure remained below 90. When last seen as an out-patient (March 29) her condition was excellent.

Case 14

This patient, a woman aged 49, was admitted on August 14, 1955, with a history of sudden onset of severe pain in her neck and behind her right eye. The onset of the pain was accompanied by vomiting.

Clinical examination confirmed the presence of a sub-arachnoid haemorrhage, but neurosurgical examination did not reveal the presence of an aneurysm. Her blood pressure was 200-240/130-145. Her condition improved quite satisfactorily and it was found that 200 mg. of 356c54 by mouth produced a considerable degree of hypotension, the systolic pressure being below 110 for more than 14 hours. During her stay in hospital she had several epileptiform fits which were associated with hypertensive episodes. Piperoxan and phentolamine tests were negative. She was treated with mixed rauwolfia alkaloids and was discharged.

Her condition as an out-patient remained most unsatisfactory. Her hypertension and epileptiform fits were not controlled. She was readmitted on December 12. Her hypertension was found to be adequately controlled by a single injection of 139c55, 10 mg. of which gave at least 12 hours of hypotension, and she was discharged. When last seen (April 4) her condition was very satisfactory, her blood pressure three and a half hours after the injection being 140/90.

Case 15

A woman aged 54 was referred for treatment of her hypertension from the ophthalmic department, which she attended because of visual deterioration, and where she was found to have numerous retinal and macular haemorrhages.

On admission her blood pressure range was 190-250/130-160. Renal-function tests were normal. Her retinae showed gross arteriosclerotic changes but no papilloedema. She was adequately controlled by 10 mg. of 139c55, which produced hypotension for more than 12 hours with a diastolic pressure below 100.

Discussion

This report is concerned with the clinical results of the trials of drugs 356c54 and 139c55 when used in the treatment of severe hypertension. These drugs differ in many of their detailed actions from those of the methonium group. I would emphasize here the gradual though reasonably quick appearance of activity, the easily demonstrable prolonged effect when given by the intravenous or subcutaneous routes, as well as the fall in blood pressure in the reclining and sitting positions, their relative lack of depression of small-intestine propulsion, their ability to slow the heart rate, and the slower appearance of postural symptoms on assuming the erect posture.

Experience with other members of this group of compounds has revealed that some members have a differential action on ganglia concerned with different activities though situated in the same autonomic group. Thus hypotensive ability does not appear to run parallel to ocular, oral, and gastro-intestinal activity. This is well shown in a comparison between 356c54 and 139c55. From results to date we think that there is a reasonable chance of evolving a compound showing considerable dissociation of hypotensive power from the other activities not required in dealing with hypertension.

The trial group of patients (5 male, 10 female) were selected only because of their severity, and were in fact consecutive admissions. They happen also to give a reasonable selection of the various disorders associated and often attributable to hypertension. Cases 1, 10, 11, and 12 (male), and 2, 3, 8, and 13 (female) were probably cases of malignant hypertension. Cases 2, 9, and 13 (female), and 11 (male) had cerebral thromboses, Cases 3, 4, 5, 6, 7, 8, 9, 10, 11, and 13 had recurrent attacks of left ventricular failure. Case 11 had angina of effort for at least a year, Case 6 had severe angina of effort and decubitus angina, and Cases 1, 2, 8, 9, 10, 11, 12, 13, and 14 had severe incapacitating occipital headaches often accompanied by vomiting and made worse by reclining. Gross vascular arteriosclerosis in peripheral vessels was easily demonstrable in Cases 2, 4, 5, 6, 7, 8, 9, 11, 13, and 15. The ages of the patients were 23, 28, 32, 38, 49, 51, 52, 54, 55 (two patients), 56, 57 (two patients), 58, and 59 years, and all except the 23-year-old woman and the 32-year-old man were known to have had severe hypertension for more than two years, and in some cases (Nos. 5, 6, 7, 8, 9, and 13) for more than seven years. Every patient in this series was fully investigated for pheochromocytoma (phenolamine and piperoxan in every case) and had full radiological investigation, including intravenous pyelography and often aortograms—for example, Case 3.

In no case were any of the hypertensive signs and symptoms made worse by treatment. In every case in which a change occurred it was for the better. In every case attacks of left ventricular failure stopped when treatment began, breathlessness was relieved, and angina of effort ceased to occur. When electrocardiographic changes occurred they were towards normal, and heart size was reduced. It was believed that the papilloedema in Cases 1, 2, 8, 10, 11, 12, and 13 was subsiding or has subsided. Only one patient (Case 10) in this group had grossly impaired renal function. There was no evidence to suggest an increased liability to thrombosis in arteriosclerotic vessels: in fact, the evidence in these patients and many others was to the contrary. Those headaches which were hypertensive in origin were immediately ameliorated, but they recurred when treatment was inadequate to maintain the lowered blood pressure.

In conclusion, there can be no doubt, from our experience with this group of patients, that the ability to maintain a sustained hypotension with the drug 356c54 and, better still, with 139c55 resulted in a rapid relief of symptoms and a reversion to normal of many of the changes known to be associated with persistent severe hypertension.

Summary

This paper is a report on the use during the past year and a half of two of a new group of ganglion-blocking agents (compounds 356c54 and 139c55) in the treatment of 15 severe cases of hypertension. These compounds were given subcutaneously, and the results so far have been most satisfactory. The advantages of the compounds, particularly 139c55, in the treatment of hypertension lie in the more gradual onset of activity, the greater duration of action, which makes treatment possible with a single or at most two daily injections, the slowing effect on the heart rate, and the relative lack of action on the small intestine.

I am indebted to a number of lay, technical, and medical helpers, too numerous to mention. I am grateful to my scientific collaborators, Dr. D. W. Adamson, Mr. J. W. Billingham, and Mr. A. F. Green, without whose close chemical and pharmacological association this work would never have been accomplished. I am indebted to Dr. F. Prescott, from whose original suggestion this entire investigation arose, and to the Wellcome Foundation for supplies of ganglion-blocking agents and for help in many other ways. I wish to acknowledge the careful and ungrudging work of Mr. H. Williams, Mr. A. Richardson, and the other staff of the Oldchurch Hospital pharmacy; and Mr. D. Stephenson, of the Wellcome Chemical Works. I am grateful to Dr. J. Stewart and the technical staff of the radiological department of

Oldchurch Hospital for undertaking a multitude of x-ray investigations, and to the sisters and doctors of my medical wards for the thousands of blood-pressure readings necessitated by this work; also to Sisters Turner and Fredway and my registrar, Dr. A. J. Gray. The biochemist, Dr. W. S. M. Grieve, and the laboratory technical staff have, as always, rendered yeoman service. Finally, I am also grateful to my secretary, Mrs. E. D. Price, for keeping my numerous records.

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INFECTED SUBDURAL EFFUSIONS

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The striking improvement in the results of treatment of purulent meningitis in recent years has led to the increasing recognition of the relative frequency with which subdural effusions complicate convalescence in such cases in childhood. Partly responsible also is the present awareness in paediatric circles of subdural collections of fluid of various kinds in infancy.

The condition has long been recognized and cases have been described; thus Schwartz (1916), in a paper on the aetiology of pachymeningitis haemorrhagica interna in infants, describes a fatal case of meningitis with bilateral subdural effusions. The pathological findings were described by Spitz, Pollak, and Angrist (1945). Only two cases were encountered in a series of post-mortem examinations of 95 consecutive deaths from meningitis in a total of almost 5,000 necropsies. One was an elderly man, the other a child of 3 years. Spitz *et al.* concluded that "subdural suppuration is a rare complication of purulent meningitis, although a higher incidence will undoubtedly be revealed as a result of more complete necropsy studies."

The contrast in recent American experience is expressed by McKay *et al.* (1953), who state that 60% of all infants under 1 year of age suffering from meningitis due to *H. influenzae*, pneumococci, and meningococci develop subdural effusions. Likewise Smith *et al.* (1951), in a period of 11 months, found 20 cases of subdural effusion in 43 infants under 2 years admitted with proved meningitis. The role of *H. influenzae* (Pfeiffer's bacillus) as the causative organism in meningitis associated with subdural effusion is impressive, appearing in at least 50% of the American cases, the pneumococcus and meningococcus accounting for the remainder. *H. influenzae* was the fourth commonest cause of meningitis; but in infants it was the most frequent, with the highest incidence in the second six months of life. It is possible, however, that subdural effusions may be peculiar to the age of the patients rather than to the causative organisms.

The case-fatality rate of *H. influenzae* meningitis was reported by Mutch (1941) as being between 90 and 100%. The very significant change in mortality which has occurred was recorded by Bloor, Grant, and Tabris (1950). Their 44 cases showed a mortality of 22.7%; but when divided into cases above or below 9 months of age the mortality was 8% and 42% respectively. These authors make no mention of the presence of sub-

dural effusions either in the fatal cases or in those surviving. However, about 50% of the survivors were considered to be retarded and 20% had severe neurological defects, including hydrocephalus, hemiparesis, bilateral pyramidal signs, and deafness. It appears probable, in view of the relatively high incidence of subdural effusions recorded in other series, that some of these defective children are suffering from the sequelae of subdural effusions as well as the primary cerebral damage attributable to the meningitis.

Of the five cases of infected subdural effusions presented here, four were associated with purulent meningitis and one was an unusual sequel to bilateral subdural haematomas treated four years previously, in which no organism was isolated. The organisms responsible for the meningitis were *H. influenzae* in two cases and meningococci in one case; no organism was grown in the fourth. All the cases were seen at hospitals in or near Chicago.

Case 1

A 12-months-old girl was admitted to hospital because of vomiting and a left hemiparesis. Seven weeks before admission she had a convulsion associated with a high fever. Subsequently she vomited frequently, and had respiratory difficulty with continued fever. At this time the parents noted that there was weakness of the left arm and leg and that the child was extremely irritable. She was admitted to another hospital and given sulphonamide, penicillin, chlortetracycline, and oxytetracycline, which had little effect on the fever, although the child vomited less and her general condition appeared to improve. She was discharged from hospital, but after two weeks was readmitted. Her temperature continued to be elevated and stiffness of the neck was noted. She was given streptomycin and serum. *H. influenzae* was cultured from the cerebrospinal fluid following lumbar puncture. During the week before admission vomiting had again increased considerably and the child developed a left hemiparesis. She had had no previous serious illness and had developed normally.

On admission to the Children's Memorial Hospital, Chicago, her temperature was 102° F. (38.9° C.), pulse 132, and respirations 26. She was irritable and appeared ill, but was fairly well nourished. The anterior fontanelle was bulging and the veins of the scalp were engorged. The fundi were normal, the pupils were equal in size and reacted normally to light. (The pharynx was not injected and the ears were normal. The heart, chest, and abdomen were normal.) The right arm and leg moved normally, the left leg moved not at all and the left arm only slightly. The deep tendon reflexes were increased on the left side, but both plantar responses were flexor.

The subdural spaces were tapped at the lateral angles of the anterior fontanelle (Fig. 1). No fluid was found on the right side, and on the left there were a few drops of clear cerebrospinal fluid only. Examination of the blood revealed a moderate anaemia with a white-cell count of 23,000, predominantly polymorphonuclear leucocytes. Streptomycin was given, but there was no real change in the child's con-

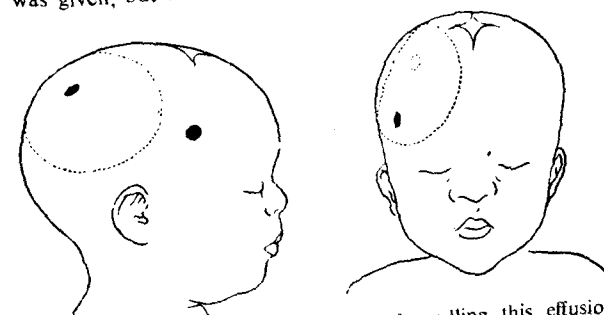


FIG. 1.—Case 1. Showing difficulty of needling this effusion from the anterior fontanelle.

dition. Accordingly on the sixth day in hospital bilateral posterior parietal burr-holes were made under general anaesthesia. The left subdural space was normal, but on the right side 30 ml. of pus was evacuated from a subdural empyema. A further burr-hole was then made in the right parietal region, but the dura mater and cortex were adherent and congested and nothing further was done. The subdural empyema was irrigated with warm saline and penicillin by a catheter through the posterior burr-hole and the wounds were closed. The child made a satisfactory recovery. Culture of the pus obtained from the subdural space resulted in no growth.

The child's subsequent progress was satisfactory. Her temperature was normal on the third post-operative day and remained so with continued clinical improvement. The hemiparesis improved slightly during her stay in hospital and she was discharged on the ninth post-operative day. She has since been followed up as an out-patient, and there has been a return of function of the left upper and lower extremities and she is developing normally. This child has been under observation for more than one year.

Case 2

A 5-weeks-old female infant developed fever and irritability 10 days before admission. On the fifth and third days before admission generalized convulsions occurred. At this time she was admitted to another hospital and received an unspecified amount of penicillin. Lumbar puncture there revealed a purulent meningitis, but no organism was isolated. She was immediately transferred to the Contagious Disease Hospital, where she was treated with intravenous oxytetracycline, 50 mg. every six hours. The temperature of 102° F. (38.9° C.) returned to normal in 24 hours.

The baby was transferred to the Children's Memorial Hospital because of diarrhoea and abdominal distension, which followed recommencement of oral feeding. The abdominal condition rapidly improved, but on the day following admission her temperature was again 102° F. (38.9° C.) and lumbar puncture yielded a cloudy fluid containing 110 and lymphocytes per c.mm., protein 92 mg. per 100 ml., and glucose 34 mg. per 100 ml. The white-cell count on admission was 26,000 per c.mm. Antibiotic therapy was continued and the temperature was again normal on the fifth day after admission.

On admission the anterior fontanelle was said to be flat, but on the third day it was described as "full," and three days later as "bulging but not tense." Bilateral subdural taps were then performed and 6 ml. of light yellow fluid was obtained from the left side and 4 ml. of a darker-coloured fluid from the right. The fluid from the right side contained protein, 2.8 g. per 100 ml., that from the left 0.9 g.

Subdural taps were repeated on four occasions during the next 10 days with decreasing amounts of fluid at each tap from the right side until no further fluid was obtained. The left side continued to yield 6 ml. on each occasion, containing protein about 0.6 g. per 100 ml.

The child was making good progress, was feeding well, and had a normal temperature. The white-cell count was now 10,000 per c.mm. She was accordingly discharged home and returned on two occasions subsequently, at intervals of one week, when the left subdural space was tapped. There was 2 ml. of yellow fluid at the first tap (protein 0.67 g. per 100 ml.; 52 W.B.C.). No fluid was obtained on the second occasion.

She subsequently made good progress. There were no neurological defects, and at 18 months of age she appeared to be normal. At no time were organisms seen on smear or grown by culture from either the C.S.F. or subdural fluid.

Case 3

The patient was a baby girl of 5 months. Her antenatal development and birth were normal. Post-natal development so far was normal and she was said to have been quite well until three weeks before admission to hospital, when she had an upper respiratory infection which progressed to

Subdural Effusions Complicating Meningitis

Although I can give only two examples of effusion complicating meningitis, I feel that in past years, before certain antibiotics were obtainable in England and before treatment of the meningitides had been accurately worked out, I must have had others.

Case 7.—A female neonate was treated at a maternity hospital for 16 days for what was undoubtedly a septicaemia with meningitis, organism undiscovered. She was transferred to a children's hospital because of convulsions. The urine contained pus and *E. coli* and the fontanelle was bulging. C.S.F.: 32 cells per c.mm., mostly lymphocytes; protein, 130 mg. per 100 ml.; globulin, slight excess; chlorides, 635 mg. per 100 ml.; sugar, 35 mg. per 100 ml. A bilateral subdural tap yielded an amber-coloured fluid containing a protein concentration of 1,000 mg. per 100 ml. Subdural taps were repeated on the following days, and antibiotics were continued. The infant was discharged a month after admission, and at 7½ months of age was sitting up unsupported, appearing normal in every way.

Case 8.—A male infant was transferred to my care at 3 months of age because of vomiting. He had been under treatment with various antibiotics for "acute pneumonitis." The head was retracted, neck stiff, fontanelle full, and the disks were normal. C.S.F.: 38 cells per c.mm.; 160 mg. protein, 710 mg. chloride, and 37 mg. sugar per 100 ml. From 10 to 40 ml. of yellow fluid was withdrawn from each side by subdural tap on 16 successive days—a total of 563 ml. of subdural fluid. Mr. Pennybacker subsequently operated and removed a membrane from the left hemisphere.

Treatment

Specific treatment is primarily the concern of the paediatrician, who should withdraw the subdural fluid on each side daily until it becomes difficult to obtain. This is really a method of producing gradual decompression, and may take anything from a few days to a few weeks. An antibiotic such as procaine penicillin 300,000 units or oxytetracycline 20 mg. per lb. (40 mg. per kg.) body weight should be given daily as a prophylactic or to clear up infection in the respiratory passages or elsewhere. A considerable amount of protein is lost in the subdural fluid, and this should be made good by one or more transfusions of citrated blood. Some infants show an increasing anaemia, so that transfusions of blood serve a double purpose. The nutrition is as often as not below average, sometimes much below, and good feeding during the pre-operative period enhances the prospects of successful operation.

When the infant is transferred to the care of the surgeon the presence of solid clot or membrane is determined by inspection after making burr-holes in the temporal region in the first place, and elsewhere if necessary. If clot and membranes are found, bone flaps are turned down and the tough outer membrane is attached to the dura, and the thin membrane and clot over the pia are removed on one side and, at a later date, on the other.

As has been seen, subdural haematomata that are discovered within a few days of birth can be successfully treated by subdural taps without resort to operation.

Subdural effusions as a complication of meningitis undoubtedly occur more often than has been realized, particularly after infection by *H. influenzae*—not only one of the most frequent infections in early infancy but also one of the most difficult to treat—and also after pneumococcal and meningococcal infections. Smith (1953) states that subdural taps alone seem to constitute adequate local therapy in these effusions, which generally clear up within three weeks. On the other hand, McKay and his colleagues (1953) achieved success by subdural tap in only 15 out of 50 cases, for the remaining 35 needed craniotomy as well.

One may conclude that small sterile effusions often arise in the course of treated meningitis and clear up spontaneously. Effusions which become clinically recognizable may be sterile or infected, and clear up in response to subdural taps and continued antibiotic therapy. If definite membrane formation has taken place and the contents of the sac are infected, subdural taps alone are unlikely to effect cure, and

craniotomy will be necessary. Subdural taps should be initiated when adequate antibiotic treatment of the infection does not bring down the fever, sterilize the spinal fluid, and abolish symptoms in three or four days.

Discussion

The detection of subdural effusions may fall to the lot of all who have to do with the medical care of young infants—the obstetrician, the paediatrician, and the general practitioner—whether in hospital or in the home. As has been seen, certain signs and symptoms found in such effusions are common to a number of unrelated conditions. Vomiting, anaemia, and wasting, and even convulsions in early infancy are so much more related to digestive disturbances and infection that the real nature of the trouble may escape recognition unless careful examination of the nervous system is a repeated routine. A simple and neglected procedure is the measurement of the circumference of the heads of young infants from time to time as a means of estimating normal and abnormal growth.

A history of a normal or non-instrumental labour should not put the physician off guard, for the real quality of the labour is often unknown unless good hospital records are kept; and, in any case, birth injuries occur in deliveries that have been apparently normal. It must be remembered that post-natal injuries, or a knock on the head, can cause subdural effusions of blood, though the history of such injury is always more forthcoming, and evidence of fracture in the skull x-ray film is more often associated with it, than with injuries incurred at birth.

Conclusion

Subdural haematomata and inflammatory effusions are best prevented by good obstetrics, and by early diagnosis and correct antibiotic therapy. When they do occur, early recognition and appropriate treatment should reduce to the minimum the incidence of sequelae such as paralysis, spasticity, mental defect, and death. Ingraham and Matson (1954) are able to state authoritatively after 14 years' follow-up that 70 to 80% of the children who had been surgically treated appear to be developing mentally for their age, and that residual neurological signs and post-operative convulsions are uncommon. The retarded and deficient children have been for the most part those with large chronic haematomas with marked atrophy of the hemispheres well established when the membranes were removed.

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In 1955 there were 759,571 donations of blood, compared with 700,202 in 1954. This is the largest number recorded. 116,410 people gave their blood for the first time to the National Blood Transfusion Service last year, and at the end of December the total strength of the donors' panel was 591,204, compared with 540,389 a year before. The National Blood Transfusion Service needs at least 650,000 regular donors to make sure that adequate supplies of blood are available to meet the needs of the hospitals, to replace the older donors when they reach the age of 65, and to provide adequate reserves of blood plasma. Anyone who is in normal health and between the ages of 18 and 65 is welcomed at the donor sessions, which are held frequently in convenient places throughout England and Wales.

VIADRIL: A NEW STEROID ANAESTHETIC**PRELIMINARY COMMUNICATION**

BY

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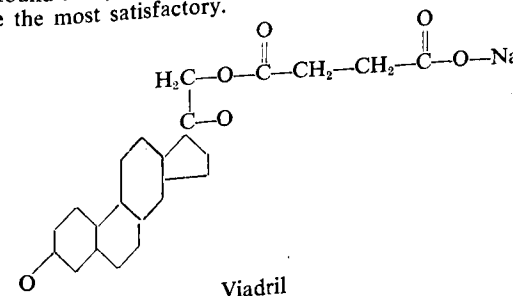
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Ideal anaesthesia is seldom carried out to-day with only one agent. Like "all Gaul," such an anaesthetic consists of three parts: (1) a basal narcotic—for example, thiopentone sodium; (2) a muscle relaxant—D-tubocurarine chloride ("tubarine"), gallamine triethiodide, curarine chloride ("tubarine"), and (3) an analgesic—suxamethonium chloride, etc.; and (3) an analgesic mixture of nitrous oxide and oxygen with or without such adjuvants as trichlorethylene or pethidine.

"Viadril" (21-hydroxypregnane-3:20-dione sodium succinate) telescopes the narcotic and relaxant functions and requires only minimal nitrous oxide and oxygen to maintain anaesthesia. This substance is revolutionary in that it is a steroid. It bears no resemblance, therefore, to any group of drugs hitherto used or contemplated for the purpose. Viadril is a non-volatile crystalline solid, freely soluble in water, the solution having a pH of 7.8 to 10.2.

History

Selye (1941, 1942), investigating many different steroids in 1941, noted that some of these caused depression and the anaesthesia in laboratory animals. Further work on the anaesthesia in laboratory animals. Further work on the pharmacology of some of these compounds was carried out by Elliott and Gordan (1947). Laubach *et al.* (1955) investigated a large number of these compounds in animals and found 21-hydroxypregnane-3:20-dione sodium succinate to be the most satisfactory.



Viadril

It was found to have a wide margin of safety, the therapeutic index in mice being 11.1, as compared with 4.6 in thiopentone sodium. In anaesthetic doses it did not produce significant hormonal effects or cause salt retention. Gordan *et al.* (1955) studied its effects on cerebral metabolism in man, and reported changes identical with those of barbiturate anaesthesia. Thus emboldened, they used the drug together with nitrous oxide for a prefrontal leucotomy.

Murphy *et al.* (1955) described a series of 125 patients anaesthetized with viadril. The duration of anaesthesia varied from 1 to 10 hours.

The known disadvantages of viadril anaesthesia are the risk of venous thrombophlebitis and the slowness of induction.

Venous Thrombophlebitis.—This occurred in three of the cases described by Murphy *et al.* Their three patients, however, had severe pre-existing vascular disease. In an attempt to obviate this I injected the drug slowly into the giving-set tubing of a normal-saline drip, just below the inspection chamber. The drip was set to run at its fastest into a large vein of the arm. Two of the cases here

reported (Nos. 7 and 19) developed thrombophlebitis in spite of these precautions. In Case 7 on the day after operation the patient complained of a painful red swelling of the forearm and arm, which he did not regard as of major importance and which improved steadily day by day. A week later a cord-like thrombosis started at the site of injection in the cephalic vein at the wrist and extended by minor vessels on the volar aspect of the forearm to the basilic vein, which was thrombosed almost as far as the axilla. The veins were slightly tender throughout their length and there was some limitation of extension at the elbow due to tenderness.

Thrombophlebitis in the median basilic vein developed in Case 19. Five days later this could be felt as a solid cord from the elbow to the axilla, and was discoloured throughout its length. It was not, however, very painful or tender.

Slow Induction.—This is a marked feature of the drug and is something of a problem in the course of a busy operating session. Doubtless further chemical research on the compound will disclose a substance with a shorter time-lag. Gordan *et al.* (1955) suggest, in fact, that an intermediate metabolite of viadril is the cause of the anaesthesia. This would explain the delay in onset of unconsciousness. A search for this substance is being carried out.

Pharmacology

In many endocrine disorders disturbed mental or psychological function is seen. Myxoedema, hypoglycaemia, hypoparathyroidism, hypopituitarism, and Addison's and Cushing's diseases are examples which spring readily to mind. The use of cortisone and corticotrophin has familiarized many with the dramatic euphoria and psychoses which these agents provoke.

Merryman *et al.* (1954), whilst investigating progesterone in psychiatric practice, found that several of their patients fell asleep. Woodbury (1952) studied the effect of steroids on electric convulsion therapy. He showed that deoxycortone is a powerful anticonvulsive agent.

The steroids exert a regulatory influence upon cerebral metabolism, as shown by the high rate of oxygen uptake of the brain of the castrate immature male rat. By administering various steroids this increased oxygen uptake can be reduced. The steroids with the androstene nucleus (including testosterone and 21-C steroids) can restore this "braking" action, which is normally exerted upon cerebral metabolism by the sex hormones.

The intravenous injection of viadril causes loss of consciousness, analgesia, absent corneal reflex, and muscular relaxation, particularly of the larynx. It has no demonstrable hormone effects. No electrocardiographic changes have been observed. No haemolysis occurs with its use. There is no depression of respiration. Slight pain is sometimes noted in the recipient vein with dilutions higher than 2.5%. Hypotension commonly occurs, but small doses of pressor drugs soon restore the blood pressure. Nitrous oxide has a remarkable synergism with viadril. If necessary, relaxant drugs, pethidine, and the volatile anaesthetic agents can be given at the same time as viadril, though much smaller doses are needed.

Technique of Administration

Viadril was supplied for this clinical trial in bottles containing 500 mg. The addition of 19.8 ml. of normal saline results in a 2.5% solution. This is injected into the tubing of a giving-set, as already described. If the patient is engaged in conversation he will say he feels nothing. After a minute or two the creases in the face begin to smooth out. Blinking begins and finally the eyes close. Soft snoring supervenes a minute or two later. This process takes about five minutes. The observer cannot but be struck by its resemblance to the coming of ordinary sleep. The fact that viadril is a steroid promotes interesting speculation into the mechanism of normal sleep. Viadril induction is quite different from thiopentone induction. There is

no yawning or sighing. The patient has no feeling that "something is about to happen." There is no unpleasant smell or taste.

After the patient has fallen asleep, quite naturally as it were, he remains peacefully in that condition. There is no stertor. The colour remains pink and the pulse is unchanged. The patient is now allowed to breathe 20-30 breaths of a nitrous oxide and oxygen mixture in the proportion of 3 litres of the former to 1 litre of the latter. This dilute mixture can be given with the utmost confidence, owing to the remarkable synergistic effect of nitrous oxide and viadril.

At the end of this induction it will be found that the laryngeal reflex has been obtunded and intubation with a cuffed tube can now be carried out. The patient may "buck" slightly but soon settles down. With the doses that I have used breathing continues normally and hyperpnoea may occur, but in spite of this there is very little resistance to assisted respiration and the patient's breathing can be "taken over" almost at once. Relaxation is good, though not comparable to that of gallamine triethiodide or suxamethonium. Bleeding is usually much reduced. The blood pressure may fall, but it responds very quickly to small doses of vasopressors. Throughout, the colour of the skin is pink. At the end of operation the nitrous oxide is cut off and coughing begins, quickly followed by grimacing. On return to the ward the patient lies in an apparently normal sleep. After a short period he can be roused. At the end of an hour or so he is fully awake, and in reply to questions will say he feels well and is in no pain. Euphoria is a distinct feature of this agent. Vomiting occurred in only one of the cases here reported.

At all times my supplies were restricted, and it will be seen that only one patient received as large an amount as 1,250 mg. of viadril (Case 6).

American workers report the use of other adjuvants, pethidine, gallamine triethiodide, and suxamethonium being used. It must be remembered, however, that the duration of their operations much exceeds common British practice. Analysis of one American series (personal communication) of 57 cases in which viadril was given yields the following figures. Of the 28 cases in which the duration is mentioned

the average time was 3½ hours, the individual times ranging between half an hour (one case) to 8½ hours (one case). The average dose of viadril was 1,301 mg., ranging from 500 (one case) to 3,000 mg. (one case). Of these cases, 18 received pethidine, the average dose being 66.6 mg., ranging from 15 (one case) to 210 mg. (one case). The other adjuvants mentioned were thiopentone, 175 mg.; 2 ml. of D-tubocurarine chloride and suxamethonium chloride for the peritoneal closure; D-tubocurarine chloride, 5½ ml.; D-tubocurarine chloride, 4½ ml.; "small amounts of suxamethonium"; and "a suxamethonium drip" (no total mentioned).

In my series of 19 cases the average time was 26 minutes, ranging from 8 (one case) to 90 minutes (two cases). The average dose of viadril was 824 mg., ranging from 500 (two cases) to 1,250 mg. (one case). All except three were pre-medicated with "omnupon," ½ gr. (22 mg.), and scopolamine, 1/150 gr. (0.43 mg.). In Case 4 morphine, ½ gr. (22 mg.), and atropine, 1/100 gr. (0.65 mg.), and in Case 8 morphine, ½ gr. (11 mg.), and atropine, 1/100 gr. (0.65 mg.), were given; another had pethidine, 100 mg., and atropine, 1/100 gr. (0.65 mg.). None received pethidine during the operation. Case 6 (see below) required 80 mg. of gallamine triethiodide and Case 8 50 mg. of suxamethonium. Local infiltration of lignocaine and adrenaline to obviate bleeding was used as routine in three cases (two thyroidectomies and one dacryocystorhinostomy). Chlorpromazine was used in Case 1. No significant reaction was noted.

A précis of the anaesthetic case histories is given in the Table, and three fuller histories are given to bring out various points.

Illustrative Cases

Bad Risk: Case 8.—Man aged 76. General condition very poor, ears cyanosed, tongue very dry and furred. Emaciated. Ill for six weeks with "stomach trouble." Very deaf; extremely difficult to take history. Barium enema previous week showed "large filling defect" of stomach. Perforated eight hours previously. Premedication: morphine, ½ gr. (11 mg.), and atropine, 1/100 gr. (0.65 mg.). Temperature 102° F. (38.9° C.), pulse 112, B.P. 160/100. At 11.33 viadril, 400 mg., injected into drip. 11.38: patient

Summary of Anaesthetic Case Reports

Case No.	Sex and Age	Operation	Pre-operative Condition	Pre-medication	Viadril (mg.)	Conduct of Operation	Length of Op. (min.)	Post-operative Condition	Vomiting
1	M 73	Cystoscopy; extravesical prostatectomy; bilateral vasectomy	Very good; has large scrotal hernia. B.P. 140/80	Omnupon, ½ gr.; scopolamine 1/150 gr.	750	Excellent relaxation. Hypotension relieved by methylamphetamine 30 mg. Chlorpromazine 50 mg. intramuscularly*	60	After ½ hour could be roused; said, "I feel all right." Eight hours later was reading newspaper. Developed thrombophlebitis	No
2	M 55	Cystoscopy; extravesical prostatectomy, bilateral vasectomy	Excellent. B.P. 120/70	Omnupon ½ gr.; scopolamine 1/150 gr.	750	"Some fullness" in arm during induction. Relaxation excellent. Patient almost "apnoeic at will"—i.e., breathing can be easily taken over. B.P. fell to 155/90	62	1½ hours later: excellent condition, says he has no pain	"
3	M 73	Transvesical prostatectomy; bilateral vasectomy	Fair. Was admitted 4 days earlier for emergency supra-pubic cystostomy for retention. 84 fl. oz. urine evacuated from bladder. Haemoglobin 69%; blood urea, 105 mg./ml. B.P. 170/80	Omnupon ½ gr.; scopolamine 1/150 gr.	750	Patient coughed once or twice. When N ₂ O/O ₂ mixture was raised from 3/1 to 6/1 patient relaxed. B.P. fell from 170/80 to 95/50, but methylamphetamine 15 mg. restored this to 150/80	40	Patient answered to his name ½ hr. later. Four hours later was in excellent condition and free from pain	"
4	M 80	Partial thyroidectomy	Good. Deviation of trachea. B.P. 210/100	Morphine ½ gr.; atropine 1/100 gr.	500	Local infiltration of lignocaine and adrenaline. Excellent anaesthesia. B.P. fell to 120/70. Surgeon says, "practically no bleeding"	33	Twenty minutes later was rousable. One hour later: sitting up; says he is "dry"	"
5	M 47	L. Keller's operation	Good	Omnupon ½ gr.; scopolamine 1/150 gr.	750	Very satisfactory	30	75 minutes later patient dozing. On being roused says "feels fine"	"

* Routine: This surgeon uses adrenaline 0.1 mg. in 60 ml. water as a prostatic capsule haemostatic. The chlorpromazine is here used as a prophylactic against pressor effects. B.P. fell steadily until unreadable, though pulse good. Methylamphetamine 30 mg. restored B.P. to 120/70 immediately.

Summary of Anaesthetic Case Reports.—Contd.

Case No.	Sex and Age	Operation	Pre-operative Condition	Pre-medication	Viadril (mg.)	Conduct of Operation	Length of Op. (min.)	Post-operative Condition	Vomiting
6	M 75	See text							
7	M 53	Excision of hydrocele	Good	Omnupon ½ gr.; scopolamine 1/150 gr.	1,000	Some hyperpnoea, but soon abolished by raising N ₂ O/O ₂ mixture from 3/1 to 5/1	18	Two hours and a half later: dozing—says "feels fine" Developed thrombophlebitis	No
8	M 76	Laparotomy	See text						
9	M 29	Trendelenburg. Stripping of veins of lower limb	Good. Is a eunuch (post-mumps)	Omnupon ½ gr.; scopolamine 1/150 gr.	750	Patient "bucked" on tube a good deal. Owing to shortage of supply only 750 mg. viadril given. Would have been better with 1,000 mg. B.P. pre-op. 100/60; during operation 120/60	30	Patient dozing in ward an hour later but easily roused	No
10	F 50	Local excision of tumour of breast	Good. B.P. 135/80	Omnupon ½ gr.; scopolamine 1/150 gr.	1,000	Very relaxed throughout. Very satisfactory result. B.P. fell to 85/60	25	Two hours later patient sitting up in bed	"
11	M 20	Right inguinal herniotomy	Good. B.P. 145/75	Omnupon ½ gr.; scopolamine 1/150 gr.	1,000	Good anaesthesia. Surgeon complained at beginning of operation that muscles were tonic, but assisted respiration obviated this	21	Two hours later patient sitting up in bed	"
12	F 32	See text							
13	F 17	Right lateral rectus resection and recession	Excellent. B.P. 130/65	Omnupon ½ gr.; scopolamine 1/150 gr.	750	Very quiet smooth anaesthesia. B.P. rose to 150/100 (? CO ₂ retention) then fell to 115/70	11	Quickly recovered	No
14	F 39	Rt. dacryocystorhinostomy	Good. Apprehensive. B.P. 110/70	Omnupon ½ gr.; scopolamine 1/150 gr.	1,000	Asleep under five minutes. Nose packed with gauze soaked in 0.2 ml. cocaine hydrochloride 15% containing 0.5 ml. adrenaline (1:1,000). Local infiltration of eyelids with lignocaine containing 1:80,000 adrenaline. After intubation nasopharynx packed. B.P. rose to 135/80. Excellent anaesthesia. Colour pink, bleeding minimal, quiet respirations; B.P. 85/60. Pulse 80	70	Forty minutes later patient says she feels fine; "eve does not hurt"	Yes
15	M 50	(1) Right inguinal herniotomy. (2) Appendicectomy	Good. Fat man; looks old. Thyroidectomy 20 years previously (? myxoedema)	Omnupon ½ gr.	750	B.P. fell steadily from 100/80 to 60/50 at 42nd minute. Pulse 70. Methylamphetamine, 15 gr., had no effect. On repeating dose B.P. rose to 130/80. Two hours later in ward, sitting up, delighted to have had operation. Surgeon's comment: "Certainly does not look like man who had an operation two hours ago"			No
16	F 35	Local excision of tumour of breast	Excellent. B.P. 130/100	Omnupon ½ gr.; scopolamine 1/150 gr.	750	Asleep in five minutes. Easily intubated under N ₂ O/O ₂ 3/1	20	Seen by surgeon 3½ hours later. Patient sitting up in bed complaining of slight headache	"
17	M 53	Dilatation of urethra	Good	Omnupon ½ gr.; scopolamine 1/150 gr.	500	No nitrous oxide. Slept peacefully throughout procedure. Jaw not relaxed. Breathing quiet; B.P. fell from 195/100 to 130/80, with pulse 66	8	Excellent. Rapid recovery	"
18†	F 50	Radical mastectomy	"	Omnupon ½ gr.; scopolamine 1/150 gr.	1,000	Very satisfactory anaesthesia. Bleeding very troublesome. This was due at first to slight respiratory obstruction due to kinking of endotracheal tube. Excessive bleeding persisted after this had been dealt with and in spite of fall in B.P. from 160/90 to 115/105 and very quiet respiration; transfused with 1 pint of blood during operation	90	Fair. Coughing at end of operation but appears shocked. P. 110. Contents of re-breathing-bag show CO ₂ content = 0.3%. Collapsed after return to ward and required further pint of blood to restore her condition	"
19	F 28	Partial thyroidectomy	Good, thin; was toxic 3 months previously but not now; has been treated medically	Omnupon ½ gr.; scopolamine 1/150 gr.	1,000	Local infiltration with lignocaine and adrenaline. Breathing quiet and shallow. Occasionally "bucked" slightly when trachea was disturbed, but assisted respiration overcame this within 3 or 4 breaths. Very satisfactory anaesthesia	90	Excellent. Coughed as soon as tube was removed and nodded head when spoken to. 80 minutes later patient conscious in ward; had slightly sore throat when swallowing. Developed thrombophlebitis	"

† This is the same patient as Case 10.

sleeping lightly; viadril, 250 mg. (total, 650 mg.); ears now pink. N_2O/O_2 (3/1) begun; patient intubated. 11.45: on table, almost apnoeic; B.P. 170/70, pulse 120. 11.50: abdomen opened; fluid in peritoneum (stomach contents); carcinoma of stomach found with many secondaries in liver; B.P. 150/80, pulse 150. 12.05: operation very difficult on account of secondary involvement of mesentery, peritoneum, colon, etc., and adhesions between all these organs. Blood transfusion begun. The perforation could not be found. Three pints (1.7 litres) of fluid were aspirated from the peritoneum and the heart began to fibrillate (B.P. 100/60, pulse 118, respirations 36). Methylamphetamine hydrochloride, 30 mg., restored the B.P. to 120/80. At 12.30, the perforation not having been found, the peritoneum was closed. One-half was sutured with ease. The patient now began to tighten up. Suxamethonium, 50 mg., relaxed him at once. The operation was completed at 12.40; the patient was then pale, but pink, with a dry skin. The pulse was of good volume but fibrillating. Death occurred on the fifth post-operative day.

Very Satisfactory Anaesthetic: Case 12.—Woman aged 32. Operation: medial rectus recession. Premedicated with omnopon, $\frac{1}{2}$ gr., and scopolamine, 1/150 gr. B.P. 110/70. At 9.59, viadril, 750 mg. (B.P. 130/65, pulse 120). 10.02, asleep. 10.04: N_2O/O_2 (3/1) begun. 10.06: intubated. 10.12: patient nearly apnoeic (B.P. 115/60). 10.20: breathing regular and of adequate volume. 10.25: operation completed, N_2O/O_2 stopped; coughed immediately. At 11.00 the patient was seen in the ward, sleeping. Easily aroused, she asked—although the conjunctival sac of the affected eye was filled with blood—“Have I been done?” and when reassured said, “Lovely; I’ve been asleep.”

Unsatisfactory Anaesthetic: Case 6.—Man aged 75. Operation: herniotomy and repair; orchidectomy. A very fit, well-built man who appeared younger than his years. B.P. 180/80. At 11.04, viadril, 750 mg. 11.12: patient was “just asleep,” N_2O/O_2 (5/1) begun. 11.17: not relaxing; viadril, 250 mg. 11.22: unable to intubate. 11.30: viadril, 250 mg. 11.35: intubated; still coughing. 11.40: relaxing (B.P. 100/60). 11.45: methylamphetamine hydrochloride, 20 mg. 11.48: patient still coughing (B.P. 110/70). 11.50, N_2O/O_2 still running at 5/1; patient resented cord being pulled. 11.53: orchidectomy complete; operation proceeding with difficulty. 12.10: gallamine triethiodide, 80 mg. 12.15: B.P. 120/80, pulse 100. 12.25: operation completed, neostigmine, 25 mg., atropine, 1/100 gr. (0.65 mg.), patient began to cough immediately. N_2O cut off.

On consideration of Case 6 it was thought that the viadril when being injected into the tubing of the drip was going up into the saline bottle. As a result the routine was instituted of closing off the tubing by means of a clamp whilst the injection was actually being given, a few millilitres at a time; stopping the injection; opening the clamp to dilute the viadril; then repeating the process as often as necessary until the full dose had been given.

Summary

A steroid, viadril (21-hydroxypregnane-3:20-dione sodium succinate), has been used as an anaesthetic in 19 cases. The pharmacology of the drug is discussed and the mode of administration described. Usually pre-medication was with omnopon and scopolamine, and maintenance by nitrous oxide and oxygen. In some cases relaxants were also given.

Viadril anaesthesia resembles normal sleep; relaxation is fairly good and bleeding usually much reduced. The patient is fully awake in an hour or so after operation, feeling well and without pain. Hormonal effects are absent and vomiting is rare.

Disadvantages are the slowness of induction and the risk of thrombophlebitis in the injected arm. Measures to combat these are suggested.

Details of the 19 cases are tabulated, and three case histories given to emphasize special points.

I am indebted to my surgical colleagues at the Moorfields, Westminster and Central Eye Hospital (Royal Westminster Branch and Highgate Annexe), the Connaught Hospital, Walthamstow, St. John's Hospital, Lewisham, and the Lewisham Hospital for their patience and interest in this clinical trial; to Dr. Gilbert S. Gordan, of the University of Medicine, San Francisco, for his great help; and to Messrs. Pfizer Ltd., and especially Dr. A. M. Brunton, their deputy director of medical services in the United Kingdom, for the supply of viadril and for much of the information contained in this report.

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FAMILIAL TUBEROUS SCLEROSIS

BY

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Tuberous sclerosis was first diagnosed in 1880 by Bourneville, who described the case of an epileptic imbecile who died of the disease; and the disease was named after the discoverer. The fully developed disease is manifested classically by infantile epilepsy, mental defect, and the characteristic facial eruption of adenoma sebaceum. It is a rare hereditary disorder of tissue growth, in which many different tissues may be affected and many varying clinical syndromes found. It may be familial, and such an afflicted family is described.

Family History

The composition of the family is shown in Fig. 1. The family is mainly domiciled in Malta, and is compounded of mixed Anglo-Maltese racial stock. The heredity is com-

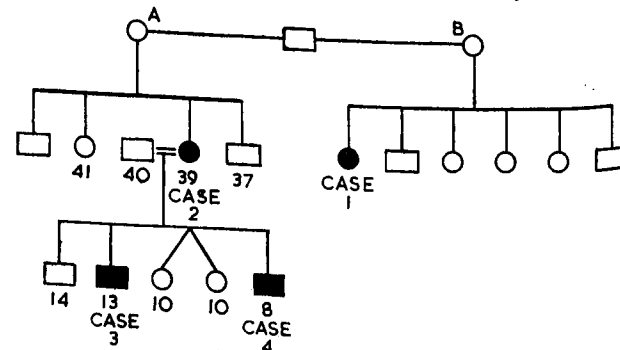


FIG. 1.—Family tree, showing four members affected with tuberous sclerosis. The ages of living members examined are shown. The grandfather married his first wife's sister.

plicated by the two marriages of the grandfather, who married his deceased wife's sister. The four patients affected by tuberous sclerosis are all alike, showing the typical facies, and anxious family inquiry is made whenever a child is born into the family. All other members of the family are of normal facial appearance and are reputedly healthy.

Case 1

This young girl died in convulsions at the age of 14 years in 1935. Zahra Neumann (personal communication) states

that the girl had suffered all her life from major epilepsy, and that the attacks increased in severity with the onset of puberty. She had a developmental asymmetry of the face, but did not show the lesions of adenoma sebaceum. She suffered also from congenital heart disease, and from retarded mental and physical development. No post-mortem examination was made, so the diagnosis of tuberous sclerosis as the cause for the congenital epilepsy is inferential.

Case 2

This patient, a woman of 39, is the mother of five children, including Cases 3 and 4. She is the half-sister of Case 1, having the same father, and their respective mothers being siblings. As a child she suffered from major epilepsy, and in early adult life from minor epilepsy. She was slow and late in development and was backward in her speech, and for many years she had a bad stammer. She was always shy and retiring when young on account of her peculiar skin condition and stammer. She has never suffered from any other illnesses.



FIG. 2.—Case 2. Photograph showing pronounced adenoma sebaceum.

When examined her face showed a pronounced degree of adenoma sebaceum (Fig. 2). The lesions covered the whole face and forehead and upper neck anteriorly. They were largest around the naso-labial folds, where some of them were of the size of a split-pea, and others protruded as pedunculated excrescences above the skin. They were discrete and pinkish in colour. They diminished progressively in size peripherally, until they could be picked out as small elevated pinheads above the skin, which contained telangiectatic capillaries.

The adenoma sebaceum had been present as long as she could remember, and the lesions had increased imperceptibly in size over the years. Some of the larger adenomata with well-developed pedicles had been treated by the constriction of horse hair around their bases.

Physically she is now a very healthy woman, with no other congenital signs. There are no associated congenital abnormalities, and radiographs of the skull and extremities and of the lung fields are all normal.

Mentally she presents as a woman of average intelligence, alert and lively, and quick in her responses to novel situations or to formal tests. She is stable and well balanced, runs her house and family affairs very capably, and can plan her future course of action ahead. She has a normal pleasant personality, and is an excellent mother to her five children.

Case 3

This patient, a schoolboy aged 13, is the second child of Case 2. He was a full-term infant of a normal and easy birth, but his mother could tell at birth that he was going to have “her kind of skin.” He developed well until he was 9 months old, when he began to have major epileptic fits. These fits were very violent for two years. He occurred about once a fortnight for these convulsions, frequently cut and bruised himself during these convulsions, and was admitted to hospital on several occasions for suture and scalp injuries. He never received any sedative or anti-convulsant therapy for his epilepsy, but gradually after he

was 3 years old his seizures became less intense and less violent, dying away completely at the age of 4. He has been completely free from all epileptic attacks for nine years.

After the onset of epilepsy he regressed mentally and developmentally and became grossly retarded. He was unable to walk until he was 5½ years old, and he could not frame a coherent sentence until he was 7. But since that age he has developed with increasing rapidity. He is now in the fourth form at school and participates keenly in normal school activities. He is bilingual and can read and write English and Maltese.

Physically he now presents as a healthy active schoolboy of slight build and pre-pubertal development. He has multiple small lesions of adenoma sebaceum covering the nose and cheek and beard areas. The lesions are slowly becoming more evident, and increase in size after any trauma. He has various traumatic scars on the forehead, and occipital alopecia where an infected dermoid cyst was excised at the age of 6 years. He also has an area of alopecia in the right parietal region, where the skin is thickened and lustrous. He has no other physical or congenital abnormalities.

Psychologically he is a quiet and shy boy, who speaks English with a pronounced Maltese intonation. As Maltese is his “natural” language, exact reliance cannot be placed upon intelligence testing, but his mental age is estimated to be in the region of 8½ years (chronological age 13½ years).

Case 4

This boy aged 8½ years is the youngest son of Case 2. His mother was well during the pregnancy and free from virus infections, and had a normal easy delivery. He weighed 7 lb. 4 oz. (3.3 kg.) at birth, and was breast-fed for six months. He was apparently normal at birth, and his mother thought his facial appearance was normal. All the early milestones of physical development were passed normally; he walked when he was 18 months old; he was talkative, and spoke many common words.

He developed petit mal at 3 years, and had two or three attacks daily for a period of nine months. In an attack he would suddenly stand quietly, run to a chair or bed, stare into emptiness, and then make repeated swallowing and shivering movements; if he was approached by his parents he would push them away. Each episode lasted about two minutes, and was followed by an unnaturally deep sleep for at least two hours. There was no tongue-biting or involuntary micturition. He was treated with sedation by phenobarbitone tablets for three years. Five years have elapsed since his last attack. He started to develop the early lesions of adenoma sebaceum when he was 3 years old, coincident with his attacks of petit mal.

At a recent examination he had a pink raised facial rash of butterfly pattern distribution, with discrete red pin-point spots especially prominent by the naso-labial folds. His physical development was normal, his vision and hearing were good, and there were no abnormal physical signs in any system. Radiological examinations of the skull, hands, and lung fields were normal.

His speech was normal until the onset of his epilepsy, but from then onwards he retrogressed steadily. He gradually spoke less and less, until he appeared to his mother to have forgotten how to speak. It was the inability to talk at the age of 8½ years that induced his mother to seek medical advice and led to the whole family coming under review. He then had a vocabulary of about 40 words, all of them common objects which he could recognize in life or in pictorial representation, and to which he could ascribe the correct name; and for these words his phonation and articulation were distinct. But for the rest of the time he made unnatural crowing noises and jabbered gibberish. He understood and obeyed simple commands, such as “clap your hands.”

In his habits he is cleanly and his sphincteric control is good. He always dresses himself and manages to use a

knife and fork capably. He is placid and good-natured in temperament, without any psychotic tendencies, nightmares, or tantrums. He has never been to school or undergone any special or institutional training. He lives at home, and each morning he performs much of the routine housework, the sweeping and dusting, and drying of dishes, and does the shopping and fetches the groceries. On occasion he exhibits a striking form of stereotyped movement, a compulsive obsession to moisten objects with saliva and polish them vigorously, and other forms of repetitive hand and finger play. In summary, his vocabulary and behaviour and responses to requests are similar to those of a mongol child, and probably correspond with a mental age of about 2 years.

The remaining three children in the family are all unaffected by tuberous sclerosis. The eldest son is lively and intelligent and well developed, and is the hope of the family. The twin girls are bright self-possessed young ladies of good average intelligence. They all speak English and Maltese with equal facility.

Discussion

Tuberous sclerosis is a rare disease, but with increasing recognition of its salient features and clinical manifestations it is being diagnosed more frequently. The incidence in America has been estimated at about 1 in 500,000 in the general population (Ross and Dickerson, 1943). In London the incidence of tuberous sclerosis with mental defect is about 1 in 300,000, and the milder forms without mental defect probably occur equally often (Dawson, 1954). All surveys show an approximately equal sex incidence. The family here reported contains the first cases diagnosed in Malta.

Tuberous sclerosis is a congenital disorder in which tumour-like masses are found in large numbers in many of the tissues of the body. These lesions are not confined to tissues of a single germinal layer, for the abnormalities of skin and brain are ectodermal and those of the kidneys, heart, and lungs are mesodermal in origin. The lesions are remarkably non-progressive and show little tendency to grow in size during life. The cutaneous lesions of adenoma sebaceum may not be apparent at birth, and often become prominent only when the normal adolescent development of the sebaceous glands takes place; but after puberty they remain static and may even regress slightly. There is no evidence that these multiple tumours could be caused by a placenta-passing virus or that there are any exogenous aetiological factors. Tuberous sclerosis is a true tissue dysplasia, beginning in the earliest months of foetal life.

Dickerson (1951) has published a complete review of the familial occurrence of tuberous sclerosis. When a family is affected cases may be found in different generations, and many members may be sufferers. In one family which he reported there were eight cases; and in a family subsequently reported by Dawson (1954) a mother and 9 of her 12 children were affected, most of them suffering from mental defect and epilepsy.

The precise pattern of inheritance has been investigated by Penrose (1938), who concluded that the disease was transmitted by a dominant gene. The great clinical variation in the heterozygous state he explained by the existence of modifying genes in the same zygote, which might lead to abortive forms or might even completely mask the dominant gene. The homozygous state has never yet been reported.

Half of the patients suffering from tuberous sclerosis have no relatives at all affected by the disease. These cases must have arisen by mutation, and if it were not for the high mutation rate the disease would have died out rapidly owing to its dysgenic effect.

One interesting factor in the heredity of such a pleomorphic disease is that in many families the pattern of the disease remains remarkably constant. Thus the prognosis for the younger children and infants may be assessed and evaluated by a careful examination of any affected relatives, and all members of the family should be sought out and

examined. In addition to this main hereditary pattern of the classic disease, the inconstant and rarer manifestations of tuberous sclerosis are also hereditary. Particular families have been described in which such features as nail-bed tumours, cystic phalanges, retinal tumours, shagreen skin patches, renal tumours, cystic lungs, and laryngeal polyps have all proved hereditary (Dickerson, 1951). In each family the pattern of transmission may be complicated by formes frustes in apparently unaffected members.

The diagnosis of tuberous sclerosis in a florid case of infantile epilepsy and mental defect should become obvious when the lesions of adenoma sebaceum appear. But it has now become apparent that tuberous sclerosis is a very pleomorphic disease, with lesions in many different structures and with diverse modes of presentation, which often render diagnosis difficult. Patients may present with epilepsy, with mental retardation in a child, with dyspnoea in an adult, with swellings in the loins, with facial lesions, or in many other different ways. Careful examination will almost always show other stigmata of tuberous sclerosis, although occasionally the diagnosis may be made only by finding relatives with adenoma sebaceum or other conclusive features of the disease. Thus when an adult presents with dyspnoea or spontaneous pneumothorax, and is found to have radiographic changes of honeycombing of the lungs, or when a child presents with haematuria and abdominal pain, and is found to have renal tumours or polycystic kidneys, then tuberous sclerosis must be considered in the differential diagnosis.

Confirmatory evidence is most likely to be found in the skin or the eyes, or by radiographic examination of the skull and extremities. In the skin the commonest and most obvious stigma is adenoma sebaceum. Other common diagnostic features are the patches of thickened shagreen skin, often 3-4 in. (7.5-10 cm.) in diameter, located usually in the lumbar region, and multiple subungual fibromas and haemangiomas. Ophthalmoscopic examination often discloses the retinal phakomas which are seen as several small round white plaques, about half the size of the optic disk. Plain x-ray examination of the skull reveals in 80% of cases multiple areas of low-density intracranial calcification, and scattered sclerotic plaques can be seen in the cranial vault in 40% of cases. Holt and Dickerson (1952) have demonstrated characteristic changes in x-ray films of the hands and feet in 66% of cases. These consist of localized cyst-like areas of bone destruction in the phalanges and irregular periosteal new bone formation along the shafts of the metacarpal and metatarsal bones. Careful examination of individual cases of tuberous sclerosis will often reveal other types of skin lesions, visceral tumours, or congenital abnormalities, but none of these are constant enough to confirm a clinical diagnosis.

The prognosis in tuberous sclerosis is poor, but is not as gloomy as is usually stated. Russell Brain (1951) declares that "most patients finally reach a mental state comparable with that of an advanced stage of schizophrenia. A few remain stationary at the mental level of a low-grade mentally defective patient. Death occurs early, usually before the age of 20, although some patients survive into the third and fourth decades." This is an accurate and succinct account of the course of the classical disease, and is especially true of those patients in mental deficiency institutions; but it is not a true picture of the disease as a whole, where increasing experience has shown that mild forms of the disease occur as often as the severe forms (Dawson, 1954). Mental defect probably occurs in only half of the cases, and some patients with retarded development improve surprisingly with adolescence. Although probably most tumours of tuberous sclerosis are present at birth, they often do not manifest themselves until later in life, while the pulmonary form of the disease always presents in adult life.

The prognosis in any afflicted patient may be assessed more accurately by a careful investigation and study of

other members of the family. This will often bring to light several undiagnosed cases, and, as the disease in any one family tends to breed true to type, the management of the individual is assisted by further knowledge of the family.

Summary

Tuberous sclerosis is a rare disorder of tissue growth, in which many different tissues may be involved. It is hereditary and may be familial: an Anglo-Maltese family is here described in which four members were affected. The classic descriptions of the disease, to which the name epiloia was given, concentrated on the symptom triad of infantile epilepsy, mental deficiency, and adenoma sebaceum of the face, and emphasized the bad prognosis. But only about half the sufferers exhibit the disease in this fully developed form, and milder forms with good prognosis occur just as often as the severe ones. The disease is very pleomorphic, and other common manifestations are renal or retinal tumours, and cystic lungs and phalanges. The disease is probably transmitted by an incompletely dominant gene, and in any affected family the pattern of the disease remains constant. Whenever tuberous sclerosis is suspected or diagnosed in a patient the remaining members of the family should be studied.

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THE BLOOD GROUPS IN PEPTIC ULCERATION

BY

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Evidence continues to accumulate that there is a distinct relationship between the ABO blood groups and certain diseases. The incidence of Group A has been shown to be unduly high in subjects suffering from pernicious anaemia (Buchanan and Higley, 1921), carcinoma of the stomach (Aird *et al.*, 1953), and bronchopneumonia in infancy (Struthers, 1951). Group O has been found to occur with excessive frequency in persons suffering from peptic ulcer (Aird *et al.*, 1954). It has been pointed out (Clarke *et al.*, 1955) that in the latter disease the Group O excess is confined to duodenal ulcer subjects. The present communication was prompted by ABO blood groups to peptic ulcer in selected previous investigations relating to patients in English hospitals. In Scotland, important differences exist both in the prevalence of peptic ulcer in general and in the geographic distribution of the ABO blood

groups. Duodenal ulcers, as opposed to gastric ulcers, are between three and four times more frequent in Glasgow than in London (Doll, 1952); Group O is also present in a slightly greater proportion of the population than in England, Group A being correspondingly diminished.

This communication reports the results of a survey, carried out in Glasgow, into the ABO Rh(D) blood-group distribution in 2,059 patients suffering from peptic ulcer. In 276 of these subjects we have also investigated the maximum acid output of the stomach in relation to the above blood groups.

Collection of Data and Controls

The survey was carried out in two adjacent Glasgow Hospitals. The peptic ulcer clinic of the Western Infirmary supplied information relating to 1,588 cases, collected over the period 1946-55. Data concerning a further 471 subjects were obtained from the Southern General Hospital for the years 1952-5. Both in-patients and out-patients were included. The following items were recorded for each patient: site of ulcer, method of diagnosis, occurrence of previous acute complication, ABO group, sex, age, and place of residence. In 1,606 subjects the rhesus group was also noted.

It is obviously essential in a study of this type to ensure accuracy in diagnosis and in blood-grouping methods. Our criterion of diagnosis in 1,177 cases has been visualization of the ulcer at operation. In the remaining 882 patients the diagnosis has been accepted when a chronic peptic ulcer has been demonstrated by barium-meal examination and has confirmed a presumptive clinical diagnosis. These two groups of patients have been subsequently analysed separately, for we have been interested to discover whether any difference in blood-group frequency existed between patients diagnosed by x-ray examination and treated medically in the first instance, and those, presumably cases of a more severe nature, who required operation at some stage of the disease. The blood groups of the ulcer patients were determined at the Regional Blood Transfusion Centre in Glasgow for the Western Infirmary cases, and in the pathology department, Southern General Hospital, for patients from that hospital. The blood groups were specially determined for this investigation, freshly collected venous blood specimens being used. The ABO Rh(D) group was established, using two potent saline agglutinating sera. The control series was provided by 5,898 consecutive new registrations of blood donors at the Regional Blood Transfusion centre made over the period 1952-5. According to their location, the ulcers have been classified as duodenal, including juxta-pyloric; gastric; combined gastric and duodenal; and stomal.

An explanation of the excess of Group O in duodenal ulcer patients recorded by previous authors may be that there is an association between possession of blood Group O and excessive output of acid by the stomach (Koster *et al.*, 1955). We have investigated this possibility. The augmented histamine test (Kay, 1953) was carried out on 276 patients in whom the diagnosis of peptic ulcer and the ABO Rh(D) blood groups had previously been established.

Results

The basic data are recorded in Table I. The percentage increase of Group O over controls for each subgroup of cases is indicated in Table II. Although an increase is recorded in each instance, subsequent analysis reveals that only in some of the subgroups is this increase of statistical significance. Certain comparisons have been made within the material, subdividing it in a variety of ways. The primary subgrouping has been according to the site of the ulcer. In addition, our aim has been to ascertain whether clinical severity or site of the ulcer is mainly responsible

TABLE I.—Basic Data

	O	A	B	AB	Total
Controls	3,177	1,906	637	178	5,898
Total peptic ulcers	1,200	630	182	47	2,059
Duodenal	947	517	145	33	1,642
Gastric	174	90	27	9	300
Combined duodenal and gastric ulcers	24	9	5	0	38
Stomal ulcers	55	14	5	5	79
Duodenal ulcers, operative diagnosis	505	270	71	20	866
" " X-ray diagnosis	442	247	74	13	776
Gastric ulcers, operative diagnosis	113	55	20	6	194
" " X-ray diagnosis	61	35	7	3	106
All cases with haemorrhage or perforation	339	163	42	13	557
Duodenal ulcers with haemorrhage or perforation	279	136	33	11	459
Gastric ulcers with haemorrhage or perforation	35	15	3	2	55
Rhesus group: all ulcers	Positive, 1,319; negative, 287				1,606
Controls	" 4,899; " 999				5,898

TABLE II.—Percentage Group Frequencies

	Total No.	O	% Increase on Controls	A	B	AB
Controls	5,898	53.87		32.32	10.80	3.02
Total peptic ulcers	2,059	58.28	8.18	30.59	8.84	2.28
Duodenal ulcers	1,642	57.68	7.05	31.49	8.83	2.01
Gastric ulcers	300	58.00	7.67	30.00	9.00	3.00
Combined duodenal and gastric ulcers	38	63.16	17.24	23.68	13.16	0.00
Stomal ulcers	79	69.63	29.25	17.72	6.33	6.33
Duodenal ulcers, operative diagnosis	866	58.31	8.22	31.18	8.20	2.31
Duodenal ulcers, X-ray diagnosis	776	56.96	5.73	31.83	9.53	1.67
Gastric ulcers, operative diagnosis	194	58.25	8.13	28.35	10.30	3.09
Gastric ulcers, X-ray diagnosis	106	57.54	6.81	33.02	6.60	2.83
All cases with haemorrhage or perforation	557	60.85	12.96	29.27	7.54	2.33
Duodenal ulcers with haemorrhage or perforation	459	60.78	12.82	29.63	7.19	2.40
Gastric ulcers with haemorrhage or perforation	55	63.67	18.19	27.26	5.45	3.63
Rhesus-group frequency: all ulcers	1,606	Positive, 82.13; negative, 17.87				
Controls	5,898	" 83.10; " 16.90				

for the increase in Group O frequency. The duodenal and gastric ulcer groups have therefore been subdivided according to the method of diagnosis and presence of complications, on the assumption that a diagnosis based primarily on operative evidence or presentation with haemorrhage or perforation denoted a more severe type of ulcer. The diagnosis was confirmed surgically in all cases of stomal ulcer.

In analysing our figures we have compared Group O against Groups A, B, and AB individually, and not against these groups combined together. Table II shows that when Group O is increased it is not necessarily at the expense of Groups A, B, and AB to an equal extent. In certain cases when Group O is increased one of the other groups is also increased. Therefore, our χ^2 tests being in terms of all four groups, there are three degrees of freedom throughout.

Peptic Ulcer: All Cases.—The proportion of patients having Group O is considerably increased; this is statistically significant ($\chi^2=15.39$, $P<0.01$). The rhesus group distribution of 1,606 patients is recorded, and shows no significant difference from the control series ($\chi^2=0.8$): in this respect Aird *et al.* (1954) report similar findings.

Duodenal Ulcer.—A significant increase is present in the frequency of Group O in the duodenal ulcer patients compared with the controls ($\chi^2=13.15$, $P<0.01$). The results have been further analysed, depending on the occurrence of complications and the method of diagnosis. All the peptic ulcer patients who sustained haemorrhage or perforation show an excess of Group O, and this is statistically

significant ($\chi^2=11.99$, $P<0.01$). Among this group the duodenal ulcer patients are responsible for the increase in frequency of Group O ($\chi^2=10.88$, $P<0.01$), to which the gastric ulcer subjects do not contribute ($\chi^2=4.06$, $P>0.05$). In the duodenal ulcer patients whose disease was so severe as to warrant operation the increase in Group O is again significant ($\chi^2=9.21$, $0.02<P<0.05$); in contrast, among those in whom diagnosis has been confirmed by barium-meal examination it is observed that the increase in Group O, while still manifest, is no longer statistically significant ($\chi^2=6.6$, $P>0.05$). However, comparing those cases with haematemesis and perforation against the rest, there is no significant difference ($\chi^2=2.76$, $P>0.05$). Also comparing the duodenal ulcers submitted to surgery and those confirmed by x-ray examination only, there is again no significant difference ($\chi^2=1.911$, $P>0.05$). The results suggest that the more severe cases—those that required surgical treatment—make the greater contribution to the observed increase in frequency of Group O, although the difference is not statistically significant.

Gastric Ulcer.—In our series no significant difference was noted between the ABO group frequencies of patients with gastric ulcer and the controls ($\chi^2=2.24$, $P>0.05$). In actual fact, the percentage of Group O is higher in this group than in duodenal ulcer. The non-significance may be due to the smaller number of gastric ulcers (300) compared with those of duodenal ulcers (1,642). The total number of patients who had both gastric and duodenal ulcers was too small for separate analysis.

Stomal Ulcer.—The percentage increase of Group O compared with controls was greater in stomal ulcer than in any other subgroup. Although the number of stomal ulcer patients is comparatively small, statistically the excess of Group O is highly significant ($\chi^2=13.00$, $P<0.01$). Comparing the figures for stomal ulcer against all other sites of ulceration, the difference is significant ($\chi^2=7.815$, $P<0.05$). In 68 of our 79 patients the site of previous ulceration had been duodenal (Table III), and this would suggest a possible

TABLE III.—Site of Previous Peptic Ulcer in 79 Cases of Stomal Ulcer

Duodenal	68	Duodenal and gastric	1
Gastric	3	Not recorded	7

explanation of our findings. However, the possibility cannot be excluded that the greatly increased incidence of Group O in patients having stomal ulcers is a particular attribute of ulcers in this situation.

Age and Sex

Since Aird *et al.* (1954) have been unable to detect any significant difference in sex proportion or age between ulcer patients of the four ABO groups, we considered that further investigation along these lines was not justified at this time. Instead our object has been to detect whether our cases constitute a representative sample of the ulcer patients treated at the hospitals in this area. No information is available concerning patients at the Southern General Hospital, from which the smaller number of our cases were drawn.

TABLE IV.—Peptic Ulcer: Sex and Site Distribution. Comparison with Recent Series (Jamieson *et al.*, 1949)

Sex and Site Distribution			Male : Female Ratio		Gastric : Duodenal Ratio		
Site	Male	Female	Present Series	Jamieson <i>et al.</i> (1949)	Present Series	Jamieson <i>et al.</i> (1949)	
Duodenal	1,321	321	4.12 : 1	3.9 : 1	1 : 6.17	1 : 9.5	
Gastric	214	86	2.49 : 1	1.8 : 1			
"Double" ulcer, G.U. and D.U. ..	34	4	8.50 : 1	2.7 : 1	1 : 3.73 1 : 4.5		
Stomal	70	9	7.77 : 1	4.2 : 1			
Total	1,639	420	3.90 : 1	3.5 : 1			

However, at the Western Infirmary, a two-year survey of ulcer patients has been carried out (Jamieson *et al.*, 1949), in which information concerning a total of 3,258 patients was analysed. In Table IV we have recorded the site, distribution, and sex of our ulcer cases, and also the male:female ratio and the gastric:duodenal ulcer ratio, together with the results obtained by the previous authors. Excluding the cases of "double" and of "stomal" ulcers, in which the numbers are so small as to vitiate useful comparison, it will be observed that no gross dissimilarities are present. In our series a slightly elevated male:female ratio in gastric ulcer subjects with an associated depression of the gastric:duodenal ratio has been caused by a relative excess of gastric ulcers, predominantly in our male patients. While a real alteration in incidence of gastric ulcer cannot be excluded, this finding is probably due to the increasing percentage of this finding is probably due to the increasing percentage of gastric ulcers submitted to surgery, these patients having been drawn exclusively from a surgical unit.

Maximum Acid Output

In 276 patients in whom the ABO group and site of ulcer were known the maximum acid output of the stomach has been estimated. The results are presented in Tables V and VI. The maximum output in the duodenal and gastric ulcer subjects displayed the typical pattern of response to

TABLE V.—Duodenal and Gastric Ulcer: Results of Maximum Acid Output Tests

Blood Group	Duodenal		Gastric	
	No. of Cases	Acid Output. Mean Level	No. of Cases	Acid Output. Mean Level
O	136	671 mg./45 mins.	24	404 mg./45 mins.
A	73	653 " "	15	292 " "
B	17	621 " "	6	320 " "
AB	4	726 " "	1	460 " "
Total	230		46	

TABLE VI.—Duodenal and Gastric Ulcer: Statistical Relationship of ABO Blood Group and Maximum Acid Output

Duodenal			Gastric		
Difference in Acid Output	P	Remark	Difference in Acid Output	P	Remark
O-A = +18	>0.05	Not significant	O-A = +112	>0.05	Not significant
A-B = +32	>0.05	" "	A-B = -28	>0.05	" "
O-B = +50	>0.05	" "	O-B = -54	>0.05	" "

be expected in the presence of these lesions: in duodenal ulcer it was above, and in gastric ulcer within, the accepted normal range. No significant correlation could be demonstrated between acid output and blood group in either condition.

Discussion

The outstanding fact emerging from recent investigations into the relationship of ABO blood groups to disease is that the groups have a selective value, conferring a relative immunity or susceptibility to certain disorders. Further, in adult life, alterations in blood-group distribution occur most strikingly in association with pathological lesions of the stomach and duodenum. In this communication an excess of Group O is again recorded in duodenal ulcer patients. We have also been able to demonstrate a statistically significant Group O excess over the controls in duodenal ulcer when surgical treatment was required but not when the diagnosis was made by x-ray examination in the first instance, although these two groups do not differ significantly from each other. This difference may not be real, and would require a larger series to confirm or refute the possibility that an increased frequency in Group O is more marked in the more severe type of case. Further work would be required before the relationship, if any, between

Group O excess and severity in duodenal ulcer could be established. Similar considerations apply to stomal ulcer, which is recognized to be one of the most intractable forms of peptic ulceration. In this type the considerable Group O excess may be attributable either specifically to the site of the ulcer or to the duodenal ulcer which so often precedes it.

The selection of a control group presents a well-recognized difficulty (Allan, 1954). Hospital patients are unsuitable, because a proportion of them suffer from diseases which are known to have associations with certain blood groups. For example, at the Western Infirmary, Glasgow, in the period 1946-8, 4.3% of in-patients and 10% of out-patients were shown to be suffering from peptic ulcer (Jamieson *et al.*, 1949). We have therefore relied on data made available by the Regional Blood Transfusion Centre in Glasgow concerning consecutive donor registrations collected over a recent period.

Thomsen (1927) suggested that the distribution of the blood groups changed with increasing age. On theoretical grounds this is unlikely, as the human blood groups are widely accepted as being immutable inherited characteristics. Bryde Andersen (1955) has since failed to confirm the presence of a relationship between age and ABO group distribution, and Aird *et al.* (1954), with one possible exception, did not observe any significant difference in age between ulcer patients of the four blood groups.

The reason for the excessive frequency of Group O in peptic ulcer subjects remains obscure. Koster *et al.* (1955) have pointed out that there is an association between high acid output by the stomach, duodenal ulcer, and excess of Group O; by contrast, achlorhydria is associated with gastric cancer and excess of Group A. If, in fact, an unduly high output of acid occurred in duodenal ulcer patients of Group O, this would suggest an explanation of the observed difference in ABO group frequencies, but we have failed to establish any such correlation. Although the blood-group substances cannot be shown to influence the secretion of hydrochloric acid, clearly they have some important role in gastric physiology, and further investigations are proceeding in order to determine its nature.

Summary

The distribution of the ABO blood groups among 2,059 peptic ulcer patients in two Glasgow hospitals has been investigated. A total of 5,898 consecutive donor registrations at the Blood Transfusion Centre supplied a control series. An increased frequency of Group O was recorded in patients suffering from duodenal ulcer, but the blood-group distribution in cases of gastric ulcer did not differ significantly from that of the controls, probably because the number of cases with gastric ulcer was too small. Among the duodenal ulcer patients, those requiring operation made the greater contribution to the Group O excess. The frequency of Group O was greatly increased in patients having stomal ulcers. Compared with controls, no difference in frequency of rhesus-negative subjects was observed.

The maximum acid output has been estimated in 276 patients with duodenal or gastric ulcer. No correlation was noted between acid output and ABO group in ulcers at either site.

The results of a peptic ulcer survey at one of the hospitals involved enable us to submit evidence suggesting that the patients concerned in this investigation constitute a fairly representative sample of those attending or admitted to hospital in this area.

We wish to thank Professor C. F. W. Illingworth and Dr. L. D. W. Scott for valuable advice and criticism. Dr. E. G. Oastler and Mr. R. B. Wright kindly permitted one of us access

this country, May (1950) reported that in six out of eight cases "the most marked effect was in relief of the mental state."

Our experience has been rather different, since out of 52 patients treated with benzhexol hydrochloride no fewer than 10 have shown mental disturbances, severe enough to justify transfer to a mental hospital in three instances. These complications have arisen within a few days as a rule, but in Case 5 marked symptoms developed after three weeks' treatment on an "alternate day" regime, during which period it was believed that the patient had become tolerant of the drug.

Dosage throughout was relatively low, but intolerance occurred even on a daily total of only 5 mg., and we cannot agree that tolerance is soon established on reducing the dose slightly, although that is the view expressed in Martindale (1952).

In most cases cessation of this form of medication brought a rapid return to mental normality, and resumption of benzhexol hydrochloride therapy produced an equally rapid relapse.

In the treatment of Cases 1 and 5, benzhexol hydrochloride was replaced by ethopropazine and hyoscine respectively with no better results, and in fact the older patient with Parkinsonism is also apt to become confused under treatment with hyoscine or other solanaceous drugs. It is noteworthy that 9 of the patients were over 60, and probably were suffering from the arteriosclerotic type of Parkinsonism: the remaining patient, although aged 57, had had a typical post-encephalitic illness for 30 years.

By way of contrast, we have described one case (No. 11) which showed considerable mental improvement following benzhexol hydrochloride therapy. This patient was a younger man, of slightly subnormal intelligence, who was probably finding his increasing disability too much for him; his physical improvement on treatment encouraged a parallel mental improvement when he found himself able to cope more adequately.

Summary

In a study of 52 cases of Parkinsonism treated with benzhexol hydrochloride ("artane," "pipanol") during the past three years, we have found severe mental disturbance arising in 10—an incidence of about 19%.

This complication has arisen in spite of the use of the drug in small doses, and has been particularly common in the arteriosclerotic group. Mental change has been evident after a few days' treatment in most of our patients, but the onset may be more gradual, in which case there is a danger that its relation to treatment may be overlooked.

Recognition of the cause of the disturbance and prompt cessation of this form of medication usually result in the rapid disappearance of the symptoms of excitement, agitation, confusion, and possibly suicidal mania.

Tolerance does not become established, but recognition of the danger, and prompt withdrawal of the drug, usually lead to rapid return of the previous mental state.

Benzhexol hydrochloride was introduced to the Geriatric Unit of Newcastle General Hospital in 1950 by Dr. T. H. Bates, and we are indebted to him for access to his patients and records, and for his interest and encouragement.

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Medical Memorandum

Blood Groups and the Age of the Menarche

It has recently become fashionable to investigate the frequency of occurrence of various diseases in relation to racial or genetic differences, as indicated by blood groups (Struthers, 1951; Discombe and Meyer, 1952; Aird et al., 1953, 1954; Pike and Dickins, 1954; Wallace, 1954; Westlund and Heistö, 1955). The present note describes a study of the age of the menarche in relation to the principal blood groups; the possibility of an association was first investigated by Vuori (1929).

All women blood donors aged under 25 years attending donor sessions in the Oxford Region from September, 1954, to March, 1955, inclusive, were asked the age in years at which they had first menstruated. Despite the deliberate restriction of the inquiry to young women, many could not say, with sufficient accuracy, when the menarche had occurred, and so could not be included in the inquiry. The relevant information was, however, forthcoming for a total of 516 donors, and their ABO and D(Rh) blood groups were determined by the standard techniques (D^u was regarded as D-positive for the purpose of this investigation). The results, which are summarized in the Table, show no evi-

Age of the Menarche in 516 Blood Donors

Blood Group	No. of Informants	Age of the Menarche (Years)	
		Mean	Standard Deviation
O	235	13.30	1.48
A	221	13.33	1.59
B	45	13.20	1.64
AB	15	13.67	1.62
D-positive	409	13.31	1.54
D-negative	107	13.34	1.50
Total	516	13.32	1.53

dence of any substantial differences between the various blood groups, either in the average age of the menarche or in its dispersion about the average.

Vuori (1929) collected his information from two groups of 104 and 140 schoolchildren, with mean ages at the menarche of 13.9 and 14.8 years respectively. In each school the mean age at the menarche was practically the same in Groups A and O; the slight departures from the general average, which he found in Groups B and AB, were to be expected in view of the small numbers of children in those groups. The present larger series confirms these findings and the investigation has therefore been discontinued. The explanation of the wide difference in the average age of the menarche in Vuori's two series is a matter for conjecture. The average of 13.32 years in the present study, although determined retrospectively, accords well with that of 13.49 years found for 2,590 schoolchildren in the South of England in 1948-9 by Wilson and Sutherland (1950).

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Reviews

AN AMERICAN TEXTBOOK OF MEDICINE

Fundamentals of Internal Medicine. By Wallace Mason Yater, A.B., M.D., M.S. (in Med.), F.A.C.P. 4th edition. This edition was prepared with the assistance of William Francis Oliver, B.S., M.D., A.A.C.P. (Pp. 1,276+xxx; illustrated. 94s. 6d.) London: Staples Press Ltd. 1955.

The first publication in Britain of an established American textbook of medicine requires a critical comparison with its chief British rivals. There are still important differences between what is taught to medical students in this country and in the United States. An obvious example is the classification of nephritis according to Ellis, which is generally accepted here but is not taught in the United States and not referred to in this book. Here any student might expect to be taught that coeliac disease is caused by a specific gluten sensitivity; that there is a characteristic small-intestine pattern in steatorrhea; that cervical spondylosis and the anterior carpal ligament are more important than the scalenus anticus in the causation of pain in the arms: none of these will he find in this book. He should be surprised to read prescriptions for bronchitis which include ammonium carbonate and chloride, and he should be shocked to read that in the treatment of chronic myelogenous leukaemia "some men favour the use of Fowler's solution." He may be surprised to find, too, that hiatal hernia is included under respiratory diseases, that the chapter on "The Physician Himself" applies entirely to the American situation, and that the texts recommended are more than 90% American.

While this textbook has much of quality—the sections on the electrocardiogram and on endocrinology are particularly good, and there are useful chapters on diseases of the skin, the eye, and the ear—its virtues do not, for the British medical student, outweigh its defects. The editor, Dr. W. M. Yater, has written most of the book himself, and, though this is a fine accomplishment, complete success in such a task could not be achieved to-day by the great Osler himself.

D. V. HUBBLE.

TROPICAL HYGIENE

The Control of Disease in the Tropics. By T. H. Davey and W. P. H. Lightbody. (Pp. 408+x; illustrated. 47s. 6d.) London: H. K. Lewis and Co. Ltd. 1956.

One of the aims of every author and publisher of a textbook is to produce one to which the well-worn cliché of book is to produce one to which the well-worn cliché of supplying a much-needed want can be applied truthfully. A volume on hygiene in the Tropics is, however, a comparative rarity, and it is now seven years since one was produced in this country. Further, the authors rightly point out that standard textbooks on public health have not made good the lack of a work of this kind, because they "are largely urban in outlook and devote comparatively little attention to the problems of disease as they exist in under-developed rural areas which form the major part of the Tropics." This publication remedies the deficiency but, quite apart from the fact that it does so, its excellence makes it notable. It is written specifically with the needs in mind of the medical practitioner with public-health responsibilities in the Tropics, and in compiling it much information has been brought together from monographs not readily available. The authors state, however, that "no attempt has been made to produce a comprehensive volume dealing with every aspect of public health in the Tropics. . . due to considerations of space, much has had to be omitted which some may feel should have been included." Among these omissions is a consideration of milk supplies in the Tropics, and, although dietary and nutritional surveys are briefly commented upon, nutritional diseases are not discussed. Sections on diagnosis are, however, included in the chapters on each disease. It is questionable whether the space devoted to these sections might not have been better used for including material which the authors regret they

have had to omit, for most of those who seek information on diagnosis will no doubt prefer to look for it in one of the standard textbooks in which it is dealt with more fully. An important subject also not discussed is family planning. This must be taken up by hygienists if malnutrition is not to increase with increasing populations. Moreover, there are now grounds for optimism regarding the success of a family-planning programme in the Tropics. One is being tackled in India in spite of religious opposition and is meeting with success.

There is a tendency among hygienists at present to criticize expenditure on curative medicine and to press instead for funds to be diverted to more preventive services. Professor Davey and Dr. Lightbody subscribe to this viewpoint, but they are fair in the way in which they put it forward. The advocates of this view need, however, to be reminded that virtually all preventive medicine becomes possible only as a result of knowledge of disease arising from clinical research which begins at the bedside and can satisfactorily be carried on only in a hospital or other centre which has adequate laboratory backing and diagnostic facilities. Authorities might well bear this in mind when arranging their budgets—the need is for more hospitals with better equipment and research facilities than at present exist in the Tropics.

The subject-matter of this book is beautifully arranged, and divided into sections headed "Geographical Distribution," "The Parasite," "Epidemiology," "Diagnosis," and "Control." The clarity of presentation is admirable; the book is well written and up-to-date. It is one with which all studying hygiene in the Tropics should be familiar.

A. W. WOODRUFF.

NEUROCHEMISTRY

Neurochemistry: The Chemical Dynamics of Brain and Nerve. Edited by K. A. C. Elliott, Irvine H. Page, and J. H. Quastel. (Pp. 900+xii; illustrated. £7.) Springfield, Illinois: Charles C. Thomas. Oxford: Blackwell Scientific Publications. 1955.

This is a collection of 32 reviews or essays by different authors, mainly concerning chemical and metabolic processes which condition the functioning of the nervous system. Descriptions are given of the composition of brain and nerve, their respiration and glycolysis, and the main chemical exchange between brain, blood, and cerebrospinal fluid; of ion movements in the functioning of the nerve fibre; and of the metabolism, physiology, and pharmacology of acetylcholine. These accounts are well documented and of high standard, giving carefully assessed quantitative data specifically regarding the nervous system. On the other hand, accounts of oxidative and glycolytic mechanisms, of "neurotropic drugs," of nutritional disorders of the nervous system, and of the "thermodynamics of the message" are much below this standard. Several contributions miss the literature of the past five years. The subjects covered are commendably wide, including neuromuscular disorders, demyelination, bacterial neurotoxins, snake venoms affecting the nervous system, oxygen poisoning, the central nervous system of arthropods, and brief mention of blood analysis in behavioural disorders. The impression is given of a rapidly developing subject, basic to the study of the nervous system, but of which current neurophysiological texts give little inkling.

H. McILWAIN.

Perspective and Horizons in Microbiology, edited by Selman A. Waksman (Rutgers University Press, New Brunswick, 1955), contains papers read and addresses given at the dedication of the Institute of Microbiology, Rutgers University, in June, 1954. The thirteen scientific papers are loosely classified under three headings, but are really unconnected except that five deal with bacterial metabolism. Among the others, Lederberg writes on bacterial genetics, Heidelberger on unsolved problems in immunology, and Eagle on problems in antibiotic research. In these and other contributions leading authorities give fresh accounts of progress at some of the most active growing points in microbiology; these are naturally not exhaustive, but they afford interesting glimpses both of present knowledge and into the possible future.

BRITISH MEDICAL JOURNAL

LONDON

SATURDAY JULY 21 1956

ANNUAL REPRESENTATIVE MEETING

Two things this year struck an experienced observer of past Representative Meetings. The first was that the average age of the representatives seemed to be lower than usual. The second was that the representatives seemed to have studied the agenda closely, shown principally by the fact that their contributions to the debates were cogent and free of empty rhetoric. Whatever financial anxieties there may have been in the mind of the Treasurer about the vote in favour of subsistence allowance for representatives this will have the one wholesome effect of making it easier for young men to play an active part in determining the policy of the Association; as speakers did not hesitate to remind the platform from time to time, there is only one body which can determine the policy of the British Medical Association, and that is the Representative Body. There have been periods in the past when it seemed as though an extra dose of courage was needed to challenge the authority of the platform, but under the benevolent guidance of Dr. Ian Grant, the Chairman of the Representative Body, there seems to have been a more ready give-and-take in debate and a healthy reluctance on the part of the representatives to be influenced by anything other than the facts of the case and the justice of the cause. Certainly it looked as if the facts of the case against smoking made it impossible on each day of the meeting to secure the necessary majority in favour of the suspension of Standing Order 70. It was the facts of the case against governmental action in the proposed banning of heroin that were responsible for two successful motions expressing as a matter of principle "its determination to preserve the right of any individual doctor to prescribe what he thinks is in the best interests of his patient," modified in a second motion of protest against Government action interfering with this right "until and unless there was some overwhelming reason to the contrary which had been agreed between the profession as a whole and the Minister." And again it was the facts of the case, allied to a vigilant concern for principle, that led the Representative

Body decisively to reject a motion from Bournemouth and Winchester aimed at disturbing the traditional responsibility of the Editor of the *Journal*.

The proceedings of the meeting have been fully reported in this and last week's *Supplement*, and here it is possible to comment on only one or two of the matters brought before the R.B. As Dr. E. A. Gregg, Chairman of Council, said at the beginning of the meeting: "Quite naturally and rightly we are much occupied with medico-political affairs." Inevitably what doctors get paid for their work looms large in these affairs. Apart from the fact that many doctors are suffering hardship because what they are paid does not make it possible for them to meet their obligations and commitments with a mind free from financial worry, salary, where a salary is paid, is linked with prestige and status—a burning issue this with senior hospital medical officers and also with public health medical officers. But if less was said than usual about remuneration it was because the representatives knew of and endorsed the recent joint approach of the General Medical Services Committee and the Joint Consultants Committee for increased remuneration. Dr. A. Talbot Rogers, the Chairman of the G.M.S. Committee, said that the basis of the claim lay in the legal argument that general practitioners and those in the hospital service were not being paid what they should be paid according to the recommendations of the Spens Committee. He added subsequently that one of the things it was hoped to win from the claim was agreement by the Government that the profession was entitled to a periodic review and that if obtained this would be "of more value than the money the claim itself would bring." But the hard-pressed doctor to-day may nevertheless feel that a bird in the hand is worth two in the bush, and no doubt those negotiating on behalf of the profession will press their claim home with all the vigour and knowledge at their disposal. In presenting the report of the Remuneration Policy Committee its chairman, Dr. J. G. M. Hamilton, drew attention once more to the fact that the Association reaffirms its policy that the two Spens reports remain the basis of professional remuneration. From the inception of the Service in 1948 each successive Minister of Health has done his best to escape from the commitment entered into by both Government and profession; and, as we learnt late on Monday this week, the present Minister is keeping in line with his predecessors. The Representative Body was at least able to learn that the Minister had agreed with the principle that private patients had the right to free drugs under the N.H.S., and will now be waiting for this right to be put into effect. Concern was expressed during the

meeting over the inadequate pay of the medical officer of health and the neglect of his position in medicine to-day. Nevertheless some of the most interesting discussions were held after the presentation of the report under Public Health by Dr. J. B. Tilley, Chairman of the Public Health Committee, when representatives showed their concern about clean milk, clean air, and immunization against infections. A welcome newcomer to the Representative Meeting was Mr. T. Holmes Sellors, Chairman of the Central Consultants and Specialists Committee. The meeting much appreciated the succinct and clear way he dealt with many matters arising as a result of his report, during the course of which ordinary business was interrupted to allow Dr. J. G. M. Hamilton, as Chairman of the Journal Committee, to introduce to the Representative Body Mr. Harry Cooper, who has been reporting the Annual Meeting of the Association for the *Journal* for fifty years. The representatives then rose and gave Mr. Cooper a resounding ovation.

The topics discussed and the 350 motions before the Representative Meeting in Brighton touched upon almost every aspect of professional life. That the proceedings have once more been so faithfully reported with so few mistakes is but one example of the great services Mr. Cooper and his colleagues have rendered the *Journal* now for half a century.

THE BRIGHTON MEETING

So diverse and extensive are the requirements of the B.M.A. for its Annual Meeting that no town or city in the British Isles can provide ideal conditions. But last week and the week before Brighton showed that it can come closer to perfection than most, offering a gay seaside welcome to the hundreds of doctors and their wives who gathered for the A.R.M. and the Scientific Meeting. The last four Annual Meetings were in Dublin, Cardiff, Glasgow, and Toronto, and it was fitting that the meeting this year should be held in so characteristically English a town as Brighton, with its promenades and piers, its Regency squares and terraces, its pink shingle and pinker rock, its "Lanes" full of antique shops, its good-humoured crowds, and, above all, with its exuberant burst of eccentricity in the shape of the Royal Pavilion—surely one of the most unusual buildings ever to give house-room to scientific discussions. The Dome in the Royal Pavilion Gardens was a splendid assembly-point for the A.R.M. and the plenary sessions, and, with the scientific and trade exhibitions in the Corn Exchange alongside, everything was made as easy as possible for the visitor to see and hear all that was going on.

With these physical advantages Brighton could confidently expect the meeting to go with a swing, but there were other assets which helped to make it specially memorable. One of the major sources of the friendliness and cheerfulness which pervaded the meeting was the new President, Dr. Alexander Hall, who, with Mrs. Hall, was always at hand to see that members and their wives were obtaining all the pleasure and profit from their visit that he and his colleagues of the Brighton and Mid-Sussex Division had so enthusiastically planned for them. The smooth organization at Brighton could only have been a product of first-rate team-work. Inevitably much of the burden falls on the local general secretary, and Dr. John Beynon carried through his task to the end with admirable efficiency and unruffled composure. The science secretary, Dr. H. G. McGregor, must have been gratified by the interest shown in the subjects chosen for discussion. Once again the plenary sessions attracted large audiences, and at the sectional meetings there were many lively discussions after the opening speakers had read their papers. An innovation at this year's meeting were the round-table conferences, at which a panel of four or five experts, after some brief opening remarks intended to put the subject chosen for discussion into perspective, became a brains trust ready and willing to answer questions from the floor. This form of discussion can be lively and entertaining, as well as instructive. Much depends on the suitability of the subject and on the way in which the chairman handles his team and guides the talk into the most promising channels: in both these respects the three panels of experts who took the platform at the unpromising hour of 9 a.m. on July 10 were remarkably fortunate. It was perhaps indicative of things to come that the Section of Child Health also chose this form of meeting for some of their discussions.

The other local arrangements were in the charge of a group of eight local sub-secretaries, and all who visited Brighton can testify to the success of their work in looking after the arrangements for premises and hotels, for private hospitality, for entertainments and excursions, for dinners and catering, for transport, for golf, for overseas visitors, and for the scientific exhibition. This last was perhaps the best that has so far been held, though the space for it was a little cramped. Nevertheless the display as a whole was a striking one and there was more evidence of the expert hand in the way the exhibits were arranged. The enthusiasm of the exhibitors themselves was notable; it was nothing unusual for the visitor to be warmly thanked for allowing an alarming gap in his knowledge to be painlessly filled in by a fascinating

and instructive exposition of the work on display. The scientific exhibition is certainly a part of the Annual Meeting which more than repays the time and trouble spent on it.

In his speech at the Annual Dinner the President spoke gratefully of all the ladies who had helped in the arrangements, and who, as he said, "had acted with charm and efficiency"; and he singled out for particular mention the honorary secretary of the Ladies' Committee, Dr. C. Lamorna Hingston. As chairman of that committee Mrs. Hall herself made an outstanding contribution to the success of the meeting. The popularity of the Ladies' Club and the heavy bookings for the visits and excursions showed how well the ground had been prepared by the hard preparatory work of the Ladies' Committee and its five subcommittees. It was a particularly happy moment when at the supper dance last Thursday evening it fell to the President to present to his wife the prize for the annual golf competition, the Notts Ladies' Challenge Cup.

At Brighton of all places the civic authorities must be almost painfully familiar with the task of welcoming the organizations which use the town's admirable facilities for meetings and conventions. But there was no hint of a standard formula in the welcome of the Mayor, Alderman Lewis Cohen, to the B.M.A., a welcome which was particularly warm because, as the Mayor himself said, "Brighton also claimed a medical degree." Thus it was practically as a colleague that the Association was able to greet the Mayor when he came to the Annual Dinner. There were many others in Brighton who helped to oil the organizational wheels, but a special word of thanks is owing to the sisters and nurses of the local hospitals who so cheerfully and efficiently shepherded the straying members as they sought the meeting-place of the section they wished to attend: their help was specially necessary in the Royal Pavilion, for anyone glancing into, say, the Music Room or the Queen's Bedroom was tempted to linger there irrespective of the subject under discussion.

One of the greatest pleasures at the Annual Meeting is to meet colleagues and friends from abroad, and it would perhaps not be invidious to mention the names of three whose presence was particularly welcome—Dr. Clarence Routley, Immediate Past-President of the B.M.A. and C.M.A.; Sir Henry Newland, from Australia, whose speech at the Annual Dinner was that of a gay young veteran; and Professor L. A. Hulst, of Utrecht, who came as the representative of the World Medical Association. There is no greater stimulus to the work of the B.M.A. than the interest

and support of friends and colleagues from overseas, of whom this year there was a record number. Their lively interest in everything connected with the meeting must have given Dr. Hall and his colleagues especial pleasure, and we hope that next year they will return, this time to the colder but no less hospitable north.

THE MINISTERS' NO!

On Monday afternoon the Minister of Health, in reply to a question in the House of Commons, said he was not prepared to say what were the terms of the medical profession's claim for increased pay for general practitioners and hospital medical staff—a claim jointly signed by Dr. A. Talbot Rogers, chairman of the General Medical Services Committee, and Sir Russell Brain, chairman of the Joint Consultants Committee. The grounds for his refusal were that the claim had not been published by the profession. Although it looks like being wise after the event, we believe that the decision not to publish the claim as soon as it was submitted was a mistake. The claim was presented last month in a lengthy memorandum setting forth a case based on the original two Spens reports, and an argument on betterment based on expert analysis of recent economic changes and alterations in the earnings of others. This detailed memorandum will be published in next week's *Journal*.

A brief statement of the present position appears in this week's *Supplement*. The claim is that the remuneration of all members of the medical profession whose case is covered by the recommendations of the two Spens Committees should, as at April 1, 1956, be increased by 24%. Our negotiators stress that this claim does not run counter to the recent plea of the Chancellor for a halt in claims for increased pay, because all the profession is asking for is the fulfilment of contractual obligations accepted by the Government of the day in 1946 and 1948.

Like all his many predecessors, Mr. Turton has to listen to the Treasury, and, as usual, inflation or no inflation, crisis or no crisis, blue parties or red parties in power, the answer is No. Mr. Turton, as counsel for the defence, shows that he has not lost his barrister's skill of inserting a probe in the weak spot of his opponent's anatomy. He has been able to say No to a question in Parliament on the grounds that the claim had not been published. And it was to his great advantage that the terms of the claim had not been before the meeting of the Representative Body in Brighton. The Minister added that a reply had been sent refusing consideration of "any claim for a general

increase in medical remuneration." It is interesting to note that the reply from the Ministry of Health was dated July 13, the last day of this year's Annual Meeting. What a convenient time to choose!—the moment when the 400 or so representatives who determine B.M.A. policy were dispersed on their holidays.

The Representative Meeting once again this year, as it has done in previous years, reaffirmed its determination to stick to the recommendations of the two Spens reports on the remuneration of general practitioners and of consultants and specialists in the National Health Service—recommendations accepted by both Government and profession, recommendations, moreover, which were a turning-point in the profession's decision to enter the Health Service in the face of a majority vote against such a decision in 1948. The medical profession will not be content with a lawyer's answer from the Minister of Health, even though he is holding a brief for a Government department other than his own. The Minister should at least recognize the legal force of a contract. He should recognize more than this: that doctors, coming unwillingly into the N.H.S. in 1948 because Parliament, Press, and people bludgeoned them into it, nevertheless thought that the people through Parliament would keep their word, would honour their bond. The Minister and the Secretary of State for Scotland, through Sir John Hawton—or it may well be the other way round, because Ministers of Health change faces so quickly—say they do not accept the premises on which the memorandum is based. Does this mean that they repudiate the reports of the two Spens Committees? If they do, they had better say so in plain terms that are not misunderstood, so that the answer, too, may be completely free from ambiguity.

C-REACTIVE PROTEIN

In 1930 W. S. Tillett and T. Francis¹ reported the presence of a specific protein in the serum of patients suffering from pneumococcal pneumonia. It was originally considered to be specific for this condition, and was detected somewhat laboriously by a precipitation reaction using the somatic C polysaccharide of the pneumococcus; hence the name of the test. But it soon became apparent that the reaction was largely non-specific and belonged to the group of tests which have been labelled "acute phase" serological reactions. These are phenomena that occur in cases of generalized inflammation, but they also occur in the presence of tissue necrosis.

The abnormal protein was originally isolated and purified by C. M. MacLeod and O. T. Avery² in 1941 and crystallized in 1947 by M. McCarty.³ Salt frac-

tionation suggested that it was associated with the albumin fraction of the serum,⁴ but subsequent electrophoretic studies⁵ indicate that it is probably an alpha-globulin. After overcoming considerable technical difficulties, it was found possible to produce a specific antiserum to this protein by injecting it into rabbits, and this antiserum is now available commercially, though expensive. By using it the test becomes a simple and rapid procedure, and also considerably more sensitive than the original test.⁶

The applications of the test to clinical medicine are slowly becoming apparent. Since C-reactive protein is seldom, if ever, found in normal people, the incidence of false positive reactions is exceedingly low. It would seem, therefore, that the test might be usefully administered as a screening test, possibly as a supplement to the erythrocyte sedimentation rate, in which false positive results are common. A second point is that the test is only roughly quantitative as performed routinely, and the gradations in which the results are conventionally reported are merely a convenient code. They do not imply chemical accuracy.

The early clinical studies with this test were largely on cases of acute rheumatic fever, and G. H. Stollerman and colleagues,⁷ reviewing its use in sixty-two patients, found it to be a sensitive and reliable indication of rheumatic activity. In the absence of any other pathological condition they also found it a good method of assessing prognosis, and more rapid and reliable than the sedimentation rate in controlling therapy. Even more important, they provided evidence—albeit not yet conclusive—that the test is not influenced directly by cortisone and other antirheumatic drugs. In other words it does appear to be a true reflection of the disease activity in these circumstances, unlike the sedimentation rate.

Some doubt has now been cast on this rosy picture by a recent American study,⁸ in which it was found that thirty out of forty patients suffering from congestive heart failure from various causes gave positive results to the test in the course of serial studies. It is true that fifteen of these cases had a rheumatic aetiology, but in only four was there any question of rheumatic activity. The test was in general positive when the failure was most severe and became negative as the patient improved. The possible causes of this phenomenon are discussed in some detail. It is an especially curious finding, since it is well known that exactly the opposite occurs to the sedimentation rate in congestive heart failure, and C. McEwen and M. Ziff⁹ had claimed this to be a specific advantage of the newer test.

¹ Tillett, W. S., and Francis, T., *J. exp. Med.*, 1930, **52**, 561.

² MacLeod, C. M., and Avery, O. T., *ibid.*, 1941, **73**, 183.

³ McCarty, M., *ibid.*, 1947, **85**, 491.

⁴ Abernethy, T. J., and Avery, O. T., *ibid.*, 1941, **73**, 173.

⁵ Perlman, E., Bullowa, J. G., and Goodkind, R., *ibid.*, 1943, **77**, 97.

⁶ Anderson, H. C., and McCarty, M., *Amer. J. Med.*, 1950, **8**, 445.

⁷ Stollerman, G. H., Glick, S., Patel, D. J., Hirschfeld, I., and Rusoff, J. H., *Amer. J. Med.*, 1953, **15**, 645.

⁸ Elster, S. K., Braunwald, M. D., and Wood, H. F., *Amer. Heart J.*, 1956, **51**, 533.

⁹ McEwen, C., and Ziff, M., *Med. Clin. N. Amer.*, 1955, **39**, 765.

¹⁰ Roantree, R. J., and Rantz, L. A., *A.M.A. Arch. intern. Med.*, 1955, **86**, 674.

¹¹ Hedlund, P., *Acta med. scand.*, 1947, Suppl. 196, p. 579.

R. J. Roantree and L. A. Rantz have recently published the results they obtained in 443 general medical patients.¹⁰ They found C-reactive protein to be almost constantly present in patients with bacterial infections, myocardial infarctions, and widespread malignant disease. It was commonly but not consistently present in virus infections, active rheumatoid arthritis, and active tuberculosis (in which the erythrocyte sedimentation rate was acknowledged as a more reliable test of clinical activity). It was rarely positive in limited primary carcinomata, chronic leukaemia, and widespread superficial dermatoses. Two other curious discrepancies have been reported: in cases of nephrosis and multiple myelomatosis, despite raised globulin levels and sedimentation rates, the C-reactive protein test was persistently negative.¹¹

In short, therefore, we have a simple, highly sensitive but non-specific test of tissue inflammation and necrosis. Its uses in clinical medicine are only now beginning to be explored. Since it is a qualitative rather than a quantitative test it seems as though it may be used chiefly for screening purposes. Its principal disadvantage is that it is excessively sensitive and may therefore cause confusion by becoming positive for irrelevant reasons.

BLINDNESS

The bleak if familiar forecast of an ageing population, increasingly blind, deaf, halt, and impotent, is underlined by the further Ministry of Health report¹ on blindness in England that Professor Arnold Sorsby has just prepared. This is a carefully documented analysis of the figures of blind registration in England during the period 1951-4, along the lines of his previous study² for the years 1948-50, and it follows the evolutionary history of the various blinding diseases one further stage down their gloomy course.

As might be expected from an affection of which all the major causes are part of the degenerative changes of old age—cataract 26.2%, senile macular lesions 21.6%, and glaucoma 13.6%—the figures show a disproportionate increase of blindness in the whole population, from 86,389 on March 31, 1952, to 93,622 on December 31, 1954, but practically the whole of this is confined to the group over 70 years of age. Women greatly outnumber men among the aged blind. The largest single cause of blindness is still senile cataract, and this is *par excellence* a remediable condition; yet of those so registered 82% have received no treatment, though some 50% are considered to be amenable to surgical relief. Many factors probably contribute to this astonishing finding—the patient who seeks no advice because of ignorance, timidity, folly, or passivity; the unqualified practitioner who treats failing sight with repeated changes of glasses without referring the patient to an ophthalmic surgeon; and, finally, the oculist who for personal reasons always

hesitates to operate. At least we can be encouraged that this admirably clear report must lead, however indirectly, to the enlightenment of patient, optician, and oculist, so that this vast assembly of the remediable blind should surely decrease as the years pass.

In the younger adult age-group (21 to 59) there has been an encouraging decrease in those registered as blind, possibly attributable to the improved methods and coverage of ophthalmic treatment. The reduced incidence of sympathetic ophthalmitis is particularly noteworthy, perhaps a result of cortisone treatment.

A striking increase in blindness has been noted in the very young, primarily due to the spate of retrolental fibroplasia, which was responsible for over a half of those registered as blind when less than a year old and a quarter of those aged between 1 and 4. These blinded infants are expected to swell the population of blind schools from 1,400 to 2,200 in 1958-9. The report discusses retrolental fibroplasia with rather more concern than seems justified, for it does not mention how dramatically the situation has changed. Since oxygen administration to premature babies has been curtailed (with a maximum concentration of 45%), no further cases have been reported. A year ago a report came from the Medical Research Council which, after summarizing the work of N. H. Ashton and his associates at the Institute of Ophthalmology, concluded thus: "It seems clear that retrolental fibroplasia as a common and tragic disease has already virtually disappeared as dramatically as it appeared a little over a decade ago. Seldom has a disease, so apparently enigmatic in its causation, so intractable to treatment, and so tragic in its effects, been so rapidly brought under control."³

CHRONIC PROSTATITIS

Before the days of sulphonamides and penicillin gonorrhoea was nearly always followed by prostatitis, especially if it affected, as it usually did, the posterior urethra; indeed, prostatic abscess was not uncommon. Since the introduction of penicillin the disease, if treated early, is usually confined to the anterior urethra, and the posterior urethra and prostate escape. Nevertheless, chronic prostatitis is still diagnosed frequently, especially in venereal disease clinics, and it no doubt follows some form of genito-urinary infection. A recent article by three U.S.A. Army medical officers¹ suggests that the usual symptoms—low back pain and heaviness in the perineum—even if accompanied by a considerable number of pus cells in the prostatic secretion do not necessarily validate a diagnosis of chronic prostatitis. These investigators examined 411 "normal" males, 155 suffering from non-specific urethritis, and 449 who had been tentatively diagnosed as chronic prostatitis. 62% of the first group, 59% of the second, and 54% of the third were considered not to be suffering from prostatitis. The presence of 15 or more pus cells per high-power field in the prostatic secretion was considered to indicate prostatitis. These findings will be somewhat surprising

to many, the more so since it was found that 55% of what appeared to be normal prostates one week were abnormal a week later and 45% of abnormal ones became normal within three weeks, whereas symptoms were unchanged. Incidentally these authors were able to isolate a pathogenic organism in only one out of 68 patients of whom 29 showed pus in the prostatic secretion.

Prostatitis is synonymous with inflammation of the prostate, and where there is inflammation there will be pus cells. If, therefore, a specimen of prostatic secretion contains an abnormal number of pus cells (opinions will differ on what is abnormal) it may be assumed that prostatitis is present. It is necessary before making the diagnosis to be sure that the pus cells emanate from the glands of the prostate (or perhaps from the seminal vesicles); for this purpose it is wise to get the patient to pass urine and to wash out the whole urethra and bladder with bland fluid before massaging the prostate. If after this the fluid expressed is found to contain large numbers of pus cells it is difficult to avoid the conclusion that the prostate is the subject of inflammation. Symptoms are often a poor guide; the patient who reports with low back pain, heaviness in the perineum, disturbances of micturition, or impotency is usually one who has been exposed to or suffered from urethritis or who is mentally upset. Digital examination of the prostate may or may not confirm the diagnosis. If the organ is soft and boggy it is obviously abnormal, but in mild chronic cases little change can be detected and the reliance must be placed on history, symptoms, and the results of pathological examinations. Most cases will clear up after gentle massage of the organ repeated every 5-7 days for a few weeks, followed by irrigation with, say, oxycyanide of mercury 1/8,000. When the patient is nervous and over-anxious reassurance, a placebo, and perhaps a sedative will usually hasten recovery.

PRIMARY TUBERCULOSIS OF THE MOUTH

When primary tuberculosis appears in unfamiliar situations, it is apt to be missed or misdiagnosed. Tuberculous ulcers in the mouth are familiar as a complication of pulmonary tuberculosis, but reports of cases in which the mouth was the site of a primary infection are scanty in the British and American literature, and most of them have appeared since 1950. F. J. W. Miller¹ reported three cases in 1953, and careful examination of patients with submandibular adenitis has now resulted in the publication by J. Boyes, J. D. T. Jones, and Miller of a report of seven cases in children and adolescents.² This report of seven cases in children and adolescents suggests that the condition is not so rare as had been supposed, and that more cases would be found if they were more diligently sought.

As the primary ulcer in the mouth is usually small and painless, the patient may make no complaint, even

if he is aware of its presence. Attention is drawn to the existence of tuberculous disease by swelling of the related lymph nodes, most often those of the submandibular group. There is a tendency to attribute tuberculous cervical adenitis to a primary infection of the faucial tonsils, and the possibility of a focus in some other part of the wide drainage area of those nodes is often not considered. Injury to the oral mucous membrane is important in allowing the infection to become established. In a majority of the cases reported by Boyes and his colleagues there was a history of dental trauma by tooth extraction or alveolar abscess; but the injury may be trivial and unnoticed. A definite history pointing to a source of infection appears to be unusual. The tubercle bacilli may be of either human or bovine type.

The pathological features of these cases conform to the pattern of primary tuberculosis. The primary focus is an ulcer in a tooth socket, or on the gum or other part of the oral mucous membrane. The infection spreads rapidly to the regional lymph nodes, which enlarge and are at first firm but later tend to soften and break down. The primary ulcer may be very small and may heal without trace while disease in the lymph nodes is still active, but in some cases a scar remains at its site. As in any case of primary tuberculosis, haematogenous dissemination is a possibility. One of the patients in the series of Boyes and colleagues developed tuberculous meningitis. In all their cases the primary ulcer healed rapidly on chemotherapy and the lymph nodes diminished in size. There was, however, a high incidence of recrudescence of active disease in the lymph nodes within a few weeks or months, sometimes with formation of abscess. This led these authors to conclude that there is a case for excision of the enlarged nodes while they are still firm. However, most of the patients had only a short course of streptomycin, whereas J. W. Galloway and N. W. Horne³ recommend six months' combined chemotherapy. For the detection of cases of primary oral tuberculosis it is recommended that any chronic ulcer of the mouth that does not heal should be examined histologically; and that primary tuberculosis should be suspected and an oral ulcer looked for when the submandibular lymph nodes are found to be enlarged.

COLLEGE OF GENERAL PRACTITIONERS

The College of General Practitioners is to have a home of its own. The President of the College, Dr. William Pickles, announces this week (p. 174) that "generous financial support"—we understand from a donor who wishes to remain anonymous—has made it possible to construct, and in part to endow, a building which, it is hoped, will be completed by 1962. This munificent gift, and the ready help of the Royal College of Surgeons, which has agreed in principle to lease a site near by on the south side of Lincoln's Inn Fields, will be acclaimed by all those who have watched with admiration the mounting success of this, the youngest, college.

¹ *Blindness in England, 1951-1954*, 1956, H.M.S.O., London. Price 3s. net.

² Sorsby, A., *The Causes of Blindness in England, 1948-1950*, 1953, H.M.S.O., London.

³ *Report of the Medical Research Council for the Year 1953-1954*, 1955, H.M.S.O., London.

¹ O'Shaughnessy, E. J., Parrino, P. S., and White, J. D., *J. Amer. med. Ass.*, 1956, **160**, 540.

¹ Miller, F. J. W., *Lancet*, 1953, **1**, 5.

² Boyes, J., Jones, J. D. T., and Miller, F. J. W., *Arch. Dis. Childh.*, 1956, **31**, 81.

³ Galloway, J. W., and Horne, N. W., *Brit. dent. J.*, 1953, **95**, 9.

PATHOLOGICAL SOCIETY OF GREAT BRITAIN AND IRELAND

FIFTIETH ANNIVERSARY MEETING

The Pathological Society of Great Britain and Ireland celebrated its jubilee by a three-day meeting, from July 12 to 14, in Manchester, the city in which was held its inaugural meeting on July 14, 1906. That meeting was also reported in this *Journal*.¹

From its inception the Society has prided itself on its role as a learned society without political affiliations. It exists, in the words of its founders, "to advance pathology and to facilitate intercourse between pathologists." It has no permanent president, and the rule is that the chair shall be taken by the head of the laboratory (or his delegate) at which a meeting is being held. It was in accordance therefore with this strong scientific tradition that at the jubilee meeting this year pride of place should have been given to scientific papers, which ranged over the fields of bacteriology and virology, immunity, morbid anatomy, and experimental pathology and cancer research. There was, however, one exception to this scientific fare, the notable address by Professor J. H. DIBLE, secretary of the Society since 1934 and now its joint secretary, on the history of the Society, which in shortened form is reproduced below.

History of the Society

In June, 1906, said Professor Dible, many pathologists in Great Britain and Ireland received a notice suggesting the formation of a Pathological Society of Great Britain and Ireland. The signatories were amongst those most eminent in their subjects in these countries—professors of pathology, men eminent in the Services and in tropical medicine, distinguished physicians, professors of physiology, and veterinarians. The idea of such a society was doubtless forming in more minds than one, but those most active in establishing the new society were Lorrain Smith and Robert Muir, together with Ritchie and Boycott. To this little group of fathers of the Society the name of Sims Woodhead must be added on account of his connexion with the Society's journal.

Why did this movement take place at that particular time? It occurred at a climax in a period of great and expanding activity in pathology and medical science generally. In the preceding three-quarters of a century the science of pathology, if not founded, certainly came to recognition as a branch of science distinct from the clinical arts. The publication of great classics on morbid anatomy, such as the atlases of Cruveilhier and Carswell, and of Virchow's *Cellular Pathology*, Cohnheim's *Lectures*, Metchnikoff's *Lectures on the Comparative Pathology of Inflammation*, Villemin's experiments on tuberculosis, and Koch's work on the aetiology of tuberculosis, had evoked a wide response. And there was also a great burst of activity along the newer lines which were being opened up by the technical advances of the histologists, such as Weigert, the experimental pathologists, like Ehrlich, and by the great advances in bacteriological technique which in the last quarter of the nineteenth century had led to a spate of discoveries of causal organisms in infective disease. This upsurge of activity demanded more and more men for its service, possessed of more specialized knowledge than had been available to the great clinical investigators like Hunter, Bright, and Addison. The first chair of pathology had been established in Edinburgh in 1831. Fifty years later, in 1882, the second whole-time chair in Britain, that of Aberdeen, was founded, and by the end of the century, or within a few years of it, chairs had been established in all the Scottish and in many of the English provincial universities. In London the situation was different owing to the independent position of the London hospitals and their teaching schools. Their domestic arrangements did not favour the appointment of the whole-time pathologist and they had no real university affiliation. Further, in London there was the Pathological Society of London, which had been in existence since 1847

¹ *British Medical Journal*, 1906, 2, 149.

and remained a great force. It was partly for these reasons that the Pathological Society of Great Britain and Ireland found in its early days its greatest support in Scotland and the English provincial schools, and that tradition had to some extent endured.

At the first meeting in Manchester on July 14, 1906, on Professor Muir's motion Professor D. J. Hamilton took the chair, and it was moved that "the Pathological Society of Great Britain and Ireland be constituted": this was carried by acclamation and so the Society came into being.

Scientific Traditions

The *ad hoc* committee appointed at this first meeting drew up draft rules, based to some extent on those of the Physiological Society. Next it took steps to acquire an official publication. Negotiations were opened with Professor Sims Woodhead, of Cambridge, the owner and editor of the *Journal of Pathology and Bacteriology* which he had founded in 1892 with Mr. Pentland, the Edinburgh publisher. This journal was adopted as the official organ of the Society, and in March, 1907, an association was formed to acquire it from Sims Woodhead and to publish it under his editorship, with Ritchie and Boycott as assistant editors. In the editorial of October, 1907, announcing the new affiliation of the journal, the editor stated: "Records of personal research and not historical résumés are specially desired; and in all cases preference will be given to articles not overburdened with abstracts from literature. Illustrations must in all cases be confined to new features. . . . Although the editors reserve to themselves the right of editing articles submitted for the journal, they will not hold themselves responsible for any statement made in the articles published." These forthright pronouncements gave some warning of the editor's determination to be master in his own house; a decision from which he never departed and which had outlived him as a tradition.

From this point onwards the records of the Society were those of steady progress. There was the part played by the Society in the encouragement of the Pathological and Bacteriological Laboratory Assistants' Association, now the Institute of Medical Laboratory Technology. Within a year of the Society's foundation the committee was asked to consider the admission of laboratory attendants engaged in scientific work as members, and, as the minutes have it, found that "there was nothing in the rules which necessarily prevented the admission of these gentlemen"; at that same meeting Richard Muir, of Edinburgh, a man outstanding for his technical work, was nominated amongst other candidates. In 1911 a subcommittee was appointed to consider and report upon "the possibility of establishing some form of employment bureau for laboratory assistants." The matter, however, was already *en train* in another quarter. Six months later the Society learnt with pleasure that such an association was in process of formation amongst the assistants themselves, and expressed its willingness to assist and encourage its objects. As time went on certain tendencies began to emerge, and traditions became established. The Society refused to send delegates to conferences and the like; it also resolutely turned its back on any action which had any sort of political flavour, regarding itself as a scientific society and refusing to deviate from its purpose as laid down by its founders: "To advance pathology and to facilitate intercourse between pathologists." Thus the meetings had been almost wholly devoted to scientific matters, and attempts from time to time to get the Society to engage in medical politics or current administrative problems had met with little support.

Epitome

In a short life of 50 years, said Professor Dible in conclusion, it was not likely that there would be much that was stirring in a dramatic sense in the history of a scientific society devoted to the advance of one particular branch of medical science, however fundamental that might be. The true history of the Society was the work of its members,

and that was to be found recorded in the proceedings of its meetings and in the 58 volumes of the *Journal of Pathology and Bacteriology* published by the Society. Their Society, Professor Dible said, had had an honourable and honoured past, and they looked forward with confident expectation that the present and future generations would uphold the traditions which the first 50 years of the Society's existence had seen established.

HYPERCALCAEMIA IN INFANTS AND VITAMIN D

Because of reports in medical journals suggesting that cases of hypercalcaemia in infants might be due to an excessive intake of vitamin D, the Ministry of Health approached the British Paediatric Association on the subject. Lacking the adequate information on which to base a firm opinion, the association appointed a committee* to inquire into the prevalence of the condition in infants, and the kind of diet with which it was associated. The committee's report, now released and dated July, 1955, is summarized below. In reaching its conclusions, the committee states that it referred to an earlier report† to the British Paediatric Association, in which in 1943, when the fortification of infant foods with calciferol was not yet standard practice, had recommended that, under the Government scheme, the daily dose of cod-liver oil for all infants (except those born prematurely) should provide 700 i.u. of vitamin D.

COMMITTEE'S REPORT

A letter of inquiry was sent to 196 consultant paediatricians in the United Kingdom. By the end of June, 1955, 204 cases of hypercalcaemia had been reported as having been recognized since the beginning of 1953. The peak incidence of onset of symptoms was between four and eight months of age. Among the reports received there was no convincing instance that, at the onset of symptoms, the infant had been entirely breast-fed and had not received any vitamin D supplement.

Calciferol Added to Dried Milk and Cereal for Infants

When calciferol is added to infant foods there is during subsequent months a fall, at varying rates, of the calciferol content of the dried food. This fall is probably considerably less in the case of milks than in cereals.

Information was obtained from a manufacturer of National Dried Milk and proprietary infant foods.

(i) *National Dried Milk*.—In September, 1953, the Ministry of Food sent a letter to the manufacturers of National Dried Milk recommending that 500 i.u. of vitamin D, as calciferol, per dry oz. be added to allow for a maximum deterioration of 44%, thus giving a minimum concentration of 280 i.u. per dry oz. in the food as marketed.

(ii) *A Proprietary Milk*.—The following tables show the amounts of crystalline calciferol added to a proprietary brand of

Date	Crystalline Calciferol Added i.u./Dry oz.	Date	Sales Statement to Contain Not Less than i.u./Dry oz.
Up to August, 1942	70	1943	Increased to 280
From August, 1942	128	Late 1943	320
" October, 1943	403		
" November, 1944	460		
" October, 1954	690		
	(This is not yet on the market)		

Age of Milk Months	Year of Manufacture	Assays i.u./Dry oz.
7-12	1950	362
		463
13-18	1952	405
3-6	1952	560

The assays are by a biological method: error $\pm 30\%$

*Dr. Reginald Lightwood (chairman), Dr. Wilfrid Sheldon, Dr. Charles Harris, and Dr. Thomas Stapleton (secretary).
†*Arch. Dis. Child.*, 1943, 18, 58.
‡28 grammes.

full-cream dried milk, the sales statement as to the vitamin D content, and reports of assays of vitamin D in the milk.

It will be seen that the sales statement—that is, the statement on the label of the preparation—refers to the minimum level of vitamin D in the dried milk. If there is not much deterioration in a particular batch, or the milk powder be retailed soon after manufacture, the level would be higher than the minimum sales level.

A more dilute, or "half-cream" milk, was made by adding lactose to the calciferol-fortified full-cream dried milk, referred to in the above table. The concentration in the full-cream milk ensured that there was enough vitamin D in the more dilute milk.

(iii) *A Proprietary Cereal*.—The following table shows the amounts of calciferol added to a dried cereal, the sales statement, and reports of assays.

Date	Crystalline Calciferol Added i.u./Dry oz.	Sales Statement Approximate i.u./Dry oz.	Assays Age of Food Months	i.u./Dry oz.
Up to March, 1946	1,000	625	0-2	1,110-1,870
From March, 1946	2,000	1,000	13-18	758-1,200

Thus, in a fairly recently prepared batch of cereal, there may well be 1,500 i.u. vitamin D per dry oz. or even more.

The above figures permit an approximate estimate to be made of the likely intake of vitamin D of an infant fed on the full-cream dried milk, referred to above, fortified with crystalline calciferol 460 i.u. per dry oz., the calciferol-fortified cereal shown above, together with the generally recommended quantity of cod-liver oil compound:

For example, the vitamin-D intake of an infant who receives each day

	Approximate Figures
(a) $\frac{1}{4}$ pint of a full-cream dried milk containing 460 i.u. vitamin D per dry oz.	1,725 i.u.
(b) 1 oz. of a cereal containing 1,500 i.u. vitamin D per dry oz.	1,500 "
(c) 1 teaspoonful of national cod-liver oil compound (Welfare Food Service)	700-800 "

would be about 4,000 i.u.

Committee's Conclusions and Recommendations

Clearly it is important that agreement should be reached on what should be the optimum intake of vitamin-D from all sources in the infant's diet. The evidence whether or not vitamin D is responsible for "idiopathic hypercalcaemia" is not here considered. There is, however, a strong case for taking steps to safeguard infants against the possible risks of an unnecessarily high intake of vitamin D. The ways in which the intake of vitamin D could be reduced are as follows:

(1) By omitting calciferol from dried milks. There is, however, no doubt that dried milks fortified with calciferol have played a part in the abolition of rickets. In this connexion it may be noted that the intake of cod-liver oil compound in England and Wales (actual issues being expressed as a percentage of the potential demand) varies between 19 and 32%.

(2) By limiting the amount of calciferol incorporated in dried milks by a range of figures. This is understood to be technically feasible. A corresponding range of figures would also be required for fortified evaporated and condensed milks. Before the range is chosen the vitamin-D needs of healthy infants would require reconsideration.

(3) By omitting cod-liver oil supplements in the case of infants fed on a calciferol-fortified dried milk. Cod-liver oil, however, is given not only for the benefit of its vitamin-D content but also for its vitamin A, and it might therefore become necessary to make separate provisions to cover this. The committee believes that the intake of vitamin D given in any supplement should be individually adjusted according to the type of feeding.

(4) By omitting calciferol from cereals used for infants. By itself, this might not be enough to remove entirely the risk of too high an intake of calciferol.

\$0.9 litre.

British Medical Association

ANNUAL MEETING, BRIGHTON, 1956

SUMMARY OF PROCEEDINGS

FIRST PLENARY SESSION—RECENT ADVANCES
IN THE KNOWLEDGE OF CANCER

Wednesday, July 11

Under the chairmanship of Mr. A. DICKSON WRIGHT (London) a group of speakers reviewed the most recent advances in the treatment of cancer. Professor G. HADFIELD (London) discussed the latest physiological work on the development of the breast and showed how this would be of great importance in the future surgical management of cancer of the breast. Workers in America had shown that the maintenance of breast structure depended on a finely balanced mechanism. An oestrogen of ovarian or adrenal origin was insufficient to produce full development of the breast. Prolactin in relatively large quantities was essential for this. Experiments had shown that on weanling male mice, which had been castrated and hypophysectomized, full development of the breast, including lactation, could be produced if prolactin, oestrone, progesterone, and cortisone were given in suitable proportions. Approximately 50% of human breast cancer was of hormone-dependent origin. It was therefore of the utmost importance that a full study of the hormones that cause development of the breast should be undertaken in these patients. Work carried out in the clinico-pathological laboratories of the Imperial Cancer Research Fund proved that prolactin could easily be demonstrated and fairly accurately estimated in the urine of all pre-menopausal women and in 58% of post-menopausal women. It had been shown that, if prolactin was absent from the urine, hypophysectomy would not cause a remission in metastatic deposits. Further work on the hormones of the breast had shown that the secretion of prolactin by the pituitary was dependent on oestrogen thresholds, and it was believed that this mechanism was of fundamental importance in causing relapses that followed oophorectomy and adrenalectomy.

Mr. A. LAWRENCE ABEL (London) gave a general survey of the progress that had been made in cancer surgery over the last ten years. He stressed the importance of early diagnosis and the treatment of premalignant conditions in lowering the mortality from cancer. Among the premalignant diseases discussed were gastric ulcer, cholelithiasis, ulcerative colitis, polyposis coli, rectal polyps, thyroid adenomata, and skin tumours. New procedures played an important part in early diagnosis, especially exfoliative cytology and frozen-section techniques. Isotopes were coming into use in diagnostic measures; new methods for the diagnosis of carcinoma of the oesophagus and stomach dependent on ^{32}P were in the course of development. Over the last 20 years the techniques of operative surgery had been improved enormously, and the results of cancer surgery had improved in consequence. This was most marked in the surgery of the colon, where the resection rate had been doubled and the five-year survival rate had increased by 15%. The lecturer outlined the important work that had been done on the treatment of carcinoma of the breast. In patients with tumours affecting the inner quadrants of the breast, a dissection of anterior mediastinal lymph nodes was mandatory, in addition to clearance of the axillary nodes. In patients in whom the lymph nodes were involved x-ray therapy played an important part. The procedures of adrenal and pituitary ablation caused in many instances satisfactory regression of the metastatic deposits. In concluding he stressed that in the immediate future a considerable lowering in cancer mortality could be achieved by propaganda among the public and by routine medical examinations.

Radiotherapy

Dr. W. M. LEVITT (London) then spoke about radiation. He said that recent advances in the radiotherapy of cancer stemmed from two main sources—first, the introduction of artificial radioactive isotopes, and, secondly, the application of new principles to electrical apparatus for the production of very high energy x rays. Radium, until recently the only radioactive substance in general clinical use, suffered from severe limitations, apart from its scarcity and high cost. The long half-life amounted for practical purposes to permanence. It was never completely eliminated if introduced into the body. It produced its radiations through the medium of the gas radon, and not directly. These combined to make it an extremely dangerous substance. The precautions necessary to render its application safe necessitated the use of comparatively stout sealed containers and thus hampered its application to clinical work. Artificial radioactive isotopes with shorter half-lives, and radiating directly, overcame many of these difficulties. Radioactive tantalum wire, for example, could be introduced directly to the tissues for interstitial therapy, and was flexible. Some isotopes with very short half-lives, such as ^{131}I and ^{32}P , could be deliberately introduced into the blood stream so that they were selectively taken up by certain tissues, their radioactivity dying out after they had served their purpose.

The gamma rays of radioactive substances and electrically produced x rays were identical in nature, and the term "megavoltage radiotherapy" covered both telecurie therapy with such substances as cobalt-60 and radium, and super-voltage x rays. The introduction of megavoltage radiotherapy might well prove to be the most important recent advance in the radiotherapy of cancer. Telecurietherapy apparatus using massive quantities of ^{60}Co produced radiations approximately equivalent to those of a 3-million-volt x-ray machine, and there were a number of x-ray machines now in use producing x rays of from 2–4 million volts. Already considerable experience had been gained in the treatment of cancer with radiations of these high energies. It was as yet too soon to say what was the optimum range of megavoltage for treatment. It could, however, be said that megavoltage therapy at 2–4 million volts, which included the ^{60}Co apparatus, offered a good prospect of improvement in results on conventional deep x-ray therapy in suitable situations, if only because the distress and discomfort to the patient were so much less, owing to the reduced effect on the skin, and because the target dose to the growth could be more easily and consistently achieved. In particular, a ray of hope, though no more, had been introduced into some very dark places, such as the treatment of inoperable carcinoma of the bladder and rectum.

Chemotherapy

Professor A. HADDOW (London) spoke on the subject of chemotherapy. He said that the special difficulties confronting chemotherapy in cancer arose from the facts that the cancer cell was but a modification of the normal, that the biochemical differences between the two were quantitative rather than qualitative, and that there was little sign of any immunological specificity. Endocrine control (as of tumours of the prostate and breast) was rendered possible by the retention of a hormonal responsiveness already present in the corresponding normal cell, or by the development, by the cancer cell, of an active hormone-dependence, which might also be demonstrated through the procedures of oophorectomy, adrenalectomy, and hypophysectomy. Agents which acted more directly on the dividing cell included the nitrogen mustards and other biological alkylating agents such as various di-epoxides, ethyleneimines, and dimethylsulphonyloxybutane and the carboxylic nitrogen mustard "chlorambucil" ("lukeran"), had received clinical application in the past few years in cases of chronic myelogenous leukaemia, and in cases of chronic lymphatic leukaemia, other lymphomas, and Hodgkin's disease, respectively. The development of antimetabolite therapy was a great step

forward in the treatment of the acute leukaemias, and the principles governing the application of antifolic-acid and antipurine agents, whether alone or in combination with cortisone and A.C.T.H., continued to clarify. Other substances, possibly acting as antimetabolites, included urethane in the treatment of multiple myeloma.

None of the agents so far available was curative, yet all merited further study for the fundamental interest of their mechanism of action. Recently a new agent had been discovered which would cure cancer in the experimental animal. This substance, however, was not curative in man, but opened up wide future possibilities for research. Until more was known of the fundamental intimate biochemistry of cancer cells, chemotherapy would not achieve a curative nature. The future chemotherapy of cancer might depend on the development of antimetabolites, which might be used in a form of substitution therapy.

SECOND PLENARY SESSION—THE PRESENT
POSITION OF A.C.T.H., CORTISONE, AND
DERIVATIVES

Thursday, July 12

Sir CHARLES DODDS (London) opened the Plenary Session from the chair by saying that A.C.T.H. and cortisone were not alternatives. A.C.T.H. stimulated the suprarenal to produce all its products, some of which were characterized (such as hydrocortisone), some of which had only recently been discovered (such as aldosterone), and very possibly there were others as yet unknown. Cortisone, on the other hand, provides only one or a modification of one of the substances produced by the cortex.

Dr. HOWARD POLLEY (Mayo Clinic, U.S.A.) gave a paper on the present therapeutic status of cortisone and its derivatives. Apart from their metabolic and endocrine effects, which were extensively relied on therapeutically, these compounds were valuable for their antirheumatic, anti-inflammatory, and anti-allergic properties and for their inhibition of fibroblastic scar-tissue formation. Refinements in their use had resulted from modifications of methods of administration, and alterations in the chemical structure of the steroid molecules, with consequent change in metabolic effect. Examples of the last procedure were prednisone and prednisolone, which had four times the antirheumatic effect and less effect on electrolytes than cortisone; 9 α -fluoro-hydrocortisone, which had an antirheumatic potency ten times that of cortisone but a fifty-fold effect on electrolytes; and hydrocortisone, which had a more certain action than cortisone when administered locally. All the cortisone substitutes as well as cortisone were capable of causing hypertension if given for any length of time, and there was general agreement that long-term therapy with them was more satisfactory if this could be avoided. Symptoms included the cyclical occurrence of fatigability, emotional instability, and general muscular and articular aching, which improved with rest, got worse when the patient was tired, and varied directly with the time from the last dose of hormone. Other manifestations of hypercortisonism were mesenchymal reactions simulating disseminated lupus erythematosus or periarteritis nodosa. Transfusion reactions, light sensitivity, and false serological reactions during blood grouping could occur. Chronic hormonal excess could modify mesenchymal reactions in rheumatoid arthritis and might be fatal. Dosage of the hormone needed to be adjusted according to the age and sex of the patient, and in cases where prolonged treatment was going to be necessary the dose should be gradually reduced by small steps to the lowest dose which kept the patient free of symptoms.

Dr. W. S. C. COPEMAN (London) said that in rheumatoid arthritis cortisone and A.C.T.H. were of equal value, although cortisone was most commonly used. He now gave an initial dose of 50–75 mg. daily in divided doses. Women tolerated hormonal therapy less well than men. Hormone treatment for rheumatoid arthritis was indicated only when treatment

by rest, splinting, and gold injections had failed. Even then cortisone was contraindicated if there was a past history of tuberculosis, peptic ulcer, diabetes mellitus, hypertension, or psychosis. Cortisone therapy did not actually influence the underlying disease process; patients felt subjectively better and were able to return to work. Provided irreversible joint changes had not occurred, he had maintained selected cases with great relief from symptoms and impaired function for as long as five years. The frequency and dangers of side-effects were overrated. The most frequent complication of hormone therapy was peptic ulceration, and any digestive symptoms should be investigated, since an ulcer might bleed or perforate. Nevertheless peptic ulcers could heal without treatment being stopped. It was essential not to stop treatment with cortisone in patients who had been receiving it for a long time and who had to undergo operations, or they might die as the result of the stress of operation. Hydrocortisone had the same effect as cortisone, but prednisone and prednisolone caused less disturbance of water and electrolyte metabolism, though they were more ulcerogenic. Hydrocortisone was typically useful for intra-articular injection in cases of rheumatoid arthritis in which a number of joints had been left unaffected by systemic treatment with cortisone. There were no side-effects from local treatment with hydrocortisone. Although the position of cortisone treatment for acute rheumatism was not completely clear yet, it seemed that after three years there was little difference in the incidence of heart disease between treated and untreated cases. More cases of rheumatoid arthritis treated with A.C.T.H. went into natural remission than did cortisone-treated cases. Most cases of rheumatoid arthritis would respond to conventional treatment, which was not outmoded by therapy with steroids.

Mr. A. J. B. GOLDSMITH (London) said that cortisone and related steroids were valuable in ophthalmology because of their anti-inflammatory effects. When steroids were combined with appropriate antibiotic therapy, infections could be controlled both bacterially and anatomically. Hydrocortisone was slightly more effective by local application than cortisone. There were no side-effects, since such small quantities were used, and the drugs could be given for a long time without losing their potency. They did not cure ocular inflammation, but blocked the exudative phase and stopped the formation of fibrous tissue. The cause of the inflammation was in no way influenced, and bacteria could continue to proliferate if unchecked by antibiotics, with disastrous consequences. If cortisone treatment was stopped too soon the disease process would continue as though untreated and possibly might be exacerbated. Cortisone could not remove chronic fibrous tissue. Hormone treatment prevented the development of scar tissue in deep keratitis, iridocyclitis, and choroiditis, and limited the chances of corneal scarring in interstitial keratitis. Assessment of the aetiology was essential in ocular disease—for example, hormone therapy in tuberculous uveitis might light up systemic tuberculosis with disastrous results. Hormone treatment was dangerous in cases of dendritic ulcer of the cornea due to the herpes virus, since extension of the ulcer might occur, with perforation of the cornea. Cortisone therapy was helpful after corneal graft operations, when it prevented invasion of the graft by new blood vessels.

Dr. F. DUDLEY HART (London) said that A.C.T.H. was only of use in treating adrenal insufficiency in cases where the adrenals were hypoplastic, as in Simmonds's disease, or in covering operations on the pituitary or hypothalamus. In acute adrenal insufficiency cortisone could be given, but 100 mg. of hydrocortisone intravenously over six hours and repeated as necessary was the treatment of choice. 5 mg. of 9 α -fluorohydrocortisone or hydrocortisone succinate could be used in such cases, but intramuscular cortisone was too slow in its action. Cortisone, hydrocortisone, or hydrocortisone acetate were the best drugs for treatment of Addison's disease or totally adrenalectomized patients, though some required additional deoxycortone acetate and salt. Treatment with 20 mg. of cortisone and 0.125 mg. of 9 α -fluorohydrocortisone orally twice daily was effective,

Dr. W. M. DAVIDSON (London) said that 1% of all new patients attending King's College Hospital suffered from iron-deficiency anaemia with a haemoglobin value below 60%. The body normally contained about 5 g. of iron, divided between the red blood cells, other systems of the

body, and the iron stores in the reticulo-endothelial system. The body conserved iron carefully, but the reserves were not large, and were easily depleted if the intake of iron was low or if abnormal amounts were lost, as for example through menorrhagia. Once the iron stores were much reduced it took only a small additional drain for frank anaemia to occur. Most patients with iron-deficiency anaemia responded satisfactorily to iron preparations given orally, but some required to be treated with parenteral injections. In that case the amount of iron given should be that calculated to restore the haemoglobin to normal and to replenish the iron stores of the body.

Wednesday, July 11

Management of Asthma

With Dr. GLADYS M. WAUCHOPE (Brighton), a vice-president, in the chair, Dr. R. S. BRUCE PEARSON (London) opened a discussion on the management of asthma. He said that three main causes operated singly or in combination to produce an asthmatic attack in a predisposed person—namely, allergic factors, infection, and emotional disturbance. Allergens should be eliminated so far as possible and desensitization reserved for severe cases. Pulmonary infection should be treated early with the appropriate antibiotic. Infection of the nasal sinuses might also require treatment. Emotional factors were often present in chronic cases and should be sought.

Symptomatic remedies were used when the main precipitating factors had been dealt with. In mild cases, inhalations gave relief and were harmless. Breathing exercises were valuable. The use of adrenaline, aminophylline, and other bronchodilator drugs was well established. More recently, cortisone and corticotrophin had been used, and they represented the greatest advance in treatment since the introduction of adrenaline. However, their action was purely symptomatic, and side-effects were likely to occur if they were used for longer than very short periods. The main uses of corticoid therapy in asthma were to treat severe status asthmaticus, to prevent status asthmaticus when it threatened to occur, and as long-continued treatment in some severe, chronic cases. There were numerous contraindications to the use of corticoid therapy in asthma, such as the coexistence of tuberculosis, peptic ulcer, heart failure, diabetes mellitus, hypertension, and nephritis.

Treatment of Asthmatic Attack

Dr. D. A. WILLIAMS (Cardiff) said that an acute attack of asthma might vary in severity from a mild attack easily controlled by simple symptomatic therapy to the highly dangerous condition of status asthmaticus. For a mild attack one of the many inhalants such as adrenalin. et atropin. co. (N.F.) or isopren. sulph. co. (N.F.) was an effective and safe form of treatment. Ephedrine by mouth was also useful for treating mild attacks in younger people, but in the elderly oral aminophylline was better. Antihistamine drugs were of little use. For more severe attacks isoprenaline tablets or subcutaneous adrenaline were the drugs of first choice. In status asthmaticus, when ordinary doses of adrenaline failed, the practice of giving additional adrenaline at the rate of 1 minim (0.06 ml.) per minute was often successful. Intravenous aminophylline often succeeded when adrenaline failed. Cortisone, corticotrophin, and related compounds were a major advance in the symptomatic treatment of asthma, especially for the treatment of status asthmaticus and in severe chronic asthma resistant to other forms of therapy. The contraindications to corticoid therapy should not be forgotten. A suitable dose for status asthmaticus was 300 mg. in divided doses on the first day, 200 mg. on the second, and 100 mg. on the third and subsequent days for a period of 7-10 days. Corticotrophin was most conveniently given in the form of the long-acting A.C.T.H. gel by intramuscular injection, the usual dose being 80 units on each of the first four days, followed by gradual reduction over the next few days. Improved symptomatic therapy had reduced the importance of

sedatives. Paraldehyde was a safe and effective hypnotic for severe cases. Neither morphine nor pethidine should be used, both because they were drugs of addiction and because they might cause respiratory depression and death.

Psychological Approach to Asthma

Dr. D. O. NEIL (London) said that emotional excitement could provoke an asthmatic attack. The three types of emotional excitement most commonly concerned were anxiety, resentment, and feelings of guilt. Secondly, the illness often began when the patient's emotional atmosphere was highly charged. Thirdly, when the asthmatic attacks were linked to emotional tension, it might be possible to modify either the circumstances of the patient's life or his reaction to them, so that the attacks diminished or disappeared. It was easier to achieve this with children than with adults. One of the most satisfying things in medicine was to see asthmatic attacks in an only child subside as the child grew less anxious and the mother learnt to handle him (and her own reactions) differently.

Recent Advances in Therapeutics

Dr. A. H. DOUTHWAITE (London) discussed some therapeutic advances in three common conditions—barbiturate poisoning, hypertension, and duodenal ulceration. Addiction to barbiturates had become alarmingly common, and the rise of barbiturate poisoning proceeded *pari passu* for these drugs had now become the favourite agent for suicide. A new antidote was bemegride ("megimide"), whose molecular structure was similar to that of the barbiturates. It was given intravenously in doses of 50 mg. repeated every five minutes until the patient was only lightly comatose. Use of the drug to bring about full consciousness was likely to induce vomiting, twitching, and convulsions. There was now a reaction against routine gastric lavage in barbiturate poisoning, for most of the drug had left the stomach before coma ensued and many deaths had been caused by the inhalation of gastric washings by comatose patients.

The most important advances in the treatment of hypertension had been the discarding of surgical procedures such as sympathectomy and the development of various hypotensive drugs. The most powerful hypotensive drugs acted as ganglion-blocking agents. Hexamethonium salts had generally been superseded by pentolinium tartrate ("ansolysen"). The latest ganglion-blocking drug was "ecolid," which was more powerful and prolonged in its action than earlier agents. The ganglion-blocking agents were effective in smaller doses if they were combined with other hypotensive agents such as reserpine and hydralazine.

In connexion with the control of gastric acidity in duodenal ulcer, the speaker described the action of alkalis incorporated in tablets which were slowly sucked, such as "nulacin" tablets. More recently aluminium glycinate had been used as the basis of a tablet to be sucked ("rodexin"). The control of night secretion was a separate problem, and the speaker described the effect of oral mersalyl in suppressing gastric secretion, a method he had recently been using.

Analgesic Drugs

Professor STANLEY ALSTEAD (Glasgow) defined analgesics, and pointed out that their use represented merely one part of a much bigger subject, the relief of pain. He said that the cynic might classify analgesics into two groups: (a) drugs which were very effective but which should not be used; (b) drugs which might be used though they were not very effective. The critical practitioner's approach to the subject was naturally empirical but was none the less valuable, and was indeed complementary to the brilliant contribution of the chemist and the pharmacologist. The speaker then commented briefly on analgesics grouped on a clinical basis of potency—"the incomparable morphine" at one end of the scale and "the humble aspirin" at the other. In the intermediate group were several fairly powerful analgesics which had mostly fallen into disuse because of their

toxicity—acetanilide, phenacetin, phenazone, and amidopyrine. Special reference was made to N-acetyl *p*-aminophenol; under its trade name of "panadol" it was a fairly recent innovation, but it could claim ancient lineage because of its relationship to acetanilide and phenacetin.

Professor Alstead included pethidine in his intermediate group and discussed its merits and its limitations. Among special techniques for enhancing the potency of analgesics the speaker referred to the intravenous injection of small doses of morphine, and also to the combination of morphine and chlorpromazine when long-continued use was necessary.

Use of Drugs in Neurosis

Dr. DESMOND CURRAN (London) said that, while the treatment of the psychoses was a job for the psychiatrist, every practising doctor dealt with patients who suffered from insomnia, tension, anxiety, mild depression, or anorexia. Judicious use of the many drugs now available was a great aid in treating such complaints, although the physician might be confused by the plethora of drugs now being released on the market, often without adequate clinical trials. Three classes of drugs were involved—hypnotics, sedatives (or “tranquillizers” in modern jargon), and stimulants. With respect to hypnotics, the speaker's preference was for barbiturates, pentobarbitone for short action and amylobarbitone sodium for longer action. As a tranquillizer, amylobarbitone sodium was effective, safe, and cheap. Chlorpromazine and reserpine had achieved notoriety in recent years, but though of proved worth in psychotic illness their value in neurosis was not proved. Various new drugs were available. Stimulating drugs were chiefly used in mild depression, when the patient noticed exhaustion and fatigue. The physician must first distinguish between endogenous depression (best treated by electric convulsion therapy) and reactive depression following social or domestic stress, in which amphetamine and its derivatives were of great value. To counteract the insomnia and irritability which might occur with these compounds, they were often combined with a sedative drug.

Illness as a Hobby

Dr. RICHARD ASHER (London) entertained the section with a discourse at once wise and witty on "Illness as a Hobby." Most people had a hobby of some kind, he said, and some of them chose illness. The devotees of this hobby could be classified into three main groups. First came "the genuine student," who, without being neurotic, took a keen interest in his illness and developed an extensive knowledge of x rays, blood tests, etc. When the illness was going well it was a harmless enough hobby, but there was always a risk of the devotee becoming hypochondriacal in the process. Secondly, there was the chronic hypochondriac, who might be one of several varieties. The rich hypochondriac travelled about Europe, going from one consultant to the next, and thus could be regarded as the "grand tour" type. Such women were usually married to rich but inattentive husbands who supplied them with money for their hobby as a substitute for affection. They were fond of discussing with their friends the virtues and failings of the various consultants they had seen, much as they would argue over the merits of rival tailors or hairdressers. The poor hypochondriac, precluded from extensive travelling, became the "perpetual out-patient," of which every hospital had its quota. Discharged from one department, they lost no time in appearing at another, and thus acquired a collection of documents rivaling that of their rich sisters, though written on less luxurious paper. Another variety was the chronic convalescent, the man who had had a long-standing organic illness and could not bear to give it up and thus abandon the sympathetic inquiries of his friends and the security of his medical régime. The third main group included the sufferers from chronic autogenous disease, among which we might recognize anorexia nervosa and Munchausen's syndrome. The speaker concluded: "To make a hobby of one's own illness is always a mistake, whereas to make a

hobby of studying other people's illnesses is an enthralling pursuit and the purpose of this annual meeting."

Placebos

Professor E. J. WAYNE (Glasgow) contributed a valuable paper on placebos. He said that for a long time little interest had been taken in the action of placebos, but numerous clinical trials employing inert "dummy" preparations in order to make the trial a "blind" one had incidentally revealed that the placebo itself could exert powerful therapeutic effects. He gave several examples of how chemically inert substances had been shown to bring about both subjective and objective improvement in a considerable proportion of patients. For example, he had personally conducted a controlled trial of the treatment of asthma by a protein derivative which was compared with saline injections. There was no difference between the two forms of treatment, but, more important in the present context, a considerable proportion of the subjects were improved by the inert therapy. An even more striking example of the power of placebos was the finding by other workers in a blind controlled trial of mephenesin that, not only did the same number of patients show improvement in the treated and control groups, but three control cases developed complications in the form of dermatitis medicamentosa, urticaria, and severe diarrhoea.

The question arose whether it was wise to use placebos deliberately, with the physician realizing that he was making use of suggestion as the therapeutic agent proper. Some had condemned this practice, like the person who said that "the placebo is a form of deceit, initially of the patient, ultimately of the doctor." The speaker himself thought that placebos should be used. "When a physician is in doubt about whether a medicine is going to act through physical or psychological mechanisms, he should use a simple, cheap, and relatively inert preparation. If he does not achieve the desired effect he can then try the effect of more potent preparations."

Epidemic at Royal Free Hospital

Dr. N. D. COMPSTON (London) described an outbreak of an epidemic illness which affected more than 300 of the staff of the Royal Free Hospital group. The clinical features resembled those described in epidemics in Iceland and elsewhere since 1948 of an illness now named benign myalgic encephalomyelitis. The earliest symptoms were malaise and headache, with depression. Within a week there supervened severe pain in the neck, back, or limbs, and dizziness. In some cases the illness proceeded no further, but in the majority neurological symptoms appeared together with intensification of the earlier symptoms. The neurological manifestations were cerebral irritation, with photophobia and neck rigidity, hypersomnia, nightmares, panic states, and uncontrollable weeping. Blurred vision due to intrinsic ocular palsy was sometimes found. Pupils were often unequal and reacted poorly to light and accommodation. Various extrinsic ocular palsies were met with and lateral nystagmus was frequent. Other cranial nerve palsies were fairly frequent. Vertigo sometimes became severe and was at times associated with nerve deafness. The limbs and trunk were usually involved in the patients with central nervous signs. Both motor and sensory disorders occurred. The course varied. Without neurological involvement, recovery was complete in one month, although recrudescence might occur. The more severe cases required hospital treatment for some months, and a few patients were still disabled after nearly a year although recovery was proceeding. No specific treatment had been found of value. Premature activity should be avoided because of the danger that relapse might be provoked. The diagnosis had to be made on clinical evidence. The cerebrospinal fluid was uniformly normal and no other laboratory tests had been found helpful. Extensive virus studies in different laboratories had so far proved entirely negative, and it seemed as though the infection was not due to any known virus.

minal surgery done in three general hospitals in the Brighton area over a five-year period, and in 10,166 abdominal operations there were 140 bursts, or an incidence of 1.3%. When appendicectomies were excluded the figure was 2.1%, and this agreed with other reviews in the literature. Most bursts occurred about the fifth or sixth day, and upper abdominal incisions were more prone to rupture than lower ones. The mortality rate was 30%, and this, too, was similar to other workers' series.

He distinguished between two varieties of wound disruption. On the one hand there was the debilitated patient with a wound which never showed signs of healing and which gaped between the sutures. But it was more with the second type of case he was concerned, where a patient in good condition disrupted his wound after discharging sero-sanguineous fluid about the fifth or sixth day. Some of these were undoubtedly due to bad surgical technique, imperfect haemostasis, and poor closure of the peritoneum. Others appeared to be outside the surgeon's control. None occurred in cases operated upon in nursing-homes, and the records did not show any significant correlation between anaemia or low serum proteins and the incidence of wound disruption. The bursts occurred most commonly in the fifth, sixth, and seventh decades, and more than a third were in patients with malignant disease. The greatest incidence occurred in the winter months and might be linked to cough. 45% of those investigated showed wound infection. Catgut alone had been used in 72% of the bursts, and it was remarkable how no trace of catgut was found in many of the wounds at resuture. He questioned increased absorption of catgut or allergy to it. An exciting factor was always increased abdominal pressure, usually due to cough, vomiting, and ileus.

Mr. SELWYN TAYLOR (London) considered that a discussion concerned with mistakes was of much more value than one concerned with successes, and that this part of the programme should have started the day, not finished it. He had reviewed the figures at a teaching hospital and was surprised that there was an almost identical pattern of age, sex, day of disruption, and preponderance of bursts following elective rather than emergency surgery, as in Mr. Park's series. Rather more of the wound disruptions followed operations by members of the senior staff, but probably many of these were completed by junior ones. Too much reliance should not be put on a study of other people's records. He agreed with Mr. Park that the burst abdomen was of two quite distinct kinds, and confined his remarks to those whose wounds disrupted for no obvious reason. The sero-sanguineous fluid, which could appear as early as twenty-four hours after operation, had never been thoroughly investigated, and he made a plea for a study of its bacteriology both aerobically and anaerobically. It did not appear to matter what type of suture material was used, since bursts had occurred where catgut, thread, silk, and steel wire had been used. He quoted the experimental work of Professor Sandblom, who had shown that where repeated wounds were made subsequent ones healed more swiftly. This might explain why a burst abdomen when resutured usually healed. In experimental wounds the introduction of antibiotics had improved the tensile strength, which suggested that asepsis was important. Finally he stated that he could find no record of a burst following a transverse abdominal wound, so that placing an incision was important if this complication was to be avoided.

Mr. HOSFORD (London) stated that the nursing staff should be taught the importance of the appearance of sero-sanguineous fluid in a wound, and they should report it at first sight. Mr. HAROLD DODD (London) said that he always explored a wound as soon as such a discharge occurred. Mr. BERNARD WILLIAMS (Portsmouth) had never seen a burst following transverse incisions, but Mr. G. E. MOLONEY (Oxford) had seen two occurring in patients who were jaundiced. Many others took part in the discussion, and it was apparent that there was no unanimity among those present either in the choice of material or in the technique for closing wounds.

SECTIONS OF OBSTETRICS AND GYNAECOLOGY AND CHILD HEALTH

Tuesday, July 10

Post-maturity

The president of the Section of Obstetrics and Gynaecology, Professor T. N. A. JEFFCOATE (Liverpool), took the chair for the opening of the joint session with the Section of Child Health. The first subject discussed was post-maturity. Mr. T. L. T. LEWIS (London) remarked that true post-maturity not only meant prolongation of pregnancy beyond 40 weeks but also implied consequent placental inadequacy. With the foetus progressively deprived of its oxygen supply, it was in danger of dying from anoxia. Death *in utero* before labour was uncommon, but the contractions of labour suddenly reduced the oxygen supply still more. Slowing of the foetal heart and the passage of meconium might then be a warning of foetal distress, but death might be too sudden to allow delivery of a live baby. A few babies survived labour only to die soon after from the inhalation of liquor amnii during labour in response to hypoxia. Mr. Lewis said there were two kinds of evidence for belief in post-maturity. First, there was a significantly higher perinatal mortality when pregnancy was much prolonged. Secondly, experimental work had shown that the percentage oxygen saturation of foetal blood decreased gradually up to term and rapidly thereafter. By the 43rd week of pregnancy there was only enough oxygen in the umbilical vein for the basal metabolic needs of the foetus and no reserve of oxygen for the foetus to use during the uterine contractions. There was also a greater proportion of long and difficult labours in post-mature cases, even after excluding disproportion and malpresentation. Mr. Lewis then discussed the diagnosis of post-maturity. Generally, the duration of pregnancy had to be estimated on the sum total of all clinical and radiological evidence. The greatest risk of post-maturity was in primigravidae over the age of 25 who were at least one week overdue.

Mr. JAMES WALKER (London) concerned himself with the management of prolonged pregnancy. He adduced figures to show that the perinatal mortality in deliveries after the 41st week could be greatly reduced by accepting three principles: that prolonged pregnancy plus another anoxia-producing factor (such as toxæmia) added to the foetal risk; that meconium staining in a long labour was an indication for caesarean section; and that difficult vaginal delivery was to be avoided in the post-mature baby. He advocated routine induction of normal primigravidae of over 35 at the end of the 41st week of pregnancy. It had been suggested that the induction of labour after term was attended by more risks than profits. About 100 inductions would be required to save 5 babies, but he himself thought it was worth it. If induction produced scanty liquor, especially if it was thick meconium, there was much to be said for immediate elective section. If labour did not follow amniotomy an intravenous oxytocin drip might be started on the third or fourth day, and in the uncommon case in which this was also ineffective section should be seriously considered.

Dr. T. E. OPPÉ (London) said that most post-mature babies showed no ill effects and were not readily distinguishable from infants born at term. From the point of view of the paediatrician, however, the baby might show signs of past or present anoxia, with difficulty in breathing, asphyxia, and signs of pulmonary aspiration. It might be dehydrated and wasted, but its alert expression, long nails, and absence of vernix distinguished it from the premature baby. Neonatal death in the post-mature baby was usually due to asphyxia or aspiration and less often to trauma or infection. Except for the prolongation of pregnancy seen sometimes in anencephaly, congenital malformations were not more common in post-mature infants. The paediatrician's concern was limited to resuscitation, drainage of

bronchial aspirate, and care of the dry cracked skin. The baby was usually hungry and required full feeds for optimal growth.

Mr. G. H. BANCROFT-LIVINGSTON (Belfast) described experimental work on the level of oxygen in umbilical-vein blood of the infants of primigravidae delivered vaginally, with no evidence of foetal distress. This had failed to show any relationship between oxygen level and either maternal age or apparent maturity of the foetus. When foetal distress had been present it was nearly always in prolonged pregnancy, but again it had been impossible to correlate foetal distress with oxygen levels in umbilical-vein blood. He did not think that prolongation of pregnancy constituted such an important problem, and it seemed unlikely that anoxia played the major part in post-maturity. The care of the individual patient was to be preferred to any method of mass induction at any given date. The passage of meconium, although not closely correlated with foetal anoxia, might indicate foetal embarrassment of a transient nature, but it was a neonatal rather than an obstetric problem.

Dr. O. D. FISHER (Belfast) said that a study of the haemoglobin level in cord blood of babies of normal primigravidae had not shown any significant correlation between haemoglobin level and foetal age or maternal age. The lowering of the intrauterine oxygen level was not reflected in a rise in foetal haemoglobin level. Post-maturity of itself in a rise in foetal haemoglobin level. Post-maturity of itself did not constitute a major paediatric problem, but the inhalation of meconium might produce a paediatric emergency.

Others who participated in the discussion were: Mr. A. PERRY (Dunedin, New Zealand), Dr. BERYL D. CORNER (Bristol), Dr. MARK S. FRASER (Aberdeen), Mr. R. M. CORBET (Preston), Miss MARY K. LAWLOR (Brighton), and Dr. A. BARKER (Whitstable).

Haemolytic Disease of the Newborn

Mr. J. B. BLAKLEY (London), a vice-president of the Section of Obstetrics and Gynaecology, took the chair when Dr. D. C. A. BEVIS (Manchester) opened the discussion on the rhesus factor and the management of haemolytic disease of the newborn. He said that the sensitized Rh-negative pregnant woman presented a difficult problem to the obstetrician. There were no clinical signs in the antenatal period which enabled one to assess the foetal condition, yet it was the obstetrician's duty to present to the paediatrician an infant as undamaged and yet as mature as possible. Dr. Bevis then reviewed the attempts that had been made to limit the effects of rhesus iso-immunization during the antenatal period. The transfusion of the mother with Rh-negative blood, the injection of stronger antigens or of negative blood, the injection of methionine, and ethylene disulphonate, the administration of methionine, and the injection of extracts of Rh-positive blood (haptens) were all ineffective, while the use of cortisone might only increase the hazards to both mother and baby. As regards the prognosis for the individual baby, the previous obstetric history of the mother was only sometimes helpful. Studies of changes in the titre of antibodies during the pregnancy were of doubtful prognostic value. He himself had thought that, as the affected baby was being subjected to haemolysis *in utero*, it was logical to look for evidence of the degree of this haemolysis antenatally by chemical analysis of liquor of this haemolysis antenatally by chemical analysis of liquor removed by abdominal paracentesis. Investigations in 41 affected babies showed that the maximum amount of free iron in the liquor during pregnancy was proportionate to the cord haemoglobin concentration at birth. This method was useful, but did not forewarn of the possibility of kernicterus in the individual case. The more anaemic the baby at birth the more likely it was to develop kernicterus, but kernicterus could occur even with a normal cord haemoglobin level. However, he had found that the concentrations of bilirubin and oxyhaemoglobin in the liquor gave a fairly accurate index of prognosis for the baby. The bilirubin concentration was high and the oxyhaemoglobin concentration low in the case of babies which were anaemic or hydropic at birth. The babies that were potentially kern-

icteric had high concentrations of both. In the absence of estimations of the liquor pigments a shrewd idea of the outlook could be obtained by similar examination of the cord blood. The maximum death rate for kernicterus, continued Dr. Bevis, was on the fourth day of life, and a replacement transfusion in the first 24 hours after birth could therefore be life-saving. He believed that these examinations of liquor and cord blood would eliminate unnecessary replacement transfusions. Moreover, they might indicate in which individual cases it was advisable to induce premature labour.

Exchange Transfusion

Dr. P. L. MOLLISON (London) discussed the indications and results of treatment of haemolytic disease by exchange transfusion. While anti-Rh immunization was about as common as ABO incompatibility, 60% of the infants born to immunized Rh-negative mothers required treatment, whereas treatment was only rarely required in ABO incompatibility. Only 1% of Rh-negative mothers with Rh-positive husbands became immunized in the first pregnancy and about 10% in the second. Previously many women had been sensitized by blood transfusion or intramuscular injection, but this was becoming much less common as blood typing improved. He was strongly of the opinion that estimation of cord haemoglobin and bilirubin concentration provided the most reliable indication of severity of the disease or the chance of developing kernicterus. Prematurity significantly reduced the chance of survival. It was very doubtful if spectroscopic examination of liquor was yet accurate enough to be used to decide severity or predict treatment. Two antibody tests—one early in pregnancy and one at 32–34 weeks—were required as a routine, and Dr. Mollison said he was shocked to discover, only a year ago, that only 50% of all women were so tested. The mother with Rh antibodies in her serum should be delivered in a hospital staffed and equipped to care for the infant. At delivery cord blood should be taken from all Rh-negative mothers. In his hospital, if the Coombs test was positive, all premature infants received exchange transfusion. The bilirubin level was recorded, and the aim was to prevent a rise to more than 20 mg. per 100 ml. Repeated exchange transfusion was done if necessary. The technique of exchange transfusion had always required skill and care. In particular infants became ill if a greater volume of blood were injected into the circulation than was removed from it. Packed cells should be used rather than stored citrated blood.

Kernicterus of Prematurity

Dr. BERNARD M. LAURANCE (Derby) described the kernicterus of prematurity. The premature infant was usually under 4½ lb. (2 kg.) and on the fourth to fifth day became deeply jaundiced, went off his feeds, developed head retraction, and sometimes had cyanotic attacks. At Derby two years ago six premature infants had died of kernicterus of prematurity soon after the dose of vitamin K analogue had been increased to 10 mg. three times a day for three days by intramuscular injection; thereafter the dose was reduced to 2 mg. as a single dose (and later to 1 mg.), and since then 250 premature infants had been admitted and there had not been a single death from kernicterus. There seemed no doubt that in the premature infant the injection of vitamin K was associated with a rise of serum bilirubin.

The next speaker was Dr. A. C. ALLISON (Oxford), who described work which showed that vitamin K analogues produced haemolysis in experimental animals deficient in vitamin E. Not all vitamin K analogues produced the same degree of haemolysis, but only small quantities of vitamin K substances were required to prevent or treat haemolytic disease—1 to 2 mg. as a single dose was sufficient.

Dr. BERYL D. CORNER (Bristol) supported the previous speakers, and said the changes in the kernicterus of prematurity and of haemolytic disease were identical. In the mature infant the bilirubin was maximal on the second day,

but in the premature not until the sixth day. Exchange transfusion was usually required when the circulating bilirubin rose higher than 25 mg. per 100 ml. of blood. In Bristol for 2½ years menaphthone dipotassium bisulphate vitamin K analogue had been used, and in 308 premature infants no significant difference in bilirubin levels could be detected between those who had received this vitamin K analogue and those who had no vitamin K. In that series there were no deaths from kernicterus.

In the following discussion Dr. O. D. FISHER (Belfast) presented figures which he claimed suggested that premature induction of labour resulted in a smaller foetal loss than in the series allowed to proceed to spontaneous labour. In reply, Dr. MOLLISON pointed out the many difficulties of investigations of that type, and stated that in his view the only method of pursuing clinical trials was one in which the cases were divided by true random selection.

SECTION OF OBSTETRICS AND GYNAECOLOGY

Wednesday, July 11

Management of Hypertension in Pregnancy

Mr. J. R. NICHOLSON-LAILEY (Taunton), a vice-president of the Section, occupied the chair when Professor R. J. KELLAR (Edinburgh) opened the discussion on the management of hypertension in pregnancy. Professor Kellar said that about 10% of all pregnant women developed a degree of hypertension during pregnancy—that is, a blood pressure of more than 140/90 mm. Hg. The pregnancy toxæmias still caused an appreciable number of maternal deaths and a high proportion of the perinatal foetal mortality. Control of the hypertension was more effective in improving the prognosis for the mother than for the baby.

The most important discovery in recent years had been that pre-eclampsia was associated with a diminution of the blood supply to the placenta. This caused impaired transfer of nutrients and oxygen to the foetus and diminished the steroid function of the placenta. The first object of treatment was to prevent the mother developing eclampsia, and this could nearly always be done. Secondly, it was desirable to improve the placental blood flow in the interests of the foetus, but this was less easily achieved because the changes in the placental vessels might be irreversible, especially if the toxæmia was of long standing. Even the milder cases of toxæmia were best admitted to hospital for rest, sedation, and observation, because the course of the disease was unpredictable. Reserpine was a useful drug if the hypertension continued despite these measures, but had to be employed with caution. It was more apposite to cases of essential hypertension than to simple pre-eclamptics. The patient with severe or imminent pre-eclampsia constituted an obstetric emergency. Termination of the pregnancy was generally required within a few days no matter what treatment was given, but hypotensive drugs could be used to control the blood pressure and thus prevent the onset of convulsions.

Mr. E. W. L. THOMPSON (Dublin) said it was important to establish early in pregnancy the individual patient's basic blood pressure. If it were high it did not necessarily portend a complicated pregnancy or labour, but it did call for special care and supervision by the obstetrician. There were four types of hypertension in pregnancy—pure pre-eclampsia (foetal loss 5%), essential hypertension (foetal loss 10%), essential hypertension with pre-eclampsia superadded (foetal loss 18%), and chronic nephritis. The first was commonest, the last was rarely seen, the middle two constituted about 15% of cases of hypertension in pregnancy, and the third was most dangerous clinically. Mr. Thompson then described the management of these patients, stressing the traditional measures of rest, adjustment of diet, and limitation of salt intake. Hypotensive drugs were valuable for the temporary protection of the patient with a dangerously high blood

pressure. One tried to prolong the pregnancy until at least the 35th week, and induction of labour was commonly planned for the 37th week if the cervix was ripe. Caesarean section had been performed in 11% of his cases, the indications being uncontrollable toxæmia or the presence of additional adverse factors.

Mr. VINCENT O'SULLIVAN (London), Dr. KATHARINA D. DALTON (London), Mr. JOHN SOPHIAN (London), and Mr. S. BENDER (Chester) contributed to the ensuing discussion.

Diagnosis of Ectopic Pregnancy

Mr. J. R. Nicholson-Lailey vacated the chair in favour of his vice-presidential colleague, Mrs. CONSTANCE L. BEYNON (Brighton), before Miss MARY K. LAWLOR (Brighton) read a paper on the diagnosis of ectopic pregnancy. After detailing the classical symptoms and signs, Miss Lawlor emphasized the atypical picture presented by the subacute or chronic case. She then reviewed the diagnostic value of certain ancillary investigations. Curettage, aspiration of the pouch of Douglas, colpotomy, culdoscopy, salpingography, and arteriography had all been advocated with varying enthusiasm, but none afforded an infallible guide. In particular, the absence of any evidence of pregnancy decidua or placental tissue either in the uterine curettings or even in the original site of the ectopic gestation did not necessarily invalidate the diagnosis. Dr. E. E. RAWLINGS (Salford) contributed to the discussion a note on the value of aspiration of the pouch of Douglas.

Retroversion of the Uterus

Mr. K. F. MACKENZIE (Brighton), a vice-president, took the chair when Mr. K. V. BAILEY (Manchester) read a paper on the importance of retroversion. Mr. Bailey described three varieties of retroversion—the so-called congenital, the puerperal, and the pathological. Congenital retroversion probably represented a pubescent manifestation of minor endocrinal dysfunction. There were usually no related symptoms, but if the uterus were also acutely retroflexed, dysmenorrhoea, menorrhagia, and relative infertility were likely to occur. Puerperal retroversion was important only if the bulky subinvolved uterus occupied the pouch of Douglas; if so, backache, pelvic dragging pain, and menorrhagia might follow. Fertility was lowered, and if pregnancy occurred the gravid uterus might become impacted in the pelvis. In pathological retroversion the uterus was pulled backwards and was limited in mobility by adhesions either of inflammation or of endometriosis. The symptoms here were of the underlying condition, and it was at this that treatment must be directed. A spirited discussion followed in which the president, Professor T. N. A. JEFFCOATE (Liverpool), Mr. J. R. NICHOLSON-LAILEY (Taunton), Dr. E. E. RAWLINGS (Salford), Dr. C. J. FARR (Cuckfield, Sussex), Mr. JOHN SOPHIAN (London), Dr. BADEN R. COOKE (New South Wales), Mr. J. B. BLAILEY (London), Mrs. CONSTANCE BEYNON (Brighton), Dr. C. D. COE (Brighton), Mr. JOHN MACPHERSON (Torquay), and Dr. MARGARET I. NEAL-EDWARDS (Hove) took part.

SECTION OF ANAESTHETICS

Tuesday, July 10

Management of Respiratory Paralysis

With the president, Dr. H. E. K. ECCLES (Brighton), in the chair, Professor E. A. PASK (Durham) presented the opening paper on the management of respiratory paralysis. He outlined the many conditions in which respiratory paralysis occurred as a symptom of disease and those conditions in which it was induced, as in anaesthesia or during the treatment of tetanus. Though paralysis of respiration was often the most dramatic feature of the disease, he emphasized that the needs of other bodily systems should also be considered in treatment. The method of performing artificial respiration should be chosen to fit the particular circumstances. It

should be efficient but should not interfere either with physiological function or with the general treatment of the patient. Although various methods would always exist, immediate use of any available method was vital in emergencies. When paralysis was maintained for a longer period the efficiency of lung ventilation was important.

The use of intermittent positive pressure through a tracheostomy was becoming increasingly common, for this method also facilitated the separation of the new airway from the pharynx.

Professor Pask then gave some criteria for assessing the effectiveness of methods of artificial respiration and illustrated a device for sampling end-expiratory air developed at Newcastle. Finally he emphasized that when a patient with a tracheostomy was paralysed for any length of time communication with him was assisted if a controlled leak permitted whispering.

Dr. R. BRYCE-SMITH (Oxford) considered the respiratory problems of comatose patients, especially those with head injuries. Anaesthetists could give help in such circumstances, for anaesthesia gave practical experience in the problems involved. Patients with head injuries could easily die from complications such as the inhalation of regurgitated gastric contents. First-aid workers should be encouraged to transport all such patients in the semi-prone position, which would prevent this complication and at the same time help to maintain a patent airway. When the airway could not be maintained unaided, an endotracheal tube might be used, but only temporarily. If unconsciousness was thought likely to persist longer than 48 hours a tracheotomy should always be performed.

Dr. A. CRAMPTON SMITH (Oxford) spoke on the respiratory problems of poliomyelitis, emphasizing the importance of treating these cases in a unit with experience in handling the special problems which arose. The method of treating these cases depended on the type of paralysis present, and here some classification was of assistance. The patients could be grouped according to symptoms into three main categories—those with dysphagia, those with respiratory paralysis, and those with dysphagia and paralysis. The treatment of patients in the dysphagic group was in the first place posture. For patients in the other groups treatment was by tracheostomy and artificial respiration by intermittent positive pressure. It was important to realize how the patient's symptoms could quickly change and thus necessitate changes in treatment.

Dr. H. B. WILSON (Aberdeen) then spoke on the treatment of tetanus. Cases with a short incubation period admitted with classical signs of the disease would probably require the use of muscle relaxants. It was vital to have control of the airway by a high temporary tracheostomy through which artificial respiration could be carried out. The general anaesthetic for this also allowed the initial wound to be excised. The cuffed endotracheal tube prevented contamination of the lung by pharyngeal secretions and permitted aspiration of the trachea. Dr. Wilson discussed some aspects of the various machines used for performing artificial respiration and their effectiveness in patients being treated for tetanus. He believed that d-tubocurarine was the most suitable agent to produce muscle relaxation; the results of treating cases in this way were so hopeful that it should be considered the method of choice.

Those taking part in the subsequent discussion included Dr. H. B. C. SANDIFORD (Portsmouth), Dr. J. F. GALPINE (Coventry), Dr. H. H. PINKERTON (Glasgow), and Dr. R. P. HARBORD (Leeds).

Anaesthesia for Aortic Graft

The second half of the meeting was devoted to four occasional papers, and Dr. J. H. CRAWFORD (Brighton), a vice-president, took the chair.

Dr. H. L. THORNTON (London) gave details of the very careful pre-operative investigations and treatment carried out on patients requiring an aortic graft. The site of operation determined the method of anaesthesia. If the site was above

the origin of the renal artery, he used his standard anaesthetic technique and hypothermia was induced in addition. Dr. Thornton then described the method used at St. Mary's Hospital, giving details of the drugs used, the measurement and control of cooling, and the value of blood-pressure control and E.C.G. observations. During the post-operative period special attention was devoted to producing a slow rise in temperature and to maintaining the blood pressure and electrolyte balance. With this careful technique he found that the operative risk in these cases could be reduced to that of other thoraco-abdominal operations.

Anaesthesia for Fenestration

Dr. R. A. BINNING (Brighton) described the method of anaesthesia for the fenestration operation which he had found to be the most successful and which he had put into current practice at the Royal Sussex County Hospital. He gave chlorpromazine and promethazine hydrochloride together with "omnupon" and scopolamine as premedication, and thiopentone, nitrous oxide, and oxygen as the basic anaesthetic, using a large-bore cuffed tube. Effective topical anaesthesia was essential, and 4% lignocaine was used for this. Local infiltration, irrigation with adrenaline in saline, and a steep anti-Trendelenburg position minimized bleeding.

Recovery Rooms

Dr. RUSSELL M. DAVIES (East Grinstead) outlined the development of post-operative recovery rooms at East Grinstead, giving details of early American and Canadian experience in this field. The statistics available of operative mortality throughout the country confirmed the belief that the widespread practice of special post-operative care in recovery rooms would be of the greatest value. Dr. Davies concluded by stating that, although recovery rooms might now be thought a luxury, they would be considered essential at all hospitals in a few years—a belief supported by all the members of the Section.

Neurological Complications of Anaesthesia

Mr. G. BONNEY (London) described the neurological complications of anaesthesia as seen by an orthopaedic surgeon, and discussed the pathology of nerve injuries, differentiating between the degenerative and non-degenerative lesions of peripheral nerves and their mode of recovery. He then described the causation of nerve injuries occurring in patients under anaesthesia. Post-operative examination and diagnosis gave some fair idea of prognosis. If degenerative changes occurred the only method of treatment was operative. The probability of success depended largely on the site and nature of the injury.

SECTION OF CHILD HEALTH

Wednesday, July 11

Accidents in Children

The president, Dr. WILFRID SHELDON (London), introduced the members of the panel for the round-table conference as Dr. C. A. BOUCHER (Ministry of Health), Mr. PATRICK CLARKSON (London), Dr. RONALD MAC KEITH (London), and Dr. KEITH SIMPSON (London). The questions had been grouped to represent different aspects of the problems of accidents.

Question 1: It has been said that in Canada and America accidents in pre-school children (1-5 years) were responsible for more than twice the number of deaths caused by the common infectious diseases of early childhood. Were there any comparable figures for England and Wales? In reply, Dr. BOUCHER said the number of deaths from accidents was more than three times the number of deaths from the common infections mentioned. They were the third most important cause of death in that age group, and at school age the second most important cause. Dr. SIMPSON

said that to compare the accidents which caused death with the infectious fevers which formerly caused death did not give a true picture of the present position.

Question 2: What was the importance of accidents relative to the other causes of death? Dr. SIMPSON replied that in England and Wales there were 20,000 deaths a year of children at all ages under 5 years. Only 1,000 were caused by accidents. The real killers were congenital malformations, birth injuries, and pneumonia. Most deaths occurred in the first year. But deaths from accidents must not be set against deaths from uncommon diseases. Street accidents accounted for half the deaths from accidents under 5, and the other 500 were caused largely by choking (270), suffocation (185), almost all of which were in the first year, drowning (88), and then a miscellaneous group of poisonous fluids, burns, poisons, etc.

Question 3: What were the particular types of accidents from which infants and toddlers suffered? At the President's invitation Dr. BOUCHER replied. He said that this question linked with the previous one. For infants choking, scalds, and burns were important, for toddlers scalds, burns, and poisoning. In particular he would wish to mention drowning in shallow water. At school ages scalds diminished and burns increased, especially to girls, owing to the burning of clothes. Road accidents increased, and the worst age for accidents with bicycles was the ninth year. The PRESIDENT then asked if drowning in shallow water was associated with epilepsy, but Dr. BOUCHER thought not. Dr. SIMPSON at this point explained that drowning was common at school age, and he was surprised that all schoolchildren did not learn to swim, and that girls did not wear pyjamas rather than nightdresses. Dr. BOUCHER said that one large multiple store had now stopped selling girls' nightdresses, and he regarded this as an enlightened action.

Question 4: Were the facilities for treatment at hospitals adequate? Mr. CLARKSON took this question, and replied that there were some 11½ million attendances at casualty departments in England and Wales each year. In general he considered the provision in casualty departments to be the biggest single deficiency in the hospital services. They were deficient both in staff and in facilities, especially in theatre accommodation, and this deficiency often resulted in unnecessary disability and distress to patients.

Question 5: Were fireworks a cause of serious accidents and were there any limitations on their sale or power? Dr. BOUCHER said he was not well informed about the limitation of sale, but, of course, they could not be sold to unaccompanied children. The major effects were seen in hospital wards in late November. Mr. CLARKSON described the two major forms of accident—explosion of fireworks which the child was carrying in his pockets, and the explosion of a firework held in the hand. In the PRESIDENT's view education of parents in firework techniques was as necessary as the education of children.

Question 6: What part could the mother play in the care of the burnt child, and should children with serious burns go to special hospitals? Every member of the panel agreed that the mother had a major part to play and should come into hospital as much as possible; it did both mother and child great good. Mr. CLARKSON deprecated new wards being planned which did not provide accommodation for mothers. In general, children with serious burns should enter a special unit and go there as quickly as possible.

Question 7: Should clothing be treated to make it non-inflammable? Dr. MAC KEITH gave a practical demonstration of a treated non-inflammable material. He admitted it was not yet widely available and would cost more than the non-treated fabric. Dr. SIMPSON then asked the cost of treating a child with burns and was told that a first admission might cost £150, and several admissions were necessary for every child with severe burns. Mr. CLARKSON thought that when such materials became available some indication of their inflammability should be shown when sold. The question of cost was left to the next question.

Question 8: What was the cost of a road accident? Dr. BOUCHER stated that the average cost was £800, but a fatal

accident cost £3,000. The 200,000 accidents each year cost the community £172m.—more than £3 per head of population.

Question 9: What means could be taken to reduce road accidents in children under 5 and at school age? Dr. MAC KEITH thought the under-fives needed protection and the over-fives education, and in that respect the services of the police were most valuable. He was supported in this by Dr. BOUCHER, who added that the most powerful influence on the children came from the example of the parents, who should also make sure that bicycles and other vehicles were kept in good working order.

Question 10: Was mechanical suffocation common, and was the American practice of "prone" nursing to be advocated? Dr. SIMPSON repeated that almost all deaths from suffocation occurred in the first year of life, and most in the first 6 months; most of these children were found lying on the face. He had no doubt it was more dangerous to allow the infant to sleep on his face than on his back or side. He emphasized that pillows should be porous, but added that many infants found dead had actually died from natural causes, usually infectious. When he met such cases he always examined the child most carefully for marks of pressure indicating that the child might have been held down into the pillow.

Question 11: Had the panel any experience in barbiturate poisoning of the use of specific antidotes? The panel all had such experience and agreed that sometimes the use of bemegride ("megimide") was quite immediate and almost magical.

Question 12: Were the drug firms aware of the dangers of attractive pills which resembled sweets? All the panel felt very strongly on this point. Dr. SIMPSON produced and distributed samples of sweets indistinguishable from pills and pills from sweets. He thought it little short of scandalous that such a state was possible. Manufacturers should put up pills in paper "cellophane" packing or in "kiddiproof" tins. To this Dr. BOUCHER added that nowadays when every home was like a chemist's shop the medicines should be kept locked away and inaccessible to children.

Question 13: Had there been any suggestion that doctors, nurses, and health visitors could help to reduce the toll from accidents? Here again in this final question unity was evident. The panel were sure that everyone visiting the home had a most important part to play. Parents would listen to those in authority, and by slow, patient teaching standards of care would improve. Dr. MAC KEITH thought there was also a place for group teaching in, for example, antenatal clinics and youth clubs.

At the end of this final question the PRESIDENT said that all doctors had an important part to play in this respect, and thanked the panel for a most stimulating and informative session.

Abnormalities Which Cure Themselves

With one of the vice-presidents, Dr. CHARLES F. HARRIS (London), in the chair, the first paper was read by Mr. DILLWYN EVANS (Cardiff), who spoke from the orthopaedic point of view and restricted his remarks to abnormalities of shape, structure, and function. He grouped the deformities under three headings. In the first group he placed deformities which cured themselves once the deforming force had ceased to act—for example, postural deformities resulting from simple malposition *in utero*, some cases of wry-neck, club-foot, or idiopathic scoliosis. Some fractures tended to spontaneous correction of mal-union, but the result depended upon the age of the child, the site of the fracture, and the type of deformity. In the second group he would place deformities which were variations of the normal and now known to be phases in the development of physical types; in the feet pes planus or calcaneus, at the knees genu valgum, were examples. In group three he placed disturbances of function resulting from structural faults which might cure themselves, such as trigger-thumb, clicking knee, popliteal bursitis.

Dr. DERMOT MACCARTHY (Aylesbury) then continued with a paper on non-orthopaedic deformities, describing abnormalities mainly in the newborn and in children up to 3 years of age. Sometimes the natural cure was incomplete and sometimes it could be accelerated by treatment. He then described the various positions of the testes which might simulate true non-descent, and emphasized that the foreskin often adhered to the glans until 3 or 4 years of age. He said 93% of all umbilical hernias would disappear by the end of the first year; afterwards the rate was slow, but the ultimately cure was complete. He then showed slides of the various types of vascular naevi in stages of spontaneous healing, and finished with an account, illustrated by research into the secrets of the latter, of the natural history of the asymmetrical head so commonly seen in infancy. The child refused to lie on the other side. The deformity diminished after the child sat up, but sometimes some degree of asymmetry persisted throughout life.

SECTION OF GENERAL PRACTICE

Tuesday, July 10

Infectious Diseases in General Practice

Under the chairmanship of the president of the Section, Dr. T. A. MORRISON (Brighton), Dr. G. I. WATSON (Peaslake, Surrey) opened the discussion, speaking as a family doctor. In his own practice infectious diseases accounted for 50% of all new visits. After discussing the history of some common infections he continued by pointing out that even at the present time, in spite of all the recent advances in bacteriology and virology, and even with the introduction of antibiotics, a careful clinical examination was of prime importance. Many clinical questions required answers which could easily be given only in general practice. Thus, what was the significance of painless palpable enlargement of the cervical glands? How long before the rash appeared were cases of measles and chicken-pox infectious? What was the incubation period of glandular fever? Was it short—5–12 days—as was usually stated? It was high time that we clarified the whole matter of quarantine. Surely its value was grossly exaggerated. There was much in favour of encouraging German measles in the young. A further aspect that required study was the characteristic seasonal prevalence of diseases.

Dr. Watson described the clinical features of some recent epidemics in his own practice caused by A.P.C. and Cox-sackie viruses, and also mentioned the investigation into the epidemiology of epidemic winter vomiting by the College of General Practitioners. Discussing treatment, he advocated liberal use of oral penicillin and sulphonamides in bacterial infections. He wondered whether there was any danger in using aspirin in fevers, because of its cortisone-like effect. A report was given of the recent investigation carried out by the College of General Practitioners on the value of sulphonamides and antibiotics in the prevention of complications in measles. The results showed that there were no benefits in using these drugs in healthy children; indeed, they might do harm. In unhealthy, catarrhal children they might be useful, but even there it was better to wait for clear indications of the need for such treatment rather than to embark on an expensive and possibly harmful routine.

Dr. LISELOTTE LENNHOF (Brighton) spoke as a hospital clinician. Over the 13 years that she had been at her hospital there had been a change in the incidence of diseases. There had during this time been only one case of diphtheria admitted into the old diphtheria ward. Patients were admitted to hospital because of the severity or high degree of infectivity of the illness. Over the past five-year period the most common diseases admitted to her hospital were intestinal infections, poliomyelitis (proved and suspected), and measles. The greatest clinical problems were experienced with the diagnosis and management of the poliomyelitis group.

Enteric Infections

Dr. J. E. JAMESON (Brighton) spoke as one in charge of a local public health laboratory. Bacteriologists were of help to practitioners in detecting carriers and sources of infections, but even if these were found the mere isolation of organisms was not a proof of their virulence. Haemolytic streptococci were versatile organisms which produced infections of the throat and skin, puerperal infections, and septicaemias. The value of typing different strains was noted, and in impetigo and acute nephritis certain strains were almost specially responsible. In the control of epidemics removal of the carrier from the community was important; this could be done by physical removal of the patient or by producing temporary control of the organisms with parenteral penicillin.

Turning to bacterial infections of the bowels, Dr. Jameson discussed typhoid, paratyphoid, and salmonella infections. Typhoid and paratyphoid infections had similar epidemiological features. Water was a direct source of infection, and indirect sources were shellfish and water-cress. In paratyphoid infections cream cakes were a common source of infection. For infection to occur there had to be a group of circumstances present: the food must be infected, usually by a carrier, it must act as a suitable culture medium with sufficient moisture and at the correct temperature, and it must be eaten when the organisms were still virulent. Investigations to discover the source of infection were often disappointing. Salmonella infections had their reservoirs in animals, and food might be contaminated by dogs, cats, mice, rats, and tortoises, and organisms were often found in duck eggs. Since duck and hen eggs were often pooled as dried bulk or as fluid eggs this was a possible source of infection. The carrier state persisted a long time in typhoid and paratyphoid infections, a moderate time in salmonella infections, and a short time in *Sonne dysenteriae*.

Dr. H. PAUL (Smethwick), a retired medical officer of health, commented on the changing patterns of the common infectious diseases. Tuberculosis deaths had declined, but they were still very considerable—7,000 in 1954. Notifications were not reduced very much, however. It was still the most dangerous infectious disease in our community. New drugs were keeping the "chronics" alive and were increasing the risks of spread. Prevention must above all be based on social measures. Diphtheria had been virtually eradicated but could easily recur if the present apathy in our immunization programme continued. We must develop realistic policies and schemes of immunization for our children. Measles was universal but had greatly diminished in virulence. There was little value in preventing it, except in young and weakly children, since, if we produced too low a level of incidence, in a couple of generations a more serious and more virulent form of disease would emerge.

Among those who took part in the ensuing discussion were Dr. H. W. SALTER (Cleveland, Ohio, U.S.A.), Dr. RALPH GREEN (Hurstpierpoint), Dr. F. M. ROSE (Preston), Dr. R. M. S. MCCONAGHEY (Dartmouth), and Dr. W. J. H. SAYERS (Brighton).

Wednesday, July 11

Neurological Diagnosis in General Practice

Under the chairmanship of the president, Dr. T. A. MORRISON (Brighton), four short papers were read by general practitioners.

Dr. S. L. KAYE (Brighton) spoke on various aspects of neurological diagnosis in general practice. Characteristic patterns of symptoms were of more importance than the elicitation of physical signs, which often were not present till late stages of disease. Ancillary neurological investigations were now rarely carried out in general practice, but they must be interpreted and their significance appreciated. Headaches, personality changes, and fits required elucidation in accurate diagnosis. Physical signs were much more crude than symptoms, and the two must always be carefully

advocated crushing of the obturator nerve for spastic contracture of the adductor muscles of the hip-joint, and said that the paralysis would last about six months. The correction of deformity by arthrodesis might improve muscle function. He suggested that slight dorsiflexion and ulnar deviation was the optimum position for arthrodesis of the wrist-joint. This operation might be followed by a tendon transference. Before lengthening a tendon a careful assessment of the amount of correction should be made. This should be done before the patient was under the anaesthetic, and it was better to shorten too little rather than too much.

The Painful Shoulder

Mr. F. A. SIMMONDS (London) opened a discussion on the painful shoulder, but confined his remarks to the syndrome of frozen shoulder. He described the clinical cycle, emphasizing its length, and the points important in differential diagnosis. He had followed up 63 frozen shoulders, none for less than two years. Thirty were normal and fourteen almost normal; fifteen caused slight and four severe disability. He had found that the results were unaffected by age or sex, and that they were not so good after trauma or deep x-ray therapy. He thought it too early to give an opinion on the value of hydrocortisone in treatment.

In this series of cases he had found that any painful area in the arm or neck might have initiated the syndrome, but only in the right age group. There had been an association with pulmonary and cardiovascular disease. While the lesion had been bilateral in 8% of patients, the same shoulder had never been affected twice. It had never been associated with a complete tear of the supraspinatus tendon. Explorations of the frozen shoulder had shown the whole rotator cuff to be involved in a vascular inflammatory reaction and the biceps tendon to be adherent to the groove in the humerus. The pathological lesion had appeared to be a degeneration accompanied by a painful repair reaction. The primary painful area was probably in the supraspinatus tendon. In his opinion active treatment was related to the clinical cycle. It aggravated the condition in the early stages and appeared to give benefit in the later stages. He had found physiotherapy and manipulations to be useless. While deep x-ray therapy had relieved pain in 50% of patients, the end-results had not been good. His best results had been obtained by repeated explanation to the patient of the cycle of events, by encouraging movement in the pain-free range, and encouraging full use of the arm in the late phase of recovery.

Mr. G. BLUNDELL JONES (Exeter) said that he was in agreement with the previous speaker. He had studied a series of 366 cases of which 242 were frozen shoulders. He described the painful arc syndrome, which he attributed to a local inflammatory change. There had been 91 cases; 30 had recovered completely, 28 had a minor ache in the shoulder, and 8 had persistent pain. The average period of recovery had been about 7 months. He had tried a variety of treatments, but had a slight bias in favour of the use of hydrocortisone. He advised acromiectomy for resistant cases in the absence of stiffness or a rent in the supraspinatus tendon. He thought that when the tendon was ruptured the acromion process, by impinging on the head of the humerus, helped the deltoid muscle to abduct the arm. He described bicipital tendinitis, which he did not consider to be a precursor of frozen shoulder. The results of conservative treatment had been satisfactory in 22 cases. He differentiated three types of calcification of the supraspinatus: (a) an acute type which caused great pain but underwent spontaneous resolution and recovered in a period which varied from two weeks to three months; (b) a chronic type which responded to injection, aspiration, or excision, but occasionally merged into a painful arc syndrome; (c) a symptomless form. He spoke of the methods of diagnosis of tears of the supraspinatus tendon and advocated suture of large rents.

In a general discussion there was a sharp difference of opinion on the value of manipulation. A majority of

speakers considered it to be a valuable method of treatment for certain types of shoulder, but emphasized the need to choose the right time.

Structural Effects of Stress

Mr. J. C. SCOTT (Oxford) spoke of the structural effects of stress. He recalled the definition of physical stress as the interaction of a force and the resistance applied to it. This might serve as a definition of stress as applied to humans and animals, but the forces, resistances, and methods of interaction also had to be defined. While the word had been applied to humans for many years, Hans Selye was responsible for much of the attention paid in the last twenty years. He had pointed out, while defining stress, that there was a superficial reaction of the body which was common to a variety of widely different factors, such as injury, infection, or strain. The common factor was non-specific stress. Selye had divided the reaction into three stages—the alarm reaction, the stage of resistance, and the stage of exhaustion. The syndrome was not initiated in the absence of the pituitary or its A.C.T.H. and was not carried out in the absence of the adrenal.

There might be a clear-cut process as in a single injury, or there might be a complicated situation where there had been many minor stimuli, both mental and physical. In the present stage of our knowledge none of the three elements (force, resistance, reaction) could be assessed. It was important, however, to accept these three factors and the departure from the simple cause-and-effect concept of disease.

The increasing frequency of the disk problem and the increasing emphasis on the psychological aspects of it could not be explained on the basis of injury or other simple physical grounds. It was well known that there was a physiological variation in the disk size. It was suggested that a disturbance of fluid balance within the annulus led to an increase in pressure beyond the normal level, at times causing acute back pain and, if repeated, rupture of the disk. An attempt had been made to determine experimentally if stress produced alteration in the size of the disk nucleus in mice. Eventually 131 disks in experimental and control animals had been submitted for statistical analysis. The principal finding had been an increase in the size of the nucleus directly proportional to the amount of stress as determined by measurements of the adrenal and thymus. Later a pilot experiment had been undertaken to try to see if there were any morphological change. Various stains were used to demonstrate the morphology and the quantity of sulphated and non-sulphated mucopolysaccharide. Dr. A. H. T. Robb-Smith (Oxford) had reported definite morphological differences. Further experiments were in progress.

Shoes for the Young

Mr. W. H. GERVIS (Tunbridge Wells) opened a discussion on foot form, function, and footwear in the young, saying that in his opinion the arch of the foot in the condition known as flat foot did not collapse but merely rocked over to the medial side. He attributed the rocking over to a medial rotation of the talus, which might result from medial torsion of the tibia or from a postural internal-rotation defect of the leg. He said that elevation of the first metatarsal was secondary to the rocking over of the foot. He illustrated a special stool which he used to examine the footprints of children. This stool had a glass top; there was an oblique mirror below through which the foot was observed. He did not believe that the muscles of the forefoot were weak in postural exercises directed towards a correction of the rotational defect. He advised that children's shoes should be as light as possible without any form of arch support.

Mr. W. SAYLE-CREER (Manchester) said that it would be difficult to describe a normal foot in words even if it were known what it should be. He believed that a prolonged survey of

a large number of children was needed to determine what was a normal shape and the real significance of variations. The important part of the forefoot was the inner metatarsals, which, if weak, allowed the foot to fall over into pronation. He compared the action of the weak inner metatarsals to that of a wobbly leg on a three-legged stool. He described the three types of incompetent first metatarsal—the atavistic, the hypermobile, and the permanently elevated. The hypermobile first metatarsal was the precursor of hallux valgus, mobile first metatarsal was the precursor of hallux rigidus. He said that badly proportioned shoes were common in schoolchildren, where the incidence of hallux valgus increased with age. Female shoes were worse than male, and this was consistent with the much greater and increasing incidence of hallux valgus in girls.

Mr. T. T. STAMM (London) spoke of the mild congenital calcaneo-varus deformity, which might be more common than had been recognized, and a cause of elevation of the first metatarsal. The PRESIDENT said that he remained convinced of the value of a simple wedge on the inner side of the heel for a flat foot.

Management of Common Knee Injuries

Mr. A. T. FRIPP (London) said that in the treatment of injuries of the knee the aims were to obtain full movement, stability, a sense of security, and freedom from pain. Since a derangement of the knee might result from damage to any of its constituents it was essential to make an accurate diagnosis. A sprain of the knee, a partial tear of the collateral ligament, or damage to the synovial membrane was followed by effusion, pain, and loss of movement. This loss of movement came on gradually and was not locking. Treatment was by aspiration, support, and exercises. He emphasized the importance of using a back splint which fitted the leg closely and was of sufficient length.

He described lesions of the articular cartilage: (1) Osteochondritis dissecans, which occurred mainly in children and could be diagnosed only by radiography. It was often necessary to explore the knee-joint and to remove the fragment of bone and cartilage. (2) Chondromalacia patellae, which usually started in adolescence and was more common than had been appreciated. The diagnosis was not always straightforward, because the condition caused indefinite symptoms of derangement. Surgical treatment was by trimming the articular cartilage or removing the patella.

Complete tears of the internal collateral ligament were to be treated by repair, early cases by suture, late cases by grafting. Torn cruciate ligaments were often masked by grafting. Torn cruciate ligaments were often masked by haemarthrosis and muscle spasm. While the treatment of a torn cruciate ligament was conservative, its presence was a contraindication to the surgical treatment of a torn cartilage or ruptured collateral ligament. Most fractures of the tibia or tibia spines were to be treated conservatively, but occasionally the fragment had to be removed. He emphasized the importance of developing the extensor mechanism of the knee after all injuries, and said that even to-day it might be overlooked. He discussed the diagnosis of torn meniscus and stressed a number of points. The diagnosis was not to be made after the first injury, and the response to conservative treatment should be watched. The finding of a cartilage click was not a reliable test. The history was of more importance than the clinical examination, but the symptom of locking had to be differentiated with care from transient stiffening. The adolescent girl who had a derangement of the knee rarely had a torn cartilage. Both cartilages might be torn in the same knee-joint. The presence of a torn cruciate ligament or arthritis in the knee was not a contraindication to the removal of a torn cartilage.

Mr. K. H. PRIDIE (Bristol) described chondromalacia patellae complicating dislocation of the patella in an adolescent girl. He advocated the repair by grafting of large defects in the weight-bearing surfaces of the joint resulting from osteochondritis.

SECTION OF OTO-RHINO-LARYNGOLOGY

Tuesday, July 10

Nasal Obstruction

With the president, Mr. T. S. ALLEN, in the chair Mr. T. O. GRAHAM (Dublin) read a paper on nasal obstruction written by Mr. T. G. WILSON (Dublin), who was unable to be present owing to illness. He stated that nasal obstruction in the adult did not constitute a threat to health, but in the newborn child complete obstruction was a serious threat and might cause death from asphyxia. Nasal obstruction might be due to congenital atresia or other uncommon causes, but, although the condition was rare, it probably occurred more frequently without being recognized. In the child nasal sinusitis seemed to be accompanied less often than formerly by violently acute symptoms. This was probably mainly due to a cyclical diminution in the virulence of the pyogenic organisms rather than to the undoubted efficiency of antibiotic treatment.

In a follow-up of about 50 children operated on for enlarged tonsils and adenoids, the majority were found to be still mouth-breathers seven years later, although the peridental health of the children was strikingly better than that of the controls. From this it was argued that heredity was an important factor in causing nasal insufficiency.

In adults with chronic nasal sinusitis the tissue changes were more often irreversible than in children. The majority of proprietary drops and sprays probably did more harm than good, particularly if persisted in too long. Of the surgical means of treatment of nasal obstruction, submucous resection of the septum and of the inferior turbinate were advocated, although there was an increasing tendency to conservatism in the case of the former operation.

Mouth Breathing in Children

Mr. F. C. W. CAPPS (London) considered that pure mouth breathing, after adeno-tonsillectomy in children was probably very rare, but dual breathing, part nasal, part oral, was common, largely due to loss of facial tone with or without orthodontic deformity. It was therefore necessary after operation to rehabilitate the persistent "gaper" by appropriate exercises and orthodontic attention. Nevertheless there was often an inborn tendency to mouth breathing which was only overcome when the child grew up and realized the social implications of the habit. The speaker repeated the danger of over-medication with nasal drops and sprays, and warned patients and doctors against their use except with proper indications. Furthermore, their use was valueless unless properly administered in the head-down or Proetz position.

Trauma in children and adults was a common cause of nasal obstruction from fracture-dislocation of the bridge of the nose and springing of the nasal septum. Unless there was soft-tissue injury he advocated immediate manipulation with the thumbs in suitable cases. If instrumental manipulation was required this could be carried out with success up to two weeks after the injury under general anaesthesia, but the importance of deep general anaesthesia to avoid shock was stressed. Mr. Capps recollected seeing a death on the table when the manipulation was carried out under very light anaesthesia.

Obstruction due to malignant disease was a rare possibility. Early symptoms were often absent, and the disease was often quite advanced before obstruction, pain, bleeding, or offensive discharge became evident. Atrophic rhinitis, now or offensive disease in this country, might give rise to nasal obstruction from the formation of offensive crusts. In the absence of a curative medical treatment the speaker advocated the insertion of polythene plastic inserts under the floor of the nasal fossae to reduce the lumen. Although the plastic insert was occasionally extruded the results in many cases were excellent in preventing crust formation.

A. panel, presided over by Professor T. POMFRET KILNER (Oxford) and consisting of Sir ARCHIBALD MCINDOE (London), Sir WILLIAM KELSEY FRY (London), Mr. MICHAEL W. C. OLDFIELD (Leeds), Mr. RAINSFORD MOWLEM (London), and Mr. P. H. JAYES (London), answered many questions. When asked whether he thought that the modern usage of x rays was not better than the old, Sir ARCHIBALD MCINDOE reaffirmed his dislike of x-ray therapy and thought that the effects of smaller modern dosage could only be known in 20 years' time. Asked the indications for injection of sclerosant into cavernous haemangiomas, the panel agreed in disliking boiling water injections because of technical difficulty in injection. Mr. OLDFIELD would use other sclerosants, but others believed in leaving them all alone because a better scar resulted. The panel disagreed on immediate or late plastic repair after hemimandibulectomy for oral cancer. General considerations of age were

important, and if the growth was histologically less malignant early repair might be done, but the danger of recurrence was high, and therefore repair should be delayed. The plastic surgeons believed early repair of cleft palate necessary so that good speech could be achieved. Sir WILLIAM KELSEY FRY believed that repair should be performed at 3 years after the orthodontist had applied a splint to the teeth, thus preventing the surgeon from contracting the dental arch. Panel members doubted the possibility of treatment of wide areas of skin tattooing after gunpowder explosions, except by the use of cosmetics. It was difficult to get patients to use it, and isolation in hospital for a period of experiment and persuasion might be necessary. Mr. OLDFIELD said he would treat hypertrophic keloid scars by x rays. Sir ARCHIBALD MCINDOE said he would not, and would either do nothing, since they improved with time, or would try to rearrange the scar to lie along Lange's lines. Mr. JAYES suggested that, if the hypertrophy had followed infection, excision might produce an improved scar. Mr. MOWLEM said he had injected keloid scars weekly with hyaluronidase and cortisone for six months without lasting benefit. The panel did not know why erotic sensation in the nipple was sometimes impaired after plastic operations on the breast. All members agreed that to decide whether a "cosmetic" operation should be performed by the National Health Service it was necessary to see the individual patients. They found difficulty in defining the term "cosmetic." The final question concerned the state of research into skin homografting. Mr. MOWLEM said that the problems of homografting were similar, whatever the organ concerned. So far as he knew no advances had been made recently. Mr. OLDFIELD thought that a lead to research was that homografting on to people with agammaglobulinaemia was possible.

THE SCIENTIFIC EXHIBITION

Those who attend Annual Meetings have come to appreciate that a tour of the Scientific Exhibition is a small, palatable course in postgraduate education. The exhibition, housed this year in the Corn Exchange, Brighton, attracted a steady stream of visitors whose interest amply repaid the hard work put in by the organizers of the individual stalls. The total space available for the exhibition was somewhat confined, so that the stalls were rather uncomfortably close together, but what the demonstrators lacked in "lebensraum" was more than compensated for by their enthusiasm.

Cancer

A relatively large amount of space was devoted to neoplasia, and cancer of the breast formed the subject of display at four stands. The Royal Marsden Hospital and the Institute of Cancer have elaborated their exhibit, an outstanding success at Glasgow in 1954 and at Toronto in 1955, on the natural history, early diagnosis, and radical and palliative treatment of mammary carcinoma. Particularly useful was the depiction of the use of hormones and pain-relieving drugs in late cases by the family doctor. The Royal Sussex County Hospital displayed the results of a policy of treating operable cases of breast cancer by radiotherapy alone, mastectomy being resorted to only when a mass was still present in the breast six weeks after completion of radiotherapy. The Royal Marsden Hospital and the University of Glasgow separately presented demonstrations of the techniques for and results of destroying the pituitary gland in the treatment of advanced breast cancer. The Royal Marsden Hospital also offered information about the new telecaesium unit for radiotherapy and the special gun used for the implantation of radioactive gold grains to irradiate localized lesions. Finally, in the sphere of oncology the Royal Marsden, St. Peter's, St. Paul's, and St. Philip's Hospitals illustrated the aetiology, symptoms, types, and treatment of bladder tumours. Graphs showed that 65% of patients reported to their doctor within a month of their first attack



(G.B.S. Photopress, Brighton)

Facts about tumours of the bladder.

of haematuria, and the great majority of general practitioners referred the patient to hospital within a month of the first consultation. It was in hospital that the greatest delays occurred before the treatment of bladder tumours was begun. This was mainly due to incorrect diagnosis, inadequate investigation, and administrative delays. More rapid diagnosis would lead to improved results in the treatment of bladder tumours.

Diagnosis

Diagnostic techniques were displayed by several hospitals. The Royal Free Hospital and the Medical Research Council's V.D. Reference Laboratory marked the 50th anniversary of the discovery of the Wassermann reaction by exhibiting recent experimental tests for syphilis which use the *Treponema pallidum* itself as antigen. Leeds University and Leeds General Infirmary demonstrated laboratory aids in the diagnosis of mycotic infections, both superficial and systemic, occurring in Britain. The Glasgow Royal Infirmary portrayed the scope of arteriography in general and its value in urology in particular, while the United Cardiff Hospitals exhibited the use of radiology in the systematic investigation of the biliary tract.

Surgery

A special welcome among the surgical stands was extended to the sole exhibit from Canada. This display of the methods, complications, and results of radical herniorrhaphy was from the Shouldice Clinic, Toronto. The effects of prostatic obstruction were graphically set forth by St. Peter's, St. Paul's, and St. Philip's Hospitals and the Institute of Urology. The exhibit of ulcerative colitis from the Gordon Hospital for Gastro-Intestinal Disease was centred round surgical treatment, but the natural history, diagnosis, and medical treatment were also illustrated. From the Churchill Hospital, Oxford, came a fine pictorial representation of congenital deformities in infants and children, and their correction. Four telling exhibits came from the Manchester Royal Infirmary, depicting the management of patients with haemorrhage from oesophageal varices (well illustrated by a film of a patient with "flapping tremor"), supracondylar fractures in children, ocular injuries, and occlusive arterial disease.

Of ophthalmological interest were the displays from the Sussex Eye Hospital of transparent acrylic implants and trephines and of contact lenses, and from the Royal Eye Unit, Lambeth Hospital, of the advantages of sedation with pethidine and chlorpromazine for ophthalmic surgery under local analgesia. Also from Lambeth (the Annie McCall Hospital) came an assessment of the value of this type of sedation in labour. Obstetrics was also concerned in a panel demonstration of the various tests carried out on antenatal



(G.B.S. Photopress, Brighton)

Aids for the disabled.

blood specimens (Southern Blood Transfusion Service); and a comprehensive and clear account of hyaline membrane in the neonatal lung (Queen Charlotte Hospital and the Institute of Obstetrics and Gynaecology).

Some aspects of rehabilitation were demonstrated at the stands set up by St. Dunstan's (showing how the blind may be helped), and by the Royal Sussex County Hospital and Cirencester, Pewsey, and Swindon Hospitals, which showed many ingenious mechanical and household aids for the disabled. In the orthopaedic field there was a display of medical apparatus from the Norfolk and Norwich Hospital for use in the traction-manipulation of disk lesions.

General Practice

Another welcome feature of this year's exhibition were three displays of work in general practice. One of these demonstrated limb-holding apparatus for plaster-of-Paris splinting: it may be used in the patient's home or at the surgery by the practitioner working alone. The South-east England Faculty of the College of General Practitioners put on a striking demonstration of epidemiological research in general practice, with particular reference to the investigation of the spread of winter vomiting disease in England during the autumn of 1954. Another exhibit demonstrated two common gluten-induced syndromes.

Medicine

Exhibits coming within the physician's province were those depicting the control of blood pressure (Charing Cross Hospital), the modern treatment of genito-urinary tuberculosis (Harefield Hospital and Institute of Urology), and spirochaetal dysentery (Eastbourne Hospital Group). St. Mary's Hospital used man's sensitivity to insects to illustrate different allergic responses, and the Canadian Red Cross Memorial Hospital, Taplow, demonstrated recent work on experimental allergic encephalomyelitis (induced by mixtures of tubercle bacillus residues and extracts of brain tissue) and its possible application to human neurological diseases.

Pathology was represented by the illustrations of the variations in the peripheral pattern in bronchography (Charing Cross and Brompton Hospitals), and by photomicrographs supporting the view that the plaques in coronary occlusion were not lipid infiltration but organized mural thrombi (Westminster Medical School).

Services and Public Health

The Royal Naval Physiological Laboratory gave an interesting survey of the development of methods of submarine escape. The Royal Air Force Medical Branch exhibited flying equipment of medical interest and apparatus used in otological work. There was also a demonstration of audio-

metric methods from the Sussex Throat and Ear Hospital. The Princess Beatrice and Birmingham Accident Hospitals combined to indicate in forthright fashion the strong case for the compulsory use of crash-helmets by motor-cyclists. It was fitting that in the centenary year of the Society of Medical Officers of Health the London School of Hygiene should put on an excellent and entertaining survey of the history of the medical officer of health during the last 100 years. Also of historical interest was the exhibition by St. Albans City Hospital of a skull about 1,600 years old found near that city. Finally, *Family Doctor* was responsible for a series of admirable tableaux demonstrating the golden rules of health.

Special Pharmaceutical Exhibitions

The Pharmaceutical Society of Great Britain had a most topical exhibition of the pharmacy of some hypotensive drugs, while the Association of the British Pharmaceutical Industry presented 20 large panels featuring a representative selection of significant recent advances in drug therapy.

Each year the Scientific Exhibition increases in size and range. Each year also sees improvements in techniques of display, for although the tendency to crowd too much into too little space still lingers it is much less in evidence this year than formerly. It might be helpful to the visitor if the stands dealing with related subjects could be grouped together. The organizers of the exhibition in Brighton can certainly be complimented on producing a display from which every visitor could learn something of value to him in his own sphere of medicine.

B.M.A. FILM SHOWS

An innovation at this year's Annual Meeting was the exhibition of films from the B.M.A. Film Library. Nine films were shown in all—"Tuberculin Techniques," "Senile Obliterative Arteritis of the Legs," "Sigmoid Rectum and Anal Canal Endoscopic Views," "Some Aspects of Accessible Cancers—Breast," "Prosthesis," "Microscopic Changes Observed in the Wings of a Bat," "My First Baby," "Gait," and "Breast Self-Examination." The Annual Meeting has such a full programme that the arrangement of suitable times for film shows presents considerable difficulties. Perhaps more viewers would be attracted if a short précis of each film was printed in the official programme together with a note stating the type of audience, medical or lay, at which it is directed. There might also be some common theme to the three or four films constituting each programme.

"My First Baby" explains to the expectant primigravida, in exemplary fashion, the details of antenatal care and of the course of labour. It is an excellent film for showing to antenatal patients, but only such as have been booked for hospital delivery. The general practitioner enters the picture only to pen a note for the patient to take to hospital, and the scope of domiciliary midwifery, if any, receives no mention. Many obstetricians will envy the facilities and the furnishings of the hospital at which this film was made. Nevertheless the film succeeds admirably in its specific purpose of educating and reassuring the primigravida.

"Gait," another film made in Britain, is concerned with the effect of certain skeletal and muscular lesions on gait, and is designed for a medical, presumably undergraduate, audience. The colour is restful and the commentary a model of unhurried lucidity.

"Breast Self-Examination," which was filmed in the U.S.A. for the American Cancer Society, explains why all women should palpate their breasts once a month and demonstrates the technique of breast self-examination. Those who believe that education of the lay public is a powerful weapon in the fight against cancer will find this film eminently suitable for exhibition to women's clubs and similar organizations.

Correspondence

Because of heavy pressure on our space, correspondents are asked to keep their letters short.

College of General Practitioners

SIR.—The College of General Practitioners is developing so rapidly that it now needs a building of its own. Generous financial support, not only for construction but also in part for maintenance, is making this possible.

Agreement in principle has been reached with the President and Council of the Royal College of Surgeons for the long-term lease of a site on the south side of Lincoln's Inn Fields. Sir Edward Maufe, R.A., has kindly agreed to act as consulting architect, and Messrs. Trehearne and Norman, Preston and Partners have been appointed architects. An approach is being made to the London County Council, prior to application for planning permission, and it is hoped to erect a fine building on this site by 1962.—I am, etc.,

W. N. PICKLES,
President.

London, E.C.4.

Vaccination Against Tuberculosis in Childhood

SIR.—Your leading article on vaccination against tuberculosis in childhood (*Journal*, June 30, p. 1534) is encouraging reading for those of us who have advocated that B.C.G. vaccination should be given much more widely than has been the practice hitherto in this country. The M.R.C. investigation¹ which showed that as many as 40% of adolescents may be tuberculin-positive must make us realize that there is considerably more infection in the population than is revealed by the state of the tuberculosis registers and the official notification rates. Surely if B.C.G. vaccination is offered to school leavers there are no grounds in refusing it to the school entrants at the age of 5 and also to neonates. Any step that can reduce not only the death rate but the attack rate at any age is important if we are to get rid of tuberculosis in this country in the next few decades. It has been possible to reduce diphtheria and smallpox to the level of rare diseases. This state of affairs was brought about by a suitable propaganda drive and the development of adequate immunization techniques, in one case, and vaccination in the other. I believe that a similar state could be brought about with regard to tuberculosis, certainly among young people, by a suitable propaganda drive and the use of B.C.G. vaccination. I do not believe parents are prejudiced against B.C.G. vaccination because of the slightly longer persistence of the lesion in neonates. It has been my experience that in many instances mothers bring their other children to the chest clinic after the elder child, a school leaver, has received B.C.G. vaccination; but if we interpret the instructions from the Ministry quite literally B.C.G. vaccination cannot be given to these children.

Although the figure, 650,000 annual births, may seem large when considering vaccination of neonates, it is really a challenge to the clinical and preventive side of the Health Service. Surely vaccination could be given to all babies born in hospital and to those born at home when they attend the baby and infant welfare clinics. The district nurse and the midwife would be valuable in spreading the propaganda. The school medical officers could visit crèches. General practitioners would be only too happy to co-operate in giving the vaccination, especially if the new British freeze-dried preparation is made available. Admittedly this effort will not embrace all the babies born, but in the course of time other infants would be brought to the chest clinics, and by the age of 5, when children go to school, I believe about only 20% at the maximum would be in need of vaccination.

If the children, once they had been vaccinated, had routine tuberculin tests, preferably annually but certainly at their school medical examinations, it would be possible

to find how many had reverted to the Mantoux-negative state, and it would also be possible to find children who had acquired exogenous infection.

The opponents in this country of B.C.G. vaccination have said that there has never been a suitably controlled trial. The M.R.C. work is the answer. Now let us act upon it and give B.C.G. vaccination to all suitable children under the age of 14 and also to any over this age who are discovered to be Mantoux-negative.—I am, etc.,

London, S.E.5.

KENNETH MARSH.

REFERENCE

¹ *British Medical Journal*, 1956, 1, 413.

SIR.—I was interested in your leading article on vaccination against tuberculosis (*Journal*, June 30, p. 1534). You mention: "One of the main disadvantages of mass vaccination in adolescence is the substantial proportion of children—as many as 40% in the Medical Research Council's investigation—who are found to be positive reactors to tuberculin and who form a large group in which tuberculosis cannot be prevented by prophylactic vaccination."

The figure of 40% concerns tuberculin tests carried out from 1950-2. It is probable that the present percentage of tuberculin-positives in this 14-year age group is considerably less. Figures for Cornwall, given in the table below, show a marked decrease in tuberculin sensitivity for the past four years.

Year	Area Concerned	Tuberculin Tested	Percentage Positive	B.C.G. Vaccinated
1953	West Cornwall	2,075	39%	1,243
1954	Cornwall	2,597	20%	2,005
1955	"	3,197	17%	2,518
1956	"	3,110	14.9%	2,526

Though much is to be said for B.C.G. vaccination of the tuberculin-negatives at the age of 5, I would hesitate to introduce anything which might prejudice the present scheme, for which there is an acceptance rate of a little over 90% and which ensures protection for the most important years.—I am, etc.,

Truro.

E. R. HARGREAVES.

SIR.—In your leading article (June 30, p. 1534) the writer makes a case for vaccinating tuberculin-negative school-children at school entry. In the same article he quotes the total of notifications of tuberculosis (all types) as follows: ages 0 to 4, 1,916; 5 to 14, 4,085; 15 to 24, 10,752. If B.C.G. is to offer a 50% protection rate for ten years, then it would seem that the obvious time to vaccinate is at 15. If the vaccine is to give protection for far longer, why begin at 5? Why not vaccinate at birth?

We can see that as far as our present knowledge goes there is a good case for confining vaccination to the contacts, special-risk groups, and school leavers, while using the tuberculin test on younger schoolchildren as an indication of infection rates and as a pointer to infectious cases. In fact, if vaccination at school leaving is to be the policy, we consider the tuberculin testing of younger schoolchildren and subsequent case finding obligatory. Alternatively, we can see that there is a case for vaccinating all children at birth in order to get maximum protection in the community.

Except the argument of administrative convenience, we can see no good case for vaccinating children on entry to school.

Since rates of infection vary from area to area, it is likely that there are some areas where the rates of infection are very low. How low must infection rates become before B.C.G. vaccination is considered unnecessary? We believe that where infection rates are less than 1% per annum it is better to use recurrent tuberculin testing than mass B.C.G. vaccination.—We are, etc.,

Ipswich.

CHARLES J. STEWART.
DAVID VAN ZWANENBERG.

Diarrhoea and Vomiting

SIR.—The epidemics of "D. and V.," such as we used to have towards the end of every summer when I first went to Guy's Hospital as a student in 1924, are now fairly rare; and when outbreaks or odd cases do arise, despite the vastly improved hygiene and relative opulence of to-day, the patients' chances of recovery are no longer hopeless, as they were nine times out of ten in those days—far from it, for there is often a choice of several treatments nowadays, all nearly equally effective.

That was a disease of older infants—6 to 18 months or so—a true "cholera infantum," though the cholera vibrio was thrown in its hand when its watery hiding-place was revealed in the "Broad Street pump" outbreak of 1854. To-day it is older children and adults who suffer most from intestinal infections and other disorders, among which ulceration ranks increasingly high. And though non-cancerous, the deaths are falling, with some disappointing exceptions, are functional disorders, many of them seriously disabling, are getting an upper hand. Nor are the infectious, or infective, catarrhs—those that attack the alimentary tract's mucous membranes—by any means overcome. We in Tonbridge, a country town of 20,000 inhabitants, with a famous boarding-plus-day public school for boys, have only lately been passing through a short but unpleasant example of (?) infective gastro-enteritis, and its cause remains unknown at the time of writing. Nevertheless, it illustrated well the snags of management—i.e., of keeping the symptoms under control till nature had worked a cure, with whichever chemical and physical aids the medical attendants favoured. For this was an ailment where recovery was as certain as anything can be in this uncertain world; and the doctors' main problem circled round that of, "Which drug firm shall we back? That famous and familiar one? Or one of the comparatively tiny but often deserving newer names, which sometimes make us think for ourselves?"

Having a colostomy myself, I can speak with feeling, if not with authority, about diarrhoea cures. And a resident household of three others, one a schoolboy, taught me much about sickness, in both senses, and about other aspects of diarrhoea. I came to a few solid conclusions, though statisticians may question their bases. For the sickness, it seemed, only a hot bottle or electric pad, or blankets heated before the fire, and a few sips of some fizzy sweetened drink, were worth their trouble (we'd have felt differently if faced with real dehydration, no doubt). But for the diarrhoea there are now some genuine and unobjectionable—even non-poisonous—medicaments; about four, if I may classify a bit. They are:

(1) *Opiates*.—Morphine $\frac{1}{4}$ gr. (16 mg.), perhaps repeated once but once only, may check the diarrhoea while vomiting is still being troublesome; nothing (or hardly anything) else will, so this may be justifiable in the early stages; later on, a few minims of tinct. opii by mouth is surprisingly effective and leaves no boggy of addiction (a much overrated spook, I know). Make it tinct. opii 3-5 min. (0.2-0.3 ml.), kaolin 60 gr. (4 g.); aqua chlor. to the ounce (28 ml.); for that may save the patient trouble with the poisons rulers. Otherwise I would not include kaolin among *medicamenta vera*.

(2) *Sulphaguanidine*.—Old-fashioned? If so, incidentally so; for I am certain that this has a pharmacological binding action that "sulfasuxidine" and "sulfathalidine" have not got. It begins to bind, in fact, before it can have started killing off the pathogenic bacteria. Of this I have satisfied myself.

(3) *Methyl cellulose*, or "celevac," in granules, please; for the tablet form does not work so well in most people. I am medical adviser to the English makers of this cellulose derivative, but I got the job because I had found the granules worked so well on me, and not the other way round. So, though I am biased, my opinion still holds water. These are taken with as little liquid as is practicable (one

or two tablespoonfuls), and the dose is a drachm (4 g.) or two night and morning or more often if necessary.

(4) *Aspirin*.—Few people seem to remember the slight but definite constipating action of aspirin. It irritates the mouth and stomach, etc., yes; but very slightly, and it does more good than harm, always provided you have no gastric or duodenal ulcer liable to bleed. If you have, try more celevac and keep far away from aspirin and all the salicylates, or it will bleed forthwith and for certain.—I am, etc.,

Tonbridge, Kent.

E. CLAYTON-JONES.

Early Management of Poliomyelitis

SIR.—Dr. E. G. Brewis in his article, "Early Management of Poliomyelitis" (*Journal*, June 30, p. 1539), makes a number of statements with which few, I imagine, of his colleagues engaged in the treatment of this disease would agree. In particular he writes that when the diagnosis of poliomyelitis becomes probable "there may be a natural desire on the part of the family doctor, aided by pressure from the relatives, to send the patient to hospital. *This course must be firmly resisted* . . . hospital admission has nothing to offer the patient which cannot be done in the ordinary decent home. This should be emphasized because so often the parents . . . and occasionally the doctor himself, believe that something can be done in hospital which may make all the difference to the patient's chances. *In many instances the reverse is true*" (the italics are mine).

Your contributor may be trailing his coat, or perhaps doffing his bonnet to give a bee an airing, but, if he is serious, may I say that I regard this as most dangerous and irresponsible advice? Polio is one of the most insidious and unpredictable of all diseases, and nobody can possibly foretell what will happen in any given case. In one, paralysis may spread from head to foot—or from foot to head—in 24 hours; in another, paralysis may appear in one limb and then come to a halt for a day or two, only to return with a devastating rush when all danger appears to be past. In a third it may spread steadily but slowly for a week. No two cases are alike, and the only confident prediction one can make is that as soon as the process has begun anything may happen.

In these circumstances it seems incredible that anyone should counsel delay in bringing the patient under skilled and continuous observation as soon as possible. Such delay is undoubtedly responsible for so many of the lamentable results in the treatment of bulbar and bulbo-spinal cases reported by your contributor and others. Far too many of these patients arrive in hospital already hopelessly compromised—half-drowned in their own secretions, or having vomited and inhaled the vomit. Even in hospital, unless constant supervision is exercised, bulbar paralysis in particular may elude detection until serious damage has occurred.

There is a further consideration. The gravest disability from which the recovered case can suffer is paralysis of respiration in whole or part. Many believe that this can be minimized by giving assistance to the threatened neurones at the earliest possible moment. As soon therefore as any detectable weakness of respiration or significant fall in vital capacity appears, the patient is put in a respirator in the hope that by taking the load off the intercostals and diaphragm more of their capacity may be retained than if the relevant neurones are allowed to reach the point of exhaustion before relief is afforded. Results would appear to justify this approach.

There are other statements which one receives with some surprise, as, for example, that "the physical stress of ambulance journeys . . . may be a deciding factor in initiating paralysis." What evidence exists—or can possibly be adduced—to warrant such an assertion? But in any event, in direct contrast to Dr. Brewis, I would say to the family doctor: "As soon as you have made the diagnosis of poliomyelitis, and especially if paralysis has appeared, get him into hospital as soon as possible, for he is launched on a

branch during the last 30 or 40 years and the region of the human mind has been explored, the laws of mental healing are known, and dramatic cures are no longer looked upon as "miracles." But the "lay" mind would still think a "miracle" of healing had been performed if, for example, a girl with hysterical paralysis were suddenly cured by mind therapy.

The need for this kind of therapy is surely evident; for I understand that 50% of the beds in this country are occupied by mental cases. The strain and stress of modern life (hurry and worry, domestic, social, economic, and business anxieties) seem to be having a serious influence on the nervous system via ductless glands, upsetting function and possibly leading to organic disease. One thinks of toxic goitre, hyperpiesis, coronary disease, and afflictions of the nose, bronchi, oesophagus, colon, bladder, and stomach. Duodenal ulcer is commonly associated with nervous tension, and this must be considered in treatment. These considerations seem to indicate the great importance of mind treatment, which is in the second dimension. We have been very slow to appreciate the fact that thinking can be damaging even to the physical body. "As a man thinketh in his heart, so is he." Compare our quite recent recognition of the importance of the blood—the circulation being discovered by Harvey in 1615. Yet 4,000 years ago it was written: "The life of the flesh is in the blood"; "The blood is the life."

So it is that few medical men understand the things of the third dimension—the spirit, which again is superior to the mind and exerts a profound influence on a man's thoughts. If the B.M.A. called for evidence of revolution and reconstruction of character through faith in Jesus Christ, there would be tens of thousands of indisputable testimonies. Those who have experienced this "miracle" might be excused for expecting "miracles" in the lower dimensions of mind and body—that is, healings of the mind and body outside scientific psychological and physical experience—such as occurred in the days of our Lord and His apostles. This is what we mean by divine healing.

I would not deny the occurrence of such miracles, but most will agree that they are very rare. And why? I can think of two reasons. One is, as I have indicated already, that it is divine guidance that has led us to the wonderful discoveries which enable us to enjoy to-day such health and healing, which we attribute to "nature." The other is that a study of the scriptures indicates that in this world of sin and death the righteous suffer with the wicked until such times as the "curse" is removed from mankind and all nature is redeemed and restored to life incorruptible. In dealing with the supernatural, one must consider divine revelation: for until we understand what is already well known in experience in the spiritual realm we shall never be able to discuss these things intelligently or make further progress. The atheist, agnostic, and sceptic have neither part nor lot in this matter.—I am, etc.,

Chigwell

N. BEATTIE.

SIR,—I can assure Dr. M. Curran (*Journal*, June 30, p. 1545) that by no means all his co-religionists, whether priests or doctors, adopt his own attitude of intransigence in the matter of co-operation with clergy of other Christian denominations and with non-Roman doctors. He may not be aware that in quite a number of districts where doctors, clergy, and ministers are established as a group and meet regularly for discussions, etc., the local Roman Catholic priest is also to be found taking his part in the giving of lectures and contributing to the discussions. In many cases Roman Catholic doctors are participants in such group meetings.

It is significant also that in *The Doctor's Profession* (S.C.M. Press), first published in 1949, the editor should have occasion to remark in his preface that "this book is the fruit of the work of a group which was almost equally composed of Roman Catholics and non-Roman Catholics, with a slight preponderance of the latter. It is worth recording that this was not planned from the outset. It merely

happened that people who were deeply concerned about these questions were to be found both among Roman Catholics and other Christians. The members of the group found also that they were able to discuss many controversial questions without either suppressing their own point of view or exaggeratedly emphasizing it." In neither of the circumstances cited above did the Roman Catholics who participated feel that they would "be giving recognition to the beliefs of the English Church as a spiritual body and would be denying our own faith."

The Roman Catholic doctors invited to submit evidence before the (Anglican) Archbishops' Commission were in no danger of being led astray by "heretics": they were merely being asked to express their opinions on certain facts, and it would be natural for them to do this in the light of their knowledge of the spiritual ministrations given to the sick in their own Church.

One would have thought that this, so far from compromising their faith, would have given them an excellent opportunity to witness for it.—I am, etc.,

Leamington Spa.

F. S. SINKER.

SIR,—It is surely fortunate that the B.M.A. committee which prepared the report on divine healing did not attempt to define miracle. It kept to its appointed task of providing evidence (*Supplement*, May 12, p. 269).

The correspondence which has appeared in the *Journal* in the past weeks confuses two different issues. First, the question is asked, Do miracles of healing occur to-day? Secondly, many believe that there are spiritual laws which, if understood and applied, would result in unusual healing of disease. The B.M.A. committee could obtain no convincing evidence that unusual healing has occurred: "The cases claimed as cures of a miraculous nature present no features of a unique and unexpected character outside the knowledge of any experienced physician or psychiatrist." This view falls into line with that expressed in the leading article of the *Journal* of June 18, 1910 (p. 1483), when the whole subject was fully reviewed in the light of the experience of those days and excellently written up by leaders of the profession.

To the Christian these findings offer no particular problem. He believes that God as creator and sustainer of this world can do a miracle when and where He chooses. However, the evidence of the Bible suggests that His miracles have been mainly limited to certain periods of history. They were supremely shown in the life and work of Jesus Christ.

Of the so-called "spiritual laws" which influence healing there is much that we do not understand, and those who speak of them often use phrases the meaning of which is hard to ascertain. What, for instance, does Dr. J. Burnett Rae (*Journal*, June 30, p. 1544) mean when he speaks of "lifting them [our therapeutic means] to a higher power and a finer end"? There are two important principles by which we may be guided. If a claim be made that the physical state of a patient's diseased tissues can be affected, then we, as doctors, believe that such changes can be observed and possibly measured by independent witnesses. They are subject to the "proof" of our senses. As Professor Alstead succinctly expressed it in an excellent article which appeared in the *Manchester Guardian* on August 29, 1955, "It may be objected that spiritual healing belongs to the realm of the spirit and that it cannot be measured with the yardstick of the clinical laboratory. To this I would say that if the spiritual healer enters the field of clinical medicine and makes claims in terms such as I have tried to explain then he must submit to the discipline of clinical science."

On the other hand, if such claims of physical change be not made and the benefit which the healer offers is purely spiritual, this too is subject to a yardstick which we should do well to use. The New Testament makes clear to us that the work of the Holy Spirit is concerned primarily with a man's relationship to God and with the quality of life which he leads. There is very little to lead us to suppose that special gifts of healing are imparted in the course of His normal activity to-day.—I am, etc.,

Gerrards Cross, Bucks.

C. GORDON SCORER.

Haemophilus Infection in Bronchiectasis

SIR,—I was interested to read the article on haemophilus infection in bronchiectasis by Dr. E. C. Allibone, Mr. P. R. Allison, and Dr. K. Zinnemann (*Journal*, June 23, p. 1457). I drew attention to the prevalence of haemophilus in chronic non-tuberculous lung conditions in childhood in 1927.¹ I cannot, however, endorse their confidence in the effects of treatment with antibiotics, which seem to me to be ineffective in eliminating the organism in such cases. Whereas in 1927 I regarded it as rather probable that the haemophilus was the actual cause of the persistent illness in these children, I would now rather take the view that the disease is bacteriologically non-specific and the result of bronchial obstruction with partial collapse and secondary infection in the collapsed areas. In fact, I would now rather regard the haemophilus as a secondary invader. It is a very common organism to find in the respiratory tract. The authors describe "relapse" as occurring in their cases. I am not clear what meaning they attach to this word. I think it clear that what they mean is reinfection occurs. The odds against this happening would be enormous; besides, they describe relapse as occurring on the average every six weeks. Their observations would therefore indicate that the haemophilus is not eradicated but only temporarily suppressed.

I am also not very happy about the use of the term "purulent bronchiectasis" in children. We rarely see the disease which used to go by this name—that is, a persisting bronchial dilatation with fetid sputum. No doubt workers in the northern cities see more cases of the type described in my M.D. thesis of 1927, but the number of cases in this area requiring bronchoscopy and bronchography has steadily diminished. We see very few cases of whooping-cough with collapse, and in most of our cases of whooping-cough or non-specific respiratory infection collapse is very transient and bronchiectasis distinctly rare.—I am, etc.,

Farnborough, Kent.

DUNCAN LEYS.

REFERENCE

¹ Leys, D. G. *Chronic Pulmonary Catarrh*, 1927, chapters 3 and 4. London.

Apartheid in Blood Transfusions

SIR,—Might not Dr. David J. Adderley (*Journal*, June 30, p. 1546) be mistaken, and himself the victim of an emotionally charged concept? To assert that there is no essential difference between blood from different sources involves a large assumption, and, so far as I am aware, not sufficient work has been done to substantiate it.

It is known that there is a gradient of increasing proportion of group O blood from east to west across Europe. Thus, at a time when the ABO groups were unknown, it would have been safer to transfuse, say, an Irish person with blood from an Irish source rather than with blood from, say, Poland. No one will imagine that the last work has been done on the constituents of blood or its various groupings. With such a difference as between populations within Europe, there is at least a prima facie case for postulating differences between bloods from different continents. Before Dr. Adderley suggests offering gratuitous advice to the profession in South Africa, let him reflect that its ideas may not be altogether wrong. Let us not confuse scientific integrity with support for a political theory of racial equality.—I am, etc.,

Wednesbury.

J. TORLEY.

Post-menopausal Oestrogen Production

SIR,—Might we make a plea for the use of a standard method of estimating oestrogenic activity from vaginal smears? Dr. R. A. Struthers in a recent interesting article (*Journal*, June 9, p. 1331) employs a method of grading which makes it difficult to compare his findings with those of many other workers in this field. Authorities such as Shorr,¹ De Allende workers in this field. Authorities such as Shorr,¹ De Allende and Orías,² and Horwith³ all use a cornification index which is calculated as the percentage of cornified squames in

several unselected fields of superficial, intermediate, and basal cells. On the other hand, Dr. Wachtel,⁴ in her recent article entitled "Suggestion for a Cytological Test of Cancer Cure," calculates the cornification index "by counting the percentage of cells with pyknotic nuclei among 200 unselected superficial and intermediate squames. The basal cells are omitted from this count."

It seems logical to assume that a cornification index provides a better yardstick and is less liable to personal interpretation than any other forms of grading, but it would be of greater value if it was always calculated in the same way. Working at Dr. P. M. F. Bishop's endocrine clinic, we have found that a count of all the vaginal epithelial cells—that is, including the basal cells—gives a more accurate clinical picture.

We would also like to know if Dr. Struthers had any particular reason for obtaining smears by scraping the anterior wall of the upper vagina as opposed to aspiration from the pool of secretion in the posterior fornix. We find the latter method gives a much more representative slide and avoids contamination from the lower third of the vagina.—We are, etc.,

MOIRA MURRAY.

FREDA OSMOND-CLARKE.

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- De Allende, I. L. C., and Orías, O., *Cytology of the Human Vagina*, 1950, translated by G. W. Corner. New York.
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- Wachtel, E., *J. Obstet. Gynaec.*, 1956, 58, 176.

Maladjusted Children

SIR,—Dr. M. Park (*Journal*, June 23, p. 1487) is disappointed at the poor response to his appeal for action based on the report of the Committee on Maladjusted Children,¹ set up with commendable initiative by the Ministry of Education. This lack of response, I fear, reflects the disappointment of many in the medical field at the nature of the main recommendations of this informative report. There is a marked difference of emphasis from the evidence submitted to the committee by the British Medical Association² and from the recent memorandum of the Royal Medical Psychological Association.

An adequate service must meet the needs of the school child, the pre-school child, the post-school child, the child at the non-maintained school, and the emotionally handicapped parent. The most important categories, the pre-school child and the emotionally handicapped parent, can be least effectively dealt with on these recommendations. To deal with the child from the non-maintained school a call is made for new legislation. The proposed administrative structure is a complex of three local authority departments (education, school health, public health), grafted on to which is the regional board concerned. To the perils and difficulties of divided authority is added a contortion of the educational system to supply a community family mental health service. This proposed service would needlessly duplicate the service already supplied freely to all categories of patients by the regional hospital boards under the terms of the National Health Service Act, 1946; this family-orientated service has grown apace in the last five years and is based on the collaboration of the general practitioner and the school medical officer, one responsible for initiating referral direct from the home and the other from the school.

Much attention has properly been given by the Ministry of Health to the mental health problems presented by the psychotic patient; the obviousness of the problem and the number of occupied hospital beds have compelled attention. Affecting as it does approximately 0.5% of the population, psychosis is, relatively, a minor problem in mental health when due regard is given to the problem of emotionally handicapped individuals, who amount to an unquestioned 6%, perhaps 30%, and possibly a higher percentage of the population. The Ministry of Health has certainly not ignored this greater problem, but we are still awaiting a

process of which nobody can foresee the end. If you wait, and above all if you wait until *early* signs, for example, of respiratory paralysis as detailed by Dr. Brewis appear—i.e., 'restlessness, rapid, shallow respirations, increasing cyanosis and distress'—then you can be sure that you have waited too long.—I am, etc.,

Isleworth, Middlesex.

G. E. BREEN.

High-grade Defectives

SIR,—Dr. J. Newcombe (*Journal*, June 23, p. 1487) has raised a matter of great importance to all oligophrenicists—if I may be permitted to start a hare for the linguistic purists. The solutions he offers for this problem are at first attractive, but a few points seem to need closer scrutiny.

I suggest that it is misleading to speak of the period of detention in relation to the severity of the crime—this has merely served to bring the case to light much later than should have been. Surely the length of detention must depend entirely on the time needed for treatment. Dr. Newcombe says these patients are not admitted primarily because of their mental deficiency but because of superimposed behaviour disorder and instability. While this is certainly true in many cases, are not the behaviour disorder and instability part of the deficiency, rather than superimposed upon it, in many others? And is it not true that these cases, which usually have an abnormal E.E.G. record, do not respond quickly to treatment?

Some aspects of this problem bring to mind the old controversy about neurosis centres and mental hospitals, the problem of sheep and goats. While we must admit that our low-grade patients will always fall into the latter category, can we be sure that all those of high grade will not? What is to happen to the high-grade patients who do not respond to treatment as quickly as we hope? Will they not either block admissions to the special hospital or approved school set aside for them, or suffer a therapeutic set-back when transferred to an ordinary mental deficiency hospital?

It is not easy to find a solution to this problem, but on the whole I feel it lies in the correct planning and administration of the mental deficiency hospital rather as a group of small special hospitals within its precincts, in the discarding of diagnostic labels, and in the more energetic use of hostels and licence.—I am, etc.,

Morpeth.

C. GUY MILLMAN.

SIR,—Following the recent discussion in your correspondence columns (Dr. J. Newcombe, *Journal*, June 23, p. 1487, and Dr. Z. P. Fernandez, June 30, p. 1546) it may be of interest to consider the special problems of the mentally defective juvenile. Frequently the high-grade mental defective comes into conflict with the law during adolescence. As an educationally subnormal pupil he adapts fairly well at either a special school or, with special considerations, at the ordinary school. Social adaptation breaks down frequently when the juvenile is faced with the responsibility of earning and spending money, with decisions regarding personal relationships outside the family. The discrepancy between the retarded emotional and intellectual maturation and the needs of normal physical development creates tensions which often seek outlets in socially harmful activities. Stealing and sexual misdemeanour are the usual charges which bring the mental defective juvenile before the court. The inability to compete at work and to withstand the desire for pleasure and possessions leads to a situation of drifting about, following momentary impulses.

These adolescents need permission to mature slowly in an environment that provides training and guidance according to their individual need and capacity. Self-reliance may not be reached until the twenties, and sometimes sheltering conditions may be required much longer. Detention in an institution rarely meets their need. Their failure of social adaptation is largely related to the complexity of modern urban life and would be less disturbing in a small family-like or village community. In strictly supervised institutional care incentives for responsibility and self-reliance are few and maturation may be further delayed. Treatment of

the juvenile high-grade mental defective implies education and training rather than care and detention. This need may be met by a special Order, such as recommended by Dr. Newcombe. The Order would need to remain in force until education and training have reached the stage when the young person is considered fit to live independently. Hostels rather than hospitals are required for such training.

Special consideration of the position of unmarried mentally defective mothers seems necessary. Because of the girl's inability to fulfil the role of mother unaided, separation from the child is most frequently advocated. One may question whether this is the right step for mother and child. Mentally defective girls are often very affectionate and quite prepared to give their infants loving attention. The care for the child may have a beneficial effect, increasing steadiness of moods and aiding emotional maturation. The girl cannot, however, take on maternal responsibilities without provision for material security and guidance. It may be considered useful—and ultimately a means of saving public expenses—if hostels were provided for these young mothers and their children where they could receive training in mothercraft and become dependable. The child would thus receive its mother's care and perhaps a number of misfits in fostering and adoption could be avoided.—I am, etc.,

Winchester.

L. ROSENBERG.

Gases Administered in Artificial Respiration

SIR,—I have read with the utmost interest the abundant correspondence issued from the publication of "Gases Administered in Artificial Respiration" by Dr. K. W. Donald and Professor W. D. M. Paton (*Journal*, February 5, 1955, p. 313). In order to convey additional information in the controversy, may I inform you of an extract of an article, summing up my own experimental researches? In January, 1945, the U.S.A. War Department diffused a bulletin entitled: "Treatment of Respiratory Depression and Asphyxia." It stated in particular:

"For many years carbon dioxide or carbon dioxide-oxygen mixtures have been employed in the treatment of asphyxia neonatorum, asphyxia from carbon monoxide inhalation, asphyxia from drowning, and other conditions in which the patient is not breathing or in which respiration is severely depressed. Evidence is now available to show that such a procedure is not rational and is associated with certain dangers.

"It has long been known that carbon dioxide will produce narcosis, and recent investigations have emphasized the dangers associated with the use of this agent when the respiratory centre is depressed. When administered for a short time in weak concentrations, it does increase the depth of respiration. This same effect is not exhibited when the centres of respiration are damaged, when the concentration of this gas is high, or when it is used over a prolonged period of time. . . . In asphyxiated patients the blood oxygen concentration is almost nil, but the blood carbon dioxide level is elevated above normal. Since in these patients carbon dioxide no longer acts as a respiratory stimulant but is actually a respiratory depressant, there is no rational basis for its administration. This is also true in cases of severe carbon monoxide poisoning, for medullary damage is present in all states of severe anoxia. For these reasons the use of carbon dioxide as a respiratory stimulant is dangerous. The carbon dioxide level in the blood will adjust itself if oxygen is supplied in adequate amounts to the tissues. This has been demonstrated to be true both experimentally and clinically."

In 1952 David B. Dill, Chief of the Medical Services of the Army Chemical Centre, U.S.A., questioned many resuscitation experts about it. The inquiry showed that "carbogen" was gradually abandoned for pure oxygen, and that now the mixture is practically never used. The author concluded thus: "It is recommended that the admixture of carbon dioxide with oxygen for artificial respiration be abandoned."

When those documents came to our knowledge we were extremely surprised, considering the favour carbogen has enjoyed for more than 30 years. We made up our minds, therefore, to form an opinion of our own by operating in

the following way: dogs, after anaesthesia, were asphyxiated by different processes (drowning, strangulation, CO₂, or CO poisoning, etc.). When breath stopped and before reaching the critical value of blood pressure, we applied artificial respiration, either with air, oxygen, or carbogen. Inhalations were pursued for a certain period of time with the chosen gas. We made the usual records of respiration and circulation. Blood was analysed as to its content of oxygen and carbon dioxide, its density, pH, alkali reserve, free CO₂, haemoglobin; in short, we made our inquiry as thorough as possible. In no case, out of about 50 experimented dogs, did we find carbogen superior to oxygen alone.

Those results were observed in all the various kinds of asphyxia, even in carbon monoxide asphyxia, which was always considered as the major indication for carbogen. In that particular case we actually did not notice a faster elimination of carbon monoxide if carbogen was administered instead of oxygen. The same fact, too, had been already claimed by other authors—namely, by Walton *et al.*⁴ Teleky,⁵ and Schwerma *et al.*⁶ However, unlike the Americans, we did not notice any harmful effect of carbogen. And so we quite agree with them that carbogen should be withdrawn from resuscitation kits.

Moreover, this measure will have further advantages. Carbogen is more expensive than oxygen and its supply is difficult in the provinces. Oxygen can be easily provided on account of its many applications in industry. Lastly, carbogen is contraindicated in some cases, such as intoxications by CO₂ (wells, fermenting vats, CO₂ fire-extinguishers more and more widely spread, etc.), intoxications by lung irritants (chlorine, phosgene, nitrous fumes, etc.). If resuscitation kits do not include carbogen, there is no danger of an unwarned rescuer using it when contraindicated. He will but dispose of oxygen, which proves useful in any type of asphyxia.—I am, etc.,

Paris

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Accidents with Injections

SIR,—It is, perhaps, a pity that Dr. C. F. Scurr does not qualify his statement that the aspiration test should always be used before subcutaneous injection, in his excellent article on accidents with injections (*Journal*, June 2, p. 1289). Dr. Scurr, in an earlier passage, writes of the possible danger of infection during mass inoculation. In a previous letter (*Journal*, July 30, 1955, p. 323) I suggested that when an aspiration test was made the danger of infecting the syringe thereby entailed using a fresh sterile syringe for each injection. Methods now advocated for mass inoculation aim at avoiding re-sterilization of the syringe, as this presents a grave practical problem, and are thus mainly concerned with preventing that back flow of blood or tissue fluid into the syringe which an aspiration test encourages. The method of Fleming and Ogilvie¹ and the purpose of the specially designed syringes of Gross² and Voorhorst³ might be brought to naught by an aspiration test, and the valve described by Gispén⁴ of course renders such a test impossible.

If it is decided, in respect of any immunization agent, that in spite of every precaution other than aspiration the risk of entering a blood vessel is still too great to be accepted, recent methods directed towards avoiding syringe contamination are also unacceptable when injecting such material. Three courses then lie open to the mass inoculator. First, he may use a freshly sterilized syringe (not only re-sterilize the needle) for each person: the demands on time, manpower, or equipment (or on all of these) will be excessive. Secondly, he may ignore the risk of transference of infection which aspiration presents: the taking up of many doses into the syringe at each filling might then be permitted, since fear of aspiration, though admittedly after raising the pressure in the subcutaneous tissue, is the

accepted bar to doing so. It might even be thought that, if the risk of infecting the syringe is being taken, there is no need to re-sterilize the needle. This, of course, would be a false argument, since infection of the needle, either outside or inside, might occur in cases where, in spite of suction, the syringe remained sterile. Even without such an unwarranted extension, I doubt if many doctors would accept this second alternative, and I am sure Dr. Scurr would not be among them. Thirdly, the inoculator may give up injection by needle and syringe in favour either of needleless injection by high velocity jet or of intradermal multipuncture. I would suggest that it is indeed along such lines that progress will be made, but the former method needs development of equipment, while the latter must first be shown to be immunologically effective. While syringe and needle are used I feel that the precaution of withdrawing the plunger (aspiration test) before injection must be forgone during mass inoculations.—I am, etc.,

G. T. L. ARCHER.

London, S.W.1.

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Divine Healing

SIR,—It is necessary to distinguish between divine healing and faith healing. The former, according to the terms of reference to the B.M.A. investigating committee, was intended to mean, I understand, the healing of patients, by divine intervention in answer to prayer, who are suffering from incurable diseases such as inoperable carcinoma. Such healing is beyond explanation by any of the ordinarily recognized "laws" of scientific medicine, but, as Dr. Jane H. Thompson suggests in her excellent letter (*Journal*, June 9, p. 1363), it is not impossible to believe that there are spiritual laws beyond "the physical and mental which keep people in health or cure them when they become diseased." This is what I would suggest as healing in the third dimension and was practised by our Lord and His apostles. One thinks of Einstein's revolutionary discovery and those who found that the atom was a little electric world in which was pent up the most appalling, and hitherto undreamed of, power. Similarly, our Lord and His apostles were evidently in possession of almighty power in the spiritual realm, the third dimension.

The letter of Dr. Nigel Loring (p. 1363) fails utterly to allow for this possibility, and his "blind faith" is an unfortunate expression and a confession of his own myopia. The definition of "faith" (in Hebrews xi. 1) is "the substance of things hoped for, the evidence of things not seen." He also speaks of "observation and experiment" as if the scientist would ever be so smug and complacent as to think that present knowledge was final. Keen Christians are perplexed, however, when they find their faith and prayers apparently unrewarded. I think that one must go on in faith and prayer, committing our case, whether curable or incurable, to God, believing in His eternal purpose for good for all who acknowledge His presence in all departments of their lives. Prayer will be answered undoubtedly in one of two ways—that is, either by cure of the disease or by grace to bear it.

Prayer and faith must not be divorced from the use of all available medical and surgical services. For surely the latter are intended to create better conditions for healing, which are ultimately always divine. If the surgeon removes a gangrenous appendix, or sews up a gastric perforation, the healing of the wounds is entirely by "nature"—which is only a word used so often to avoid acknowledging the God who is the author of the laws by which "nature" works. Looking at it this way, let us acknowledge at once that all healing is divine, in the last analysis. As to "faith healing," this may be simply and solely a psychological phenomenon. The faith may be in a man, or a charm, or a grotto, or a "saint," or a mere superstition, nothing divine about it. It works in functional disorders; and, now that psychological medicine has developed into a special

branch during the last 30 or 40 years and the region of the human mind has been explored, the laws of mental healing are known, and dramatic cures are no longer looked upon as "miracles." But the "lay" mind would still think a "miracle" of healing had been performed if, for example, a girl with hysterical paralysis were suddenly cured by mind therapy.

The need for this kind of therapy is surely evident; for I understand that 50% of the beds in this country are occupied by mental cases. The strain and stress of modern life (hurry and worry, domestic, social, economic, and business anxieties) seem to be having a serious influence on the nervous system via ductless glands, upsetting function and possibly leading to organic disease. One thinks of toxic goitre, hyperpiesis, coronary disease, and afflictions of the nose, bronchi, oesophagus, colon, bladder, and stomach. Duodenal ulcer is commonly associated with nervous tension, and this must be considered in treatment. These considerations seem to indicate the great importance of mind treatment, which is in the second dimension. We have been very slow to appreciate the fact that thinking can be damaging even to the physical body. "As a man thinketh in his heart, so is he." Compare our quite recent recognition of the importance of the blood—the circulation being discovered by Harvey in 1615. Yet 4,000 years ago it was written: "The life of the flesh is in the blood"; "The blood is the life."

So it is that few medical men understand the things of the third dimension—the spirit, which again is superior to the mind and exerts a profound influence on a man's thoughts. If the B.M.A. called for evidence of revolution and reconstruction of character through faith in Jesus Christ, there would be tens of thousands of indisputable testimonies. Those who have experienced this "miracle" might be excused for expecting "miracles" in the lower dimensions of mind and body—that is, healings of the mind and body outside scientific psychological and physical experience—such as occurred in the days of our Lord and His apostles. This is what we mean by divine healing.

I would not deny the occurrence of such miracles, but most will agree that they are very rare. And why? I can think of two reasons. One is, as I have indicated already, that it is divine guidance that has led us to the wonderful discoveries which enable us to enjoy to-day such health and healing, which we attribute to "nature." The other is that a study of the scriptures indicates that in this world of sin and death the righteous suffer with the wicked until such times as the "curse" is removed from mankind and all nature is redeemed and restored to life incorruptible. In dealing with the supernatural, one must consider divine revelation: for until we understand what is already well known in experience in the spiritual realm we shall never be able to discuss these things intelligently or make further progress. The atheist, agnostic, and sceptic have neither part nor lot in this matter.—I am, etc.,

Chigwell

N. BEATTIE.

SIR,—I can assure Dr. M. Curran (*Journal*, June 30, p. 1545) that by no means all his co-religionists, whether priests or doctors, adopt his own attitude of intransigence in the matter of co-operation with clergy of other Christian denominations and with non-Roman doctors. He may not be aware that in quite a number of districts where doctors, clergy, and ministers are established as a group and meet regularly for discussions, etc., the local Roman Catholic priest is also to be found taking his part in the giving of lectures and contributing to the discussions. In many cases Roman Catholic doctors are participants in such group meetings.

It is significant also that in *The Doctor's Profession* (S.C.M. Press), first published in 1949, the editor should have occasion to remark in his preface that "this book is the fruit of the work of a group which was almost equally composed of Roman Catholics and non-Roman Catholics, with a slight preponderance of the latter. It is worth recording that this was not planned from the outset. It merely

happened that people who were deeply concerned about these questions were to be found both among Roman Catholics and other Christians. The members of the group found also that they were able to discuss many controversial questions without either suppressing their own point of view or exaggeratedly emphasizing it." In neither of the circumstances cited above did the Roman Catholics who participated feel that they would "be giving recognition to the beliefs of the English Church as a spiritual body and would be denying our own faith."

The Roman Catholic doctors invited to submit evidence before the (Anglican) Archbishops' Commission were in no danger of being led astray by "heretics": they were merely being asked to express their opinions on certain facts, and it would be natural for them to do this in the light of their knowledge of the spiritual ministrations given to the sick in their own Church.

One would have thought that this, so far from compromising their faith, would have given them an excellent opportunity to witness for it.—I am, etc.,

Leamington Spa.

F. S. SINKER.

SIR,—It is surely fortunate that the B.M.A. committee which prepared the report on divine healing did not attempt to define miracle. It kept to its appointed task of providing evidence (*Supplement*, May 12, p. 269).

The correspondence which has appeared in the *Journal* in the past weeks confuses two different issues. First, the question is asked, Do miracles of healing occur to-day? Secondly, many believe that there are spiritual laws which, if understood and applied, would result in unusual healing of disease. The B.M.A. committee could obtain no convincing evidence that unusual healing has occurred: "The cases claimed as cures of a miraculous nature present no features of a unique and unexpected character outside the knowledge of any experienced physician or psychiatrist." This view falls into line with that expressed in the leading article of the *Journal* of June 18, 1910 (p. 1483), when the whole subject was fully reviewed in the light of the experience of those days and excellently written up by leaders of the profession.

To the Christian these findings offer no particular problem. He believes that God as creator and sustainer of this world can do a miracle when and where He chooses. However, the evidence of the Bible suggests that His miracles have been mainly limited to certain periods of history. They were supremely shown in the life and work of Jesus Christ.

Of the so-called "spiritual laws" which influence healing there is much that we do not understand, and those who speak of them often use phrases the meaning of which is hard to ascertain. What, for instance, does Dr. J. Burnett Rae (*Journal*, June 30, p. 1544) mean when he speaks of "lifting them [our therapeutic means] to a higher power and a finer end"? There are two important principles by which we may be guided. If a claim be made that the physical state of a patient's diseased tissues can be affected, then we, as doctors, believe that such changes can be observed and possibly measured by independent witnesses. They are subject to the "proof" of our senses. As Professor Alstead succinctly expressed it in an excellent article which appeared in the *Manchester Guardian* on August 29, 1955, "It may be objected that spiritual healing belongs to the realm of the spirit and that it cannot be measured with the yardstick of the clinical laboratory. To this I would say that if the spiritual healer enters the field of clinical medicine and makes claims in terms such as I have tried to explain then he must submit to the discipline of clinical science."

On the other hand, if such claims of physical change be not made and the benefit which the healer offers is purely spiritual, this too is subject to a yardstick which we should do well to use. The New Testament makes clear to us that the work of the Holy Spirit is concerned primarily with a man's relationship to God and with the quality of life which he leads. There is very little to lead us to suppose that special gifts of healing are imparted in the course of His normal activity to-day.—I am, etc.,

Gerrards Cross, Bucks.

C. GORDON SCORER.

Haemophilus Infection in Bronchiectasis

SIR,—I was interested to read the article on haemophilus infection in bronchiectasis by Dr. E. C. Allibone, Mr. P. R. Allison, and Dr. K. Zinnemann (*Journal*, June 23, p. 1457). I drew attention to the prevalence of haemophilus in chronic non-tuberculous lung conditions in childhood in 1927.¹ I cannot, however, endorse their confidence in the effects of treatment with antibiotics, which seem to me to be ineffective in eliminating the organism in such cases. Whereas in 1927 I regarded it as rather probable that the haemophilus was the actual cause of the persistent illness in these children, I would now rather take the view that the disease is bacteriologically non-specific and the result of bronchial obstruction with partial collapse and secondary infection in the collapsed areas. In fact, I would now rather regard the haemophilus as a secondary invader. It is a very common organism to find in the respiratory tract. The authors do not describe "relapse" as occurring in their cases. I am not clear what meaning they attach to this word. I think it can hardly be supposed that reinfection occurs. The odds against this happening would be enormous; besides, they describe relapse as occurring on the average every six weeks. Their observations would therefore indicate that the haemophilus is not eradicated but only temporarily suppressed.

I am also not very happy about the use of the term "purulent bronchiectasis" in children. We rarely see the disease which used to go by this name—that is, a persisting bronchial dilatation with fetid sputum. No doubt workers in the northern cities see more cases of the type described in my M.D. thesis of 1927, but the number of cases in this country has steadily been diminishing. We see very few cases of primary tuberculosis with collapse, and in most of our cases of whooping-cough or non-specific respiratory infection collapse is very transient and bronchiectasis distinctly rare.—I am, etc.,

DUNCAN LEYS.

Farnborough, Kent.

REFERENCE

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Apartheid in Blood Transfusions

SIR,—Might not Dr. David J. Adderley (*Journal*, June 30, p. 1546) be mistaken, and himself the victim of an emotionally charged concept? To assert that there is no essential difference between blood from different sources involves a large assumption, and, so far as I am aware, not sufficient work has been done to substantiate it.

It is known that there is a gradient of increasing proportion of group O blood from east to west across Europe. Thus, at a time when the ABO groups were unknown, it would have been safer to transfuse, say, an Irish person with blood from an Irish source rather than with blood from, say, Poland. No one will imagine that the last work has been done on the constituents of blood or its various groupings. With such a difference as between populations within Europe, there is at least a prima facie case for postulating differences between bloods from different continents. Before Dr. Adderley suggests offering gratuitous advice to the profession in South Africa, let him reflect that its ideas may not be altogether wrong. Let us not confuse scientific integrity with support for a political theory of racial equality.—I am, etc.,

Wednesbury.

J. TORLEY.

Post-menopausal Oestrogen Production

SIR,—Might we make a plea for the use of a standard method of estimating oestrogenic activity from vaginal smears? Dr. R. A. Struthers in a recent interesting article on post-menopausal oestrogen production (*Journal*, June 9, p. 1331) employs a method of grading which makes it difficult to compare his findings with those of many other workers in this field. Authorities such as Shorr,¹ De Allende and Orias,² and Horwith³ all use a cornification index which is calculated as the percentage of cornified squames in

several unselected fields of superficial, intermediate, and basal cells. On the other hand, Dr. Wachtel,⁴ in her recent article entitled "Suggestion for a Cytological Test of Cancer Cure," calculates the cornification index "by counting the percentage of cells with pyknotic nuclei among 200 unselected superficial and intermediate squames. The basal cells are omitted from this count."

It seems logical to assume that a cornification index provides a better yardstick and is less liable to personal interpretation than any other forms of grading, but it would be of greater value if it was always calculated in the same way. Working at Dr. P. M. F. Bishop's endocrine clinic, we have found that a count of all the vaginal epithelial cells—that is, including the basal cells—gives a more accurate clinical picture.

We would also like to know if Dr. Struthers had any particular reason for obtaining smears by scraping the anterior wall of the upper vagina as opposed to aspiration from the pool of secretion in the posterior fornix. We find the latter method gives a much more representative slide and avoids contamination from the lower third of the vagina.—We are, etc.,

MOIRA MURRAY.

FRED A. OSMOND-CLARKE.

London, S.W.3.

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² De Allende, I. L. C., and Orias, O., *Cytology of the Human Vagina*, 1950, translated by G. W. Corner. New York.
³ Horwith, M., New York Hospital, personal communication.
⁴ Wachtel, E., *J. Obstet. Gynaec.*, 1956, 58, 176.

Maladjusted Children

SIR,—Dr. M. Park (*Journal*, June 23, p. 1487) is disappointed at the poor response to his appeal for action based on the report of the Committee on Maladjusted Children,¹ set up with commendable initiative by the Ministry of Education. This lack of response, I fear, reflects the disappointment of many in the medical field at the nature of the main recommendations of this informative report. There is a marked difference of emphasis from the evidence submitted to the committee by the British Medical Association² and from the recent memorandum of the Royal Medical-Psychological Association.

An adequate service must meet the needs of the school child, the pre-school child, the post-school child, the child at the non-maintained school, and the emotionally handicapped parent. The most important categories, the pre-school child and the emotionally handicapped parent, can be least effectively dealt with on these recommendations. To deal with the child from the non-maintained school a call is made for new legislation. The proposed administrative structure is a complex of three local authority departments (education, school health, public health), grafted on to which is the regional board concerned. To the perils and difficulties of divided authority is added a contortion of the educational system to supply a community family mental health service. This proposed service would needlessly duplicate the service already supplied freely to all categories of patients by the regional hospital boards under the terms of the National Health Service Act, 1946; this family-orientated service has grown apace in the last five years and is based on the collaboration of the general practitioner and the school medical officer, one responsible for initiating referral direct from the home and the other from the school.

Much attention has properly been given by the Ministry of Health to the mental health problems presented by the psychotic patient; the obviousness of the problem and the number of occupied hospital beds have compelled attention. Affecting as it does approximately 0.5% of the population, psychosis is, relatively, a minor problem in mental health when due regard is given to the problem of emotionally handicapped individuals, who amount to an unquestioned 6%, perhaps 30%, and possibly a higher percentage of the population. The Ministry of Health has certainly not ignored this greater problem, but we are still awaiting a

broad appraisal of the situation and a planned development of services to deal with it. The moment is possibly ripe for setting up a committee of the Ministry of Health to inquire into the problem of the emotionally handicapped person—child, adolescent, and adult.

Dr. Park rightly points to the value of local postgraduate instruction in child psychiatry for medical practitioners. Since February, 1954, we have organized at Ipswich a weekly clinical discussion or demonstration for medical practitioners in this area. Under the aegis of the East Anglian Regional Hospital Board and the Ipswich Group Hospital Management Committee we have supplemented this in the last three years with a one week's course in child and family psychiatry. Full-time attendance has been 17, 24, and 41 respectively. School medical officers have been in the majority, due to the ready recognition of the course by the Ministry of Education and the encouragement given to their attendance. General practitioners have displayed keen interest and a number have attended. But their attendance at local courses would be greatly facilitated if the Ministry of Health made locum provision possible by a more generous recognition of courses under Section 48, National Health Service Act, 1946; the Minister is empowered to enter into arrangements, not only with universities and medical schools, but also with "any other persons for the provision of courses." Londoners are fortunate in having access to courses at the Tavistock Clinic.—I am, etc.,

Ipswich.

J. G. HOWELLS.

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- ² *British Medical Journal Supplement*, 1952, 1, 184.
- ³ *British Medical Journal*, 1956, 1, 812.

The Insatiable Critic

SIR,—In a review (*Journal*, May 26, p. 1221) of my small book, *Smoking and its Effects*,¹ Dr. Richard Doll complains that I did not pay enough attention to results obtained by the "direct observation of mortality among non-smokers and heavy smokers." To me the significant fact was that non-smokers are liable to contract lung cancer, and this is stated in the text.

The name of Doll (as also that of Hill) figures in the index more often than that of any other author, and in a book of 144 pages no less than 22 are devoted to an account and discussion of his work.—I am, etc.,

London, W.C.1.

SIDNEY RUSS.

REFERENCE

- ¹ Russ, S., *Smoking and its Effects*, 1955. London.

Paediatric Anaesthesia

SIR,—With reference to Mr. Albert Davis's (July 7, p. 45) remark on the complacent attitude of anaesthetists towards paediatric anaesthesia, he must be aware that the main difference between his methods as a house-surgeon and those of modern anaesthesia is in the use of the intravenous route. By this means quiet sleep is produced by a short-acting barbiturate, muscular relaxation achieved by a relaxant drug, and analgesia maintained by inhalation of weak concentrations of anaesthetic gases, supplemented when required by intravenous analgesics.

In ambulant patients these ideal conditions are achieved only at the expense of delayed recovery of the ambulant state. In adults it is possible to ease the terrors of an inhalation induction by the use of very small intravenous doses of barbiturates or by the use of the ultra-short-acting thialbutone sodium. This was recently discussed by the Anaesthetic Section of the Royal Society of Medicine.

To insert and keep a needle in the vein of a wriggling terror-stricken child can be a very difficult procedure and may cause as much psychological trauma as the application of a face-mask. There is the added risk of depositing some of the irritant drug extravenously or even intra-arterially, with dire results. The intravenous induction can be achieved in children in some cases. I have worked with a dental surgeon

who is a superb teller of fairy stories to children and practically hypnotizes them, so that they know nothing of the injection.

With regard to tonsillectomy and other major surgery in in-patients, the terrors of anaesthesia can be removed completely by efficient and well-timed premedication. For a considerable time in one of my hospitals we have had great success in "tonsil children" by the use of methylpentynol as a premedicant. Mr. Davis would be very welcome should he care to visit us.—I am, etc.,

London, W.4.

DONALD BLATCHLEY.

Progressive Massive Fibrosis

SIR,—Dr. J. P. Anderson's suggestion (*Journal*, June 23, p. 1484) is, we think, a good one, but he might be interested in some work published in 1954.¹ This was concerned with the effect of isoniazid on the radiological rate of progression of progressive massive fibrosis. In retrospect the trial was not perfect, but there are considerable difficulties in giving therapy to large numbers of working miners over long periods, particularly if injections are involved.

Dr. A. T. Doig's suggestion (p. 1484) is more difficult to discuss. His hypothesis is, if we understand him correctly, that progressive massive fibrosis is caused by collapse secondary to pulmonary fibrosis or mucous plugs in lungs containing macules of coalworker's simple pneumoconiosis. As regards the former, this presupposes a considerable amount of fibrosis in the coal macule, whereas the pathological evidence would suggest that there is little, if any, collagen to be found in it. The evidence also suggests that the macule causes dilatation of the terminal bronchiole and not collapse, and we do not know of any other evidence to support Dr. Doig's hypothesis. As regards the latter, if it were a main cause of progressive massive fibrosis one would expect progressive massive fibrosis to appear frequently after pneumonic shadows are seen in the lungs. This again is contrary to our observation, as we pointed out in our paper. It is possible, however, that alveolar collapse is one of several mechanisms whereby an established mass increases in size.—We are, etc.,

Penarth, Glam.

A. L. COCHRANE.
W. E. MIALL.

REFERENCE

- ¹ Miall, W. E., Oldham, P. D., and Cochrane, A. L., *Brit. J. Industr. Med.*, 1954, 11, 186.

"P.U.O."

SIR,—Like Gerontius, I saw with "horror, horror and dismay" the title of the article by Dr. J. V. O. Reid (*Journal*, July 7, p. 23), "Pyrexia of Unknown Origin." I believe it is correct to say that P.U.O. was coined as a term by the Army medical services in the first world war. Since the Services could hardly be expected to tolerate the suggestion of anything unknown, it is right to point out that the letters P.U.O. stood for pyrexia of undetermined origin.—I am, etc.,

London, W.8.

MICHAEL HARMER.

Rovsing's Sign

SIR,—I was most interested in Mr. W. W. Davey's article on the above subject (*Journal*, July 17, p. 28) and would like to express my entire agreement with his statements. For many years I have been trying to disillusion house-surgeons as to the value of this sign as a diagnostic aid in acute appendicitis. For some reason this sign always seems to be given extraordinary significance in their training, but, as Mr. Davey points out, is in no way specific of an appendicular lesion. I have demonstrated the most classical Rovsing's sign in many other conditions, such as torsion of an ovarian cyst, torsion of a piece of omentum, and in cases where no pathology was found at subsequent operation.

It would therefore be well for this sign to be erased from the diagnostic criteria of acute appendicitis.—I am, etc.,

Slough, Bucks.

ROBIN BURKITT.

JULY 21, 1956

Obituary

Miss MARTHA MARQUARDT

Miss Martha Marquardt, formerly secretary to Paul Ehrlich, died on Saturday, July 14. We are indebted to Sir HENRY DALE, O.M., for the following tribute.

Miss Martha Marquardt had been personal secretary to Paul Ehrlich from 1902 until his death in 1915—a period which included the whole of the last and, perhaps, the most permanently important phase of his great contributions to medical science. In those years he effectively launched his new campaign of chemotherapy and led it to its first practical triumph in the discovery and successful application of calyculin and its derivatives. To anybody who had opportunities of contact with Ehrlich during that period of tunities of contact with Ehrlich during that period of prodigious activity it must have been obvious that Miss Marquardt's tireless efficiency, and the intensity of her devotion to all his interests, played an important part in enabling him, with his prematurely ageing physique, still to reach such a pinnacle of achievement.

When Ehrlich died, in 1915, Martha Marquardt was still in her earlier forties; and she was then to devote more than another 40 years almost entirely to the commemoration of his life and his personality, and to collecting the records of his career. In 1924, in honour of what, had he lived, would have been his 70th birthday, she wrote and had published in Germany an intimate personal memoir, *Paul Ehrlich als Mensch und Arbeiter*, recalling his very unusual personality and methods of work with a charming and humorous affection. She found herself, however, increasingly unhappy in her native Germany, and became a voluntary exile in Paris. There she wrote, for German readers, an attractive little book which sketched, in successive chapters, various aspects of the daily life of the ordinary working Parisians. Her main concern, however, was the collection of everything that had any bearing upon Ehrlich's life and work—reprints of his published papers, copies of the letters and manuscripts of his published papers, copies of the letters and with which she had typewritten while she worked for and with him, and of any unpublished theses and addresses which she could trace. The second world war caught her there, in Paris, and it is not easy to understand how she survived it. She never spoke of the suffering and privation which it must have entailed for her; but she told me, only quite recently, that she had twice had to face, and had successfully resisted, threats of personal arrest and of the seizure of her treasured Ehrlichiana, first by the German army of occupation, and then by the French army of liberation, puzzled by the presence of this German woman, apparently still hiding in Paris and hoarding a mass of German documents. When she managed at length to bring her plight to the notice of the late Sir Almroth Wright, who had been one of Ehrlich's closest English friends, he brought her to London, and found means for her support, and opportunity in what is now the Wright-Fleming Institute of St. Mary's Hospital for her to undertake the fuller and more ambitious life of Ehrlich, which Sir Almroth encouraged her to write. This book, entitled simply *Paul Ehrlich*, published by Heinemann in 1949, and later in Germany and the U.S.A., contains a wealth of material of great value for an understanding of Ehrlich's personality and career; but Miss Marquardt was no longer young, and she had never acquired the chronological instinct of an experienced biographer. She had mined, moreover, against advice, to write this book directly in English, with which her familiarity was never so close as she seemed to believe. In spite, therefore, of a friendly and laborious effort to bring her draft into line with normal English usage, this book never appeared to me to have the spontaneity and lively charm of the shorter character-sketch which she had written in German 25 years earlier.

Her life's greatest ambition, however, remained yet to be fulfilled. Her plea for a complete edition of Ehrlich's scientific writings, important items of which had never yet been

published, enlisted my own full sympathy. As soon as the conditions made it possible, Miss Marquardt obtained the support of the Wellcome Trustees for a visit to Frankfurt, where she was able to gather further items for the collected edition, from the war-battered institute which had once been Ehrlich's. After some failures, a firm of publishers was found ready to accept a stable responsibility for the enterprise, with the help of a guarantee from the Wellcome Trust; and Dr. F. Himmelweit accepted, and has discharged with a growing enthusiasm, the main editorial function, with the devoted co-operation of Miss Marquardt, and my own supervisory responsibility. And now there is a note of genuine tragedy in the thought that Martha Marquardt has gone, full of courage and enthusiasm until the mere weight of years bore her down, a few days or weeks only before the overdue publication of the first volume of the "collected edition" for which she had worked and waited so eagerly.

We announce with regret the death of Dr. F. W. CHEESE on June 10 at Stourbridge at the age of 80. Frederick William Cheese spent most of his childhood in South Africa, where his father had emigrated following the death of his wife. When his father died he returned to England with his brother and two sisters. He studied medicine at St. Bartholomew's Hospital, graduating M.B., B.S. in 1906. He proceeded M.D. (Durham) in 1908. After a period of resident appointments at St. Bartholomew's, Dr. Cheese went into practice in Harpenden. During the first world war he served in France with a field ambulance and sustained severe frostbite of the fingers, a disability which proved to be a considerable handicap. In 1920 he re-entered general practice in Ludlow, moving to Cliftonville in 1930. He was chairman of the East Kent Division of the B.M.A. from 1939 to 1940. In 1942, at the age of 66, he was compelled to leave Margate under the emergency regulations then in force on the South Coast. He was dispossessed of his practice without compensation, being given five days to remove his chattels. This remained a source of rancour and bitterness to the end of his days. With his one surviving sister, Dr. Cheese went to Stourbridge. There followed a period as medical officer of an ambulance train, but he found the travelling too arduous, and in 1944 succeeded to the practice of the late Dr. A. R. Sharrod, of Stourbridge. From 1945 to 1947 he was chairman of the Dudley Division. Frederick Cheese was a mixture of the old and the new. He was remarkably in touch with modern developments in medicine, yet retained a traditionalism which showed itself in his punctiliousness in his habits and dress. He was never seen out except in a butterfly collar, clerical grey suit, bowler hat, and chamois leather gloves. His chauffeur always followed him into the patients' houses, carrying his bag. He remained in work until illness overcame him. He was unmarried.

S. D. M. W. writes: The untimely death of J. F. DIGNAN (*Journal*, July 7, p. 49) has brought to light how great were the feelings of love and trust which he inspired in his patients. Their grateful devotion to him reminds us of how strong an influence our profession wields in the lives of those who come to us for help and relief of their suffering. Taking over his hospital department in the emergency, I had the melancholy task of breaking the sad news to many of his patients who came expecting to see him. Their spontaneous expressions of grief were universal and came from their hearts. They had lost a friend, someone who cared for their troubles and took infinite pains to do all he could, both clinically and in the wider field of social rehabilitation, to ameliorate their lot. One patient who said, with tears in her eyes, "Oh, I shall miss him; he was so kind," has, I think, given him in her simple phrasing an epitaph as honourable as any which a man might hope to deserve.

Medical Notes in Parliament

PAY CLAIM REJECTED

Lieut.-Col. LIPTON (Brixton, Lab.) asked the Minister of Health on July 16 on what grounds he refused to disclose the increases in doctors' pay asked for by the British Medical Association. Mr. TURTON—Because, so far, there has been no claim published by the profession. The communication on this subject has been only in the form of a preliminary memorandum sent to my Department and to that of the Secretary of State for Scotland. To this a reply has now been sent stating that in present circumstances we would not feel justified in giving consideration to any claim for a general increase in medical remuneration.

Lieut.-Col. LIPTON—Before we can decide whether the reply is justified or not, cannot we be told what the doctors asked for? Why all this secrecy? Mr. TURTON—Because there has been no claim published by the profession. I must act under proper procedure, and not anticipate publication when I have only received what is a draft memorandum.

ADMISSION TO MENTAL HOSPITALS

Dr. DONALD JOHNSON (Carlisle, Con.), who has been questioning the Minister of Health for some time about the admission of involuntary patients to mental hospitals, brought the matter up for discussion on the motion for the adjournment on July 10.

He regarded the figure given him, in answer to his questions, of some 20,000 people a year being put into mental hospitals against their will as alarmingly high. Only some 15% of the number had been under outside observation in hospital wards. In other words, some 17,000 people were "swept up," mainly on a summary reception order, and detained in mental hospitals for an indefinite period up to a year. This was done on the opinion of two or three people, who, though of professional status and empowered to sign certificates, were as liable to error as the remainder of mankind. Mental hospitals were overcrowded to the extent of 15.6%. The more practical way of solving the problem was by exercising more discrimination over admissions. This could be done, he suggested, by the establishment of observation wards in general hospitals, in which patients could be viewed in surroundings as detached as possible from mental illness, and could be seen by general physicians not quite so preoccupied with their own specialty as were psychiatrists. Such surroundings would provide a respite during which the patient could perhaps surmount an acute crisis, and resume his place in the community without having acquired the stigma of having been a patient in a mental hospital. He quoted figures given by the L.C.C. in their evidence to the Royal Commission, that 4,746 persons were admitted to observation wards during 1953; and of these, 1,274, almost a quarter, were discharged at the end of the 17-day observation period, and a further quarter moved as voluntary rather than involuntary patients. It was clear to anyone with only a superficial acquaintance with the ways of mental hospitals that the quarter who were discharged were discharged much more quickly than if they had become entangled in the mental hospital machine.

New Outlook

Miss PAT HORNSBY-SMITH, Parliamentary Secretary, Ministry of Health, thought Dr. Johnson did less than justice to the great work that had been done towards removing the "stigma" from mental hospitals. The substantial increase in the number of voluntary patients, from 51% in 1946 to 75% in 1955, showed that there was a new outlook. Correcting a misapprehension that had grown up as a result of accommodation designated under Section 20 of the Lunacy Act being referred to as "observation wards," she pointed out that the primary purpose of Section 20 was to provide hospitals to which persons who needed to be placed under

control as well as given treatment without delay could be removed without formality beyond the action of the duly authorized officer. It was for cases of emergency, where there had to be prompt removal of a patient. Before the Health Service Act such patients could be sent only to public assistance institutions.

Professional opinion about the use of Section 20 had been divided for many years. In 1954 the number of Section 20 cases was 24,470, of which 7,141 were admitted to mental hospitals, 7,638 to mixed hospitals, and 9,691 to general hospitals. There was no clear evidence that the types of patient sent to the three kinds of hospitals differed much. Yet more than half the patients sent from Section 20 wards in general hospitals to mental hospitals were sent as certified patients, whereas of those admitted in the first place to Section 20 wards in mental hospitals only one-quarter continued under legal detention. It therefore seemed that the proportion of voluntary patients resulting from admissions into mental hospitals was higher than from admissions into other hospitals.

Mr. J. E. S. SIMON (Middlesbrough, West, Con.) asked why that should be so.

Miss HORNSBY-SMITH said it was a matter of medical controversy, and she would rather not give an opinion. Of the total Section 20 admissions, 12.7% were discharged from mental hospital wards within the detention period, whereas the discharge rate from the mixed and general hospitals was 33.1%. The differing results indicated in these percentages supported the view that many patients admitted direct to mental hospitals were willing to stay on as voluntary patients. The Royal Commission on the Law relating to Mental Illness could be expected to deal with all the procedures for compulsory admission, and it would be premature to anticipate any suggestions that they might make.

Car Parking by Doctors

Dr. BARNET STROSS (Stoke-on-Trent, Central, Lab.) asked the Minister of Transport on July 11 whether, in framing his regulations on parking meters, he would arrange that medical practitioners in the course of their work would be exempted from charges if they parked their cars in streets in which parking meters were installed. Mr. HAROLD WATKINSON's reply was "No." A general exemption of this nature would be contrary to the principles underlying the proposals for parking in the Road Traffic Bill. Dr. STROSS thanked the Minister for his recent letter, and asked whether he proposed to retain his inflexible attitude for ambulances and fire-fighting vehicles. Would he consider speaking to the B.M.A. about the whole matter? Mr. WATKINSON said there was nothing inflexible about his attitude. He had power to make exemptions, but he preferred to wait until he had the detailed survey of London parking that was being made. No one would gain more from that than the doctors if they could move about more freely.

Harley Street Congestion

Mr. ERIC JOHNSON (Manchester, Blackley, Con.) asked the Minister of Transport if he was aware that cars were being parked in a single line on one side of Harley Street, and in a double line on the other side; and if he would authorize the diagonal parking of cars on one side, which would accommodate more cars and take up less of the roadway. Mr. HUGH MOLSON, Parliamentary Secretary, said he knew about the excessive parking in Harley Street, but the suggestion would not improve matters. It would be as well to await the outcome of the special survey of parking facilities in inner London. Mr. JOHNSON said that the Parliamentary Secretary's view was not shared by residents in Harley Street, who thought the suggestion would undoubtedly improve matters. Mr. MOLSON stated that it would reduce from 10 to 8½ the number of cars which could be parked in 100 ft. (30 m.), it would take 19½ ft. (6 m.) off the carriage way instead of 15 ft. (4.5 m.), and it would be more obstructive to passing traffic. The SPEAKER: In other words, it is not a very good idea.

I.T.A. Decision on Tobacco Advertisements

The POSTMASTER-GENERAL, replying to Mr. P. GORDON WALKER (Smethwick, Lab.) on July 11, declined the suggestion that he should make regulations under Section 4(4) of the Television Act, 1954, prescribing that there should be no tobacco advertisements within 15 minutes before or after children's programmes. Mr. GORDON WALKER said that, in view of what had been stated by the Minister of Health about the connexion between smoking and cancer, it was indefensible that there should be incitement to smoking in close conjunction with children's programmes. Dr. HILL replied that the programme companies had decided not to include advertisements for tobacco in these programmes. That seemed to him reasonable. To go beyond that, bearing in mind newspaper advertisements, seemed to him in mind newspaper advertisements, seemed to him grandmotherly. Mr. BERESFORD CRADDOCK (Spelthorne, Con.) called attention to the B.M.A. discussion on July 10, in which he said seemed to be a direct contradiction to the implications in the question. Dr. HILL: It is not strictly my field, but let nothing I say appear to controvert the acknowledged statistical relationship between heavy cigarette smoking and cancer of the lung.

NEW MEASURES ON RADIATION HAZARDS

The Government's intentions towards putting into effect the recommendations contained in the Medical Research Council's report on *The Hazards to Man of Nuclear and Allied Radiations* were given to the House of Commons on July 16 by the MINISTER OF HEALTH. They amount to a complete review of existing safety standards, and in particular to appointment of a special committee under the chairmanship of Lord Adrian to examine the practice in diagnostic radiology and the use of radiotherapy in non-malignant conditions.

Mr. Turton, who was answering many questions and opinions expressed in a debate on the report, said the findings in the report were reassuring. They did not reveal any present danger from the peacetime uses of radiation. But we were entering a new age in which nuclear energy might become the principal source of power, and it was necessary to have a thorough understanding of the extent of the dangers that might accompany scientific progress, and in particular the possible harmful genetic effects. Clearly, they must try and work out the safety limits, and avoid any extra radiation that was not absolutely necessary. It was remarkable that the American investigation of the biological effects of atomic radiation, and that conducted in this country, had—working independently—reached broadly similar conclusions.

The second conclusion in the British report dealt with those exposed by occupation to additional risk. The Atomic Energy Authority would have no difficulty in carrying out these recommendations, and they would be carried out. It might mean a certain amount of shift rearrangement. On conclusion three, relating to the dose level to the whole population, he said that the total amount of man-made radiation was 27% of the natural background, and there was still a long way to go between that and the 200% that was permissible according to the conclusion.

In regard to fall-out (conclusion four), taking the maximum permissible amount of radio-strontium as 1,000 units, so far and the amount regarded as dangerous as 100 units, so far the amount of strontium in the fall-out from all the tests was only 1 unit. He was advised that there was no evidence of any irregularity in fall-out.

Limiting Test Explosions

The Prime Minister, said Mr. Turton, had repeatedly stated that the Government were prepared to discuss methods of regulating and limiting test explosions which took account of their own position as well as that of other powers. Specific proposals had been put forward to the United Nations disarmament subcommittee on Anglo-French

initiative on March 19. The Prime Minister had also stated last week that, while Britain would prefer such discussions to be pursued within the context of a comprehensive agreement on disarmament, they did not exclude any other method of discussion acceptable to those concerned, and would do their best to see that progress was made.

Occupational hazards in medicine arose among those engaged in hospitals on x-ray diagnostic and therapeutic work and using radioactive substances. An advisory committee under the chairmanship of Sir Charles Darwin had prepared a comprehensive code of practice for use in Health Service hospitals. This was undergoing final revision and would be issued shortly. But it was important that they should now consider whether the code should be modified or supplemented in the light of the Medical Research Council's report, and the matter had been referred to the radioactive substances advisory committee for consideration. To assist in carrying out the code, and applying protective measures in hospitals and industry, a radiological protection service had been set up by the Minister of Health and the Medical Research Council. They were continuing and extending the work carried out for many years by the National Physical Laboratory.

An important part of the recommendations was that the present practice in medical diagnostic radiology should be reviewed, and the use of radiotherapy in non-malignant conditions critically examined. These were essentially clinical matters, which must be considered, and advice given by representatives of the medical and dental professions for the benefit of all their colleagues. The Government had decided to appoint as soon as possible a special committee composed of scientists and professional men to review this question and make recommendations. It would be appointed after consultation with their Royal Medical Colleges and corporations, the British Dental Council, the Faculty of Radiology in Dentistry, and other professional bodies. Lord Adrian had consented to be chairman.

Pedascopes were already under review by the radioactive substances advisory committee. He was inviting that committee to review also luminous watches and clocks and television apparatus, and advise him about them as soon as possible.

It was suggested in conclusion that for future genetic studies it was essential to collect further information when births, marriages, and deaths were registered. Detailed recommendations would be discussed with the Registrar-General. The committee were to reassemble after the summer recess and submit to the Medical Research Council their recommendations for further work. In recent years the Council had sponsored a substantial programme of research, including the genetic effects, and present expenditure in this was more than £400,000 a year. The Government regarded this matter as of the highest priority, and immediate action would be taken when further recommendations were received.

More Alert

Dr. EDITH SUMMERSKILL (Warrington, Lab.), opening the debate, said that if the House was to discharge its duty to humanity seriously it must become more alert to the appalling dangers of nuclear energy.

She would have thought that the House should have had a statement from the Minister of Health on this report. He was responsible for protecting the health of the people. But in replying to questions on this subject the Minister had been complacent and, indeed, had revealed that he was apparently not aware of the most serious conclusions of the committee.

It was emphasized throughout the report that the scale of nuclear tests determined the danger in the future, yet only the previous week Japanese scientists had stated that the United States had exploded the biggest weapon of a series of eight nuclear tests which began in May. In view of some of the statements which were being made she wondered whether the soldiers were determined to ignore the advice of the scientists until it was too late.

INFECTIOUS DISEASES AND VITAL STATISTICS

Summary for British Isles for week ending **June 30**
(No. 26) and corresponding week 1955.

Figures of cases are for the countries shown and London administrative county. Figures of deaths and births are for the 160 great towns in England and Wales (London included), London administrative county, the 17 principal towns in Scotland, the 10 principal towns in Northern Ireland, and the 14 principal towns in Eire.

The table is based on information supplied by the Registrars-General of England and Wales, Scotland, N. Ireland, and Eire, the Ministry of Health and Local Government of N. Ireland, and the Department of Health of Eire.

CASES In Countries and London	1956					1955				
	Eng. & Wales	London	Scot.	N. Ire.	Eire	Eng. & Wales	London	Scot.	N. Ire.	Eire
Diphtheria	8	0	5	0	2	6	0	1	0	
Dysentery	1,466	238	201	10	3	807	47	298	7	
Encephalitis, acute ..	2	0	1	0		3	1		0	
Enteric fever:										
Typhoid	5	0	1	0		5	0	1	0	
Paratyphoid	3	2	2	0		17	0	0	0	
Food-poisoning	385	18		0		327	36		0	
Infective enteritis or diarrhoea under 2 years				17					11	27
Measles*	3,740	374	195	113	293	17,716	342	138	177	417
Meningococcal infection	21	2	11	2		23	1	7	0	1
Ophthalmia neonatorum	16	0	12	0		41	3	9	0	
Pneumonia†	267	9	145	3		295	16	139	7	
Poliomyelitis, acute:										
Paralytic	47	0	6	0	4	47	9	6	0	
Non-paralytic	34	5								
Puerperal fever}	240	26	11	0		230	49	12	1	
Scarlet fever	642	35	68	22	6	585	43	86	39	13
Tuberculosis:										
Respiratory	746	90	167	27		743	88	139	31	
Non-respiratory ..	106	10	16	3		133	5	33	2	
Whooping-cough	2,372	142	277	61	133	1,833	91	97	62	52

DEATHS in Great Towns	1956					1955				
	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire
Diphtheria	0	0	0		0	0	0	0	0	0
Dysentery	1	0				1	1		0	
Encephalitis, acute ..		0			0		0			0
Enteric fever	0	0	0			0	0	0	0	
Infective enteritis or diarrhoea under 2 years		0	3	0	2	5	0	0	0	0
Influenza	6	3	0	0	0	3	1	0	0	0
Measles		0	0		0		0	0	0	0
Meningococcal infection		0	0				0	0		
Pneumonia	164	20	9	5	3	143	17	15	12	2
Poliomyelitis, acute	3	2			0	1	1			0
Scarlet fever		0	0		0		0	0	0	0
Tuberculosis: Respiratory	} 42	{ 7 0	{ 2 0	{ 0 1	{ 6 1	} 47	{ 3 1	{ 2 0	{ 3 0	{ 6 0
Non-respiratory										
Whooping-cough	2	0	0	0	0	0	0	0	0	0
Deaths 0-1 year	189	19	18	6	22	191	21	25	10	6
Deaths (excluding stillbirths)	4,719	711	515	74	140	4,433	640	512	114	109
LIVE BIRTHS	7,944	1186	965	233	458	7,650	1097	881	237	426
STILLBIRTHS	184	19	32			209	28	13		

* Measles not notifiable in Scotland, whence returns are approximate.
† Includes primary and influenzal pneumonia.
§ Includes puerperal pyrexia.

Vital Statistics

Poliomyelitis

Poliomyelitis notifications in England and Wales in the week ending July 7 (27th week) were as follows (with those for the previous week in parentheses): paralytic 72 (47), non-paralytic 42 (34), total 114 (81).

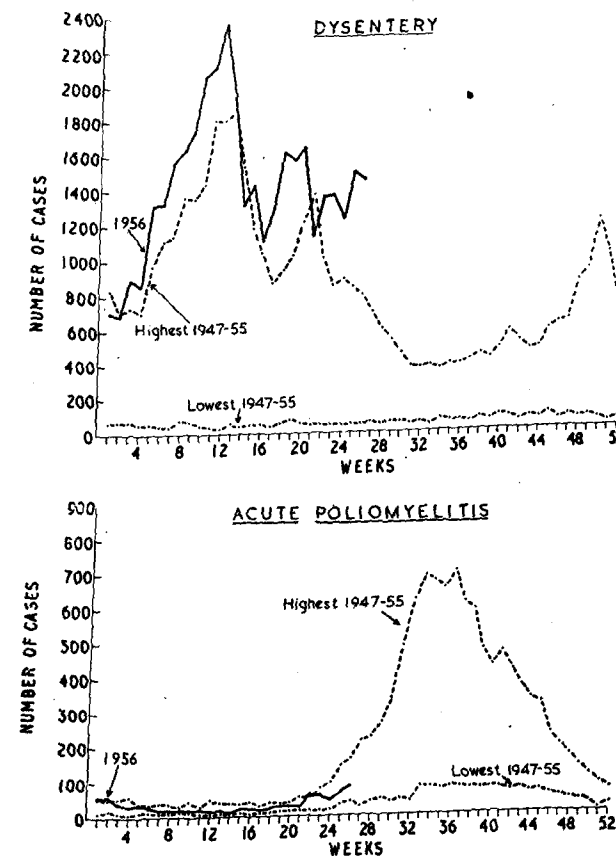
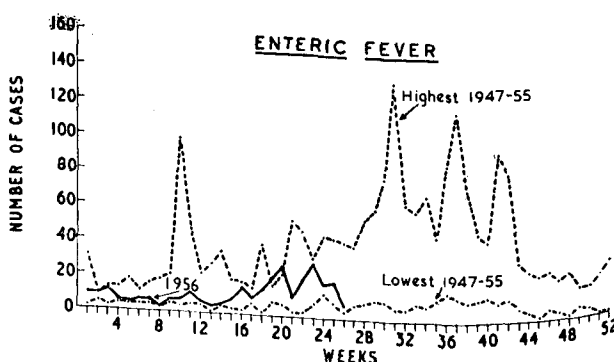
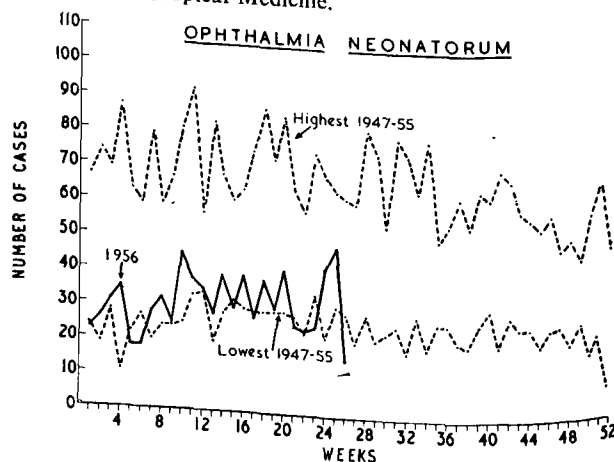
Some of the districts with populations of 15,000 or more in which the notification rate exceeds 15 per 100,000 in the year to date are as follows: Macclesfield M.B. 50, Whitehaven M.B. 87, Ennerdale R.D. 52, Darlington C.B. 22, Yeovil M.B. 75, Yeovil R.D. 25, Guildford M.B. 52. No districts with populations of less than 15,000 have serious outbreaks at present. Total notifications in the calendar year to the end of the 27th week are the third highest in the years since 1947, and notifications in the 27th week were the third highest compared with the same week in the other years in this period.

Week Ending July 7

Notifications of infectious diseases in England and Wales during the week included: scarlet fever 682, whooping-cough 2,405, diphtheria 7, measles 3,429, acute pneumonia 259, acute poliomyelitis 114, dysentery 1,235, paratyphoid fever 22, and typhoid fever 1.

Graphs of Infectious Diseases

The graphs below show the uncorrected numbers of cases of certain diseases notified weekly in England and Wales. Highest and lowest figures reported in each week during the nine years 1947-55 are shown thus -----, the figures for 1956 thus ———. Except for the curves showing notifications in 1956, the graphs were prepared at the Department of Medical Statistics and Epidemiology, London School of Hygiene and Tropical Medicine.



Infectious Diseases

The largest rises in the number of notifications of infectious diseases in England and Wales, during the week ending June 30, were 516 for measles, from 3,224 to 3,740, and 208 for whooping-cough, from 2,164 to 2,372, and the only large fall was £2 for dysentery from 1,519 to 1,466.

The largest increases in the incidence of measles were 166 in Lancashire, from 342 to 508, 94 in London, from 280 to 374, 66 in Hertfordshire, from 46 to 112, and 55 in Northamptonshire, from 55 to 110. A small rise in the incidence of whooping-cough was recorded in most areas, but the largest fluctuation in the local trends was a fall of 44 in Lancashire, from 409 to 365. The notifications of scarlet fever numbered 642, 19 fewer than in the previous week, and the largest variations in the local trends were a fall of 27 in London, from 62 to 35, and a rise in Lancashire of 24, from 69 to 93. 8 cases of diphtheria were notified during the week, being 3 more than in the preceding week: 5 of these cases were notified in Kingston-upon-Hull C.B.

The notifications of acute poliomyelitis numbered 81, and these cases were 9 more for both paralytic and non-paralytic cases than in the preceding week. The largest returns were Lancashire 33 (Manchester C.B. 18, Liverpool C.B. 4, Middleton M.B. 4, Salford C.B. 2), Yorkshire West Riding 9 (Barnsley C.B. 3, Leeds C.B. 2), Cheshire 6 (Macclesfield M.B. 3), and London 5 (Camberwell 2).

The chief features of the returns for dysentery were a fall of 106 notifications in Wales and a rise of 61 in Yorkshire West Riding. The largest centres of infection during the week were London 238 (Lewisham 39, Wandsworth 27, Greenwich 20, Lambeth 19, Southwark 18, Stepney 18, Battersea 16, Deptford 16, Woolwich 12), Lancashire 213 (Colne M.B. 22, Nelson M.B. 20, Blackpool C.B. 19, Liverpool C.B. 18, St. Helens C.B. 15, Worsley U.D. 14, Bacup M.B. 12, Bolton C.B. 10, Manchester C.B. 10), Yorkshire West Riding 210 (Sheffield C.B. 38, Leeds C.B. 35, Wakefield C.B. 32, Dewsbury C.B. 14, Doncaster C.B. 13, Morley M.B. 12), Essex 70 (Barking M.B. 20, Waltham Holy Cross U.D. 12), Kent 69 (Dartford M.B. 34, Eastry R.D. 18), North-

umberland 61 (Ashington U.D. 52), Warwickshire 59 (Conventry C.B. 25, Birmingham C.B. 20), Leicestershire 49 (Leicester C.B. 34), Sussex 42 (Rye M.B. 29, Brighton C.B. 11), Suffolk 40 (Ipswich C.B. 40), Middlesex 37, Nottinghamshire 36 (Beeston and Stapleford U.D. 17), Surrey 32 (Esher U.D. 13), Yorkshire North Riding 28 (Middlesbrough C.B. 20), Lincolnshire 26 (South Kesteven R.D. 12), Hertfordshire 26 (Stevenage U.D. 26), and Durham 25.

Medical News

Royal College of Surgeons.—Cardiff has been chosen for the next provincial meeting of the Royal College of Surgeons, which will be held in 1958 or 1959. This was decided at the council meeting on July 12, and follows the outstanding success of the College's Manchester meeting last December, a meeting which was not only the College's first provincial assembly but also its first scientific meeting. Sir HARRY PLATT was re-elected President. Sir RUSSELL BROCK was elected Vice-president, and Mr. LAWRENCE ABEL re-elected Vice-president. On July 5 the College announced the results of a poll, in which 1,888 Fellows voted, for two places on the council: Sir RUSSELL BROCK (1,506 votes) and Sir ARCHIBALD MCINDOE (1,215 votes) were re-elected; Mr. R. H. MAINGOT (867 votes) failed to secure a seat. A most generous benefaction to the College was made known at the Buckston Browne dinner on July 11 when Sir ARCHIBALD MCINDOE handed to the President a cheque for £7,500—the first of seven yearly instalments—from the Simon Marks Charitable Trust. Sir SIMON MARKS, chairman of Marks and Spencer Ltd., said at the dinner that the gift was a tribute to Sir Archibald's surgery. The money will be used by the College to support basic research on surgery in its own departments. The following lecturers have been appointed by the College council: Mr. L. W. PLEWES (Joseph Henry lecturer for 1957), Professor W. D. WRIGHT (Edridge-Green lecturer), and Professor G. HADFIELD and Dr. C. P. RHOADS (Imperial Cancer Research Fund lecturers for 1957).

Direction of Research.—This subject has recently been studied by a Government committee. Now it is to be the turn of research directors and administrators, who will discuss it at an international symposium at the National Physical Laboratory in the autumn. In April the Government issued as a White Paper the report of the Jephcott committee which had been examining the organization and working of the Department of Scientific and Industrial Research. The committee was strongly against the D.S.I.R. becoming "like an ordinary Government department," as was proposed in a draft Bill, preferring instead the creation of a council on the lines of the Medical Research Council and the Agricultural Research Council. This council, recommended the committee, although it would be appointed and responsible to the Minister, should be executive, not simply advisory. In this way, with the introduction high in the chain of authority of "a number of distinguished scientists and industrialists whose professional authority will be recognized," the committee believed that the climate for research in the department could be improved. The problem of the best use of limited research staff and facilities will be taken a stage further at the N.P.L. symposium, which is being held from September 26 to 28. Here the subject will be the "Direction of Research Establishments," bringing the discussion to the research group or laboratory level. Among the speakers are Sir HAROLD HIMSWORTH, F.R.S., secretary of the Medical Research Council, and Sir CHARLES HARINGTON, F.R.S., director of the National Institute for Medical Research. The meeting is restricted to directors of research and research administrators. Besides those from Britain, there will be many delegates from Europe, other parts of the Commonwealth, and the United States. They will debate

Intra-arterial Oxygen

Q.—What is the value of intra-arterial oxygen injections in peripheral arterial disease? Is there a centre in the British Isles where this treatment is under trial?

A.—The value of intra-arterial oxygen injections in peripheral arterial disease is still undecided. The effect of injecting a small volume of gas into the artery of a limb is to produce a short period of ischaemia at the periphery due to the obstructive effect of the bubbles in the smaller vessels. The effect is not confined to oxygen but occurs also with other gases. The period of ischaemia is followed by one of hyperaemia, which persists for a longer time than would be expected were it due simply to ischaemia such as might have been produced with a tourniquet. The exact physiological mechanism of the phenomenon, although the object of interest and experiment, is still obscure.

Repeated intra-arterial injections of oxygen as a method of treating peripheral arterial disease is under trial at the Royal Victoria Hospital, Belfast.

Percentile

Q.—What does "50th percentile" mean? Is this just a jargon term that could with advantage be replaced by some more familiar phrase?

A.—If a large series of measurements is arranged in increasing order, the p th percentile is, roughly speaking, the value below which precisely $p\%$ of the observations fall, and above which there are $100-p\%$. The 25th percentile and the 75th percentile are often called the "lower and upper quartiles" respectively, and the 50th percentile is called the "median." Although the 50th percentile happens to have a short and fairly familiar name, the longer terminology is not entirely useless, since in describing the distribution of a number of measurements it may be useful to quote a number of different percentiles, including the 50th.

The calculation of a percentile from any given series of measurements will usually involve interpolation between adjacent observations on either side of the required value. If there are n observations, the median is defined as the $\frac{1}{2}(n+1)$ th of the ordered series, if n is an odd number, and as the average of the $\frac{1}{2}n$ th and $(\frac{1}{2}n+1)$ th if n is even. The median will in general be different from the average (or "arithmetic mean"). For example, for the following set of measurements: 2, 3, 5, 10, 20, the mean is 8, but the median is 5.

Pyridoxine

Q.—What are the clinical actions of pyridoxine (vitamin B_6)? Has it any acute or chronic toxic effects in man?

A.—There has been no evidence of clear-cut deficiency of vitamin B_6 in man, but benefits have been claimed with this vitamin in the treatment of diseases such as pellagra and beriberi, which are primarily due to deficiencies of other B vitamins. Possibly diets which are lacking in vitamin B_1 or nicotinamide tend to be deficient in vitamin B_6 as well. Skin symptoms resembling those found in animals deficient in vitamin B_6 may be induced in man by the antivitamin desoxypyridoxine, and may be cured by giving the vitamin at the same time. Large doses of vitamin B_6 have been advocated for the treatment of excessive vomiting, especially during pregnancy, but it is rather doubtful whether the treatment is more than a placebo. Rats can tolerate doses of up to 1 g. of vitamin B_6 per kg. of body weight without ill effects, but higher doses are toxic. In agreement with this low toxicity in the rat overdosing in man has never been known to cause ill effects.

Inheritance of Polycystic Kidney

Q.—How is polycystic kidney inherited?

A.—Most, perhaps all, instances of polycystic kidney, except for the variety causing signs and symptoms in infancy and early childhood, are due to a dominant gene. Accord-

ingly the risk of having polycystic kidney for the children of a man with the condition is 1 in 2. The children of a man known to have the condition should therefore be examined clinically and radiologically, when young adults, for the presence of polycystic kidney. Those who are found to have the condition should be warned that if they themselves have children these, too, will have a 1 in 2 risk of developing polycystic kidney. Those who are found on examination when adult to be normal can, however, be reassured that they will not transmit the condition.

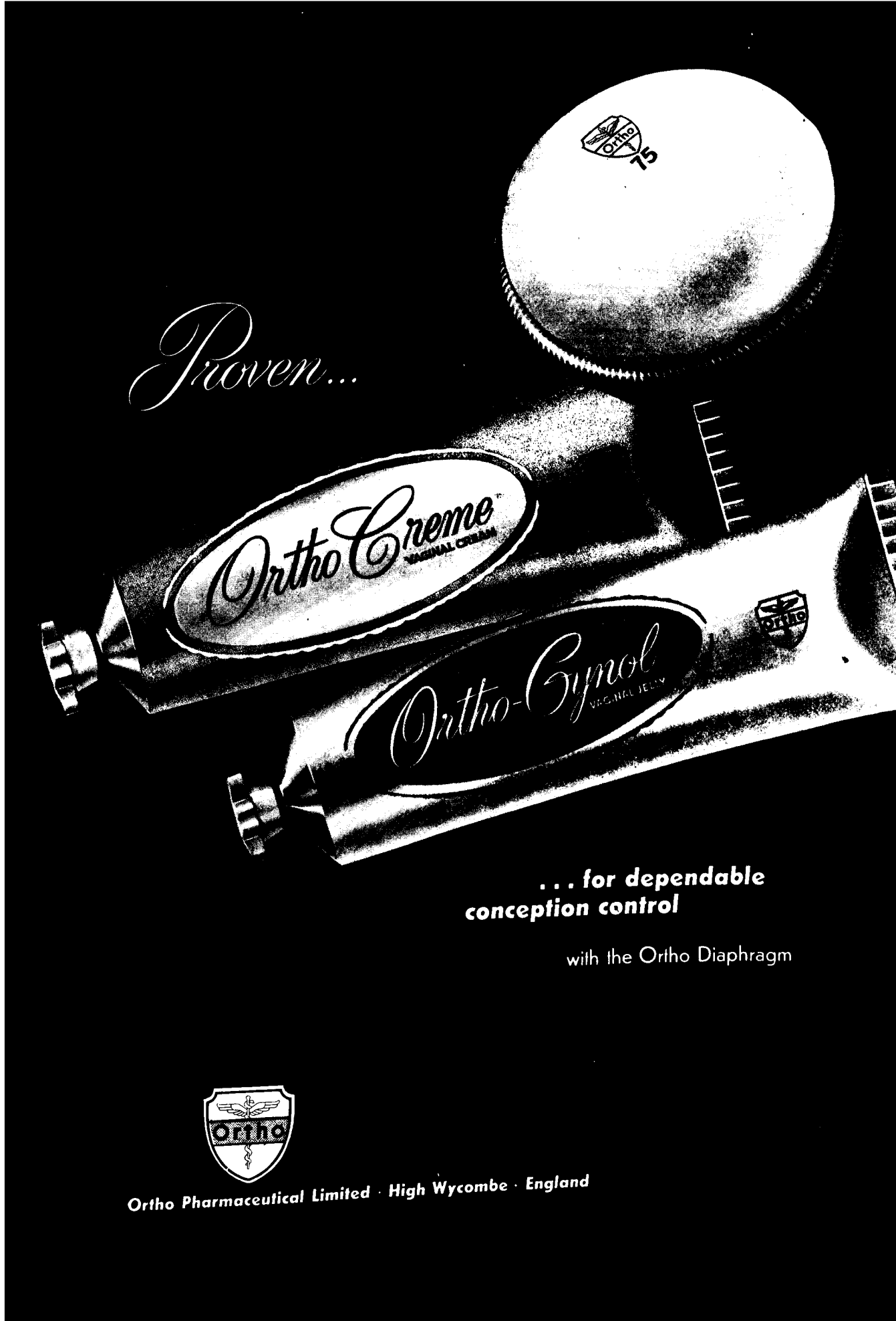
NOTES AND COMMENTS

Varicose Ulcer.—Mr. ROWDEN FOOTE (London) writes: I am most disturbed by the answer on varicose ulcer ("Any Questions?" June 23, p. 1499). I think great harm may be done to a multitude of patients if this advice is taken. Compression treatment for oedematous and ulcerated legs has stood the test of many hundreds of years. Your correspondent does not, however, seem to have heard of the "elastoplast" or dry-elastic bandage. I submit it might have been better to have published an extract from Thomas Baynton's famous work of one hundred and fifty years ago, *A New Method of Treating Ulcers of the Legs*, than to have answered the question in the way you have. The answer ignores the cardinal essentials of treatment, which we all know to be compression treatment followed by massage, exercises, and elastic bandages. Again, surgery along the lines of Madelung's operation is recommended. This procedure did not survive for many years after its introduction in 1884 owing to its high mortality and uselessness. Finally, the application of zinc oxide, soft paraffin, and a crêpe bandage is advised by the *Journal* in 1956. This is entirely beyond my comprehension.

OUR EXPERT replies: I must remain entirely unrepentant in the face of Mr. Rowden Foote's letter. There is certainly no one method in the treatment of varicose diseases and their complications, and there was nothing in my answer to disparage "elastoplast" or other supporting bandages, or treatment by physiotherapy. Mr. Foote may not be aware of the fact that treatment in bed in elevation will lead to the almost automatic healing of varicose ulcers. Often all that is needed locally is an application to prevent adherence of dressings. The zinc ointment recommended has the advantage of protecting eczematous areas. The healed ulcer scars produced in this way are extremely sound, and any form of post-operative support after the period of convalescence is most unusual. Perhaps three brief case outlines from a large series may be helpful: *Case 1*, a woman of 53 with recurrent ulceration over the internal malleolus extending over four years which had failed to respond to hospital treatment on Bisgaard lines. The ulcer healed with two weeks' postural treatment, operation was carried out, and the leg has remained well without external support. *Case 2*, a woman of 46 who had had six children and recurrent ulceration of the left internal malleolus extending over five years. She had had a variety of treatments as an out-patient, including supporting treatment and physiotherapy. At the time she came under observation she was completely incapacitated by a very infected ulcer. Healing was secured with three weeks' postural treatment, operation was carried out, and the patient is well. *Case 3*, a man of 62 with a 16 years' history of multiple ulcers around the lower third of the leg and diffuse eczema from the instep to the knee. He had been given up as incurable by hospital and his doctors. The condition cleared up with three weeks' treatment in elevation, operation was carried out, and the patient remains well. Perhaps these observations will suggest to Mr. Foote that I am more aware of the various methods of treatment than his letter would suggest, and also to dispel his fears about the harmfulness of the treatment recommended.

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BRITISH MEDICAL JOURNAL

LONDON SATURDAY AUGUST 4 1956

THE NATURE OF GENIUS*

BY

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One hundred years ago there came into life a being whose long years of work and insight were to make such contributions to knowledge as profoundly to influence the civilization of every country. And we may safely say that the full impact of that influence has yet to be experienced. Whoever stands in my place in another hundred years from now will in his commemorative speech—and I am confident there will be one—be able to report further progress in the assimilation and application of Freud's discoveries to an extent which it is impossible for us now to predict.

I chose the title of my lecture for its brevity, but it would have been more modest and more accurate had I entitled it "Some of the Factors Conditioning the Workings of Certain Forms of Productive Thinking." You will allow me to rectify it in this sense.

There is a quite stupendous literature on the subject of what Ostwald called "geniology," which would necessitate a large volume merely to summarize. This is certainly not the place to attempt any such compilation, but it is worth while commenting on the relative fruitlessness of so many of the attempts to solve the problem of genius. I should attribute that largely to the emotional ambivalent attitude so commonly shown in the approach to the topic. It has been well said that "there is a sort of doom overshadowing the very conception of genius: everyone who approaches it is drawn into a murky orbit of adoration and contempt, idolatry and scorn, profundity and shallowness." On the one hand, there are the writers who display a dithyrambic narcissistic identification with geniuses which allows the authors to praise their own glory under the guise of adoration. The Marquis de L'Hôpital asked: "Does he eat, drink and sleep like other men? . . . I represent him to myself as a celestial genius, entirely disengaged from matter." Such writers indignantly deny that genius has any relation to mere talent. De Quincey, for instance, maintained that the two are "not merely different, but are in polar opposition to each other." One author even regarded genius as "a psycho-biological mutation," from which it is only a step to contemplating the future selective breeding of geniuses.

On the other hand, more envious writers have laboured to find various ways of directly or indirectly disparaging men of genius and their achievements. The most popular one, from the time of Lombroso and Nordau onwards, is to insist that geniuses are psychopaths and mostly tainted with insanity, their achievements being lucky and more or less accidental by-products. The literature on this aspect of the problem is very extensive, but I have not found it illuminating. One can also detract from any credit due to the genius by asserting it was the result purely of heredity, so that we owe him no praise. One of the most original writers on the topic, Lange-Eichbaum, goes so far as to maintain that what constitutes a genius is the height of fame to which his worshippers raise him, this being the reason why the decision of who precisely is a genius varies from one period to another. But perhaps he did not sufficiently distinguish here the matter of subjective recognition from that of the actual objective achievement.

In the first place we may ask whether there really is such a thing as genius—that is to say, any attribute that differs essentially in its very nature from those present in all human beings. It is a question that has been often debated, but I propose to answer it from the start with a decided negative, and in doing so I find myself in agreement with such a high authority as Kant. All Freud has taught us concerning the regular laws of mental development goes to confirm the view that the manifold differences between various individuals, and indeed between the various races of mankind, are quantitative rather than qualitative, and this conclusion is only slightly modified by the reflection that a quantitative difference may on occasion be so striking as to give the impression of something qualitative and absolute. The question seems to me to resemble that concerning the presence in mankind of something qualitatively different from anything present in other animals—namely, the divine gift of a soul—and I need hardly say that this also finds no support in either biological or psychological researches. Indeed, the original meaning of the word "genius" was a designation for a semi-divine spirit who on appropriate occasions visited certain fortunate mortals and inspired their creations, after which it could presumably wander forth in search of other habitats. We still retain this sense of a discarnate spirit when we speak of a *genius loci* or of the "genius of a language" which institutes changes independently of any individual volition. It was only in 1700 that the term began to designate the actual person who was thought to be inspired by something mysterious within.

We apply the term "genius" more often to artists, particularly poets, whose intuition at times seems to border on the miraculous, than to men famous for more purely intellectual achievements. It is very possible that the conditions of creative genius are not identical in these two groups. At all events I am so much less at home

*Address delivered at the Royal Society of Medicine on the occasion of the centenary of the birth of Sigmund Freud.

with the former that I propose here to refrain from any consideration of its nature, and will refer you to Ernst Kris's masterly study of artistic creativeness. Even the intellectual group itself is by no means homogeneous. We speak of the genius of Napoleon, for instance, because of the degree in which both his military and his administrative capacities transcended those of the average being. I will therefore narrow my field still further to that of scientific production of the highest order.

Attributes of Genius

The number of those whose claims to belong to this Olympus are universally recognized is very small. After listing such names as Newton, Darwin, and Einstein we begin to enter a more debatable territory. "The genius of Freud" is a phrase that has been used so widely that I think we must subscribe to a truth contained in it. Characteristically enough, Freud himself vehemently dissented from its being applied to him. Even as far back as 1886, when he was 29, he wrote to his betrothed: "There was a time when I grieved that Nature had not, in one of her gracious moods, impressed on me that stamp of genius as she sometimes does. Since then I have long known that I am no genius, and I no longer understand how I could have wished to be one. I am not even very talented; my whole capacity for work probably lies in my character attributes." On one occasion in later life when it was applied to him he burst out with the protest: "Geniuses are unbearable people. You have only to ask my family to know how easy a person I am to live with. So I cannot be a genius." This disclaimer, however, was based on a very partial definition of genius, so we need not take it too seriously. But to ask in what sense the term can properly be used of Freud leads us into the heart of our subject and raises a number of difficult problems.

The numerous attempts to define genius have not proved very helpful. On one occasion some thirty definitions were listed, but for present purposes we may be content with that offered by the *Encyclopaedia Britannica* as "the highest conceivable form of original ability, something altogether extraordinary and beyond even supreme educational prowess." One notes here what is certainly a characteristic attitude of the beholder, that of astonishment or even amazement, one that is doubtless the source of the intense admiration the productions of genius so often evoke. It gives rise to the notion of mystery about the achievements of genius, and hence to that of its supernatural nature. Of all their characteristics Révész selects this one of *surprise* as being the most central, to which all others are accessory, and he perspicaciously remarks that it is typical for this feeling to be repeated, however often one contemplates the achievement.

Intuition; Spontaneity; Periodicity

This seems to accord with the frequency with which geniuses often receive their inspiration in a sudden flash that startles the recipient himself. It is a feature that has always been recognized. Both Plato and Aristotle commented on it, and they associated it with the divine source of the inspiration. The description of Apollo in the third book of *Hyperion* seemed to Keats to have come by chance or magic—to be, as it were, something given to him. He said also that he had often not been aware of the beauty of some thought or expression until after he had composed and written it down. It had then struck him with astonishment and seemed rather the production of another person than his own. Alfred Russel Wallace wrote: "Finally both Darwin and myself, at the critical period, had our attention directed to the system of *positive checks* as expounded by Malthus in his *Principles of Population*. The effect was analogous to that of friction upon the specially prepared match, producing that flash of insight which led us immediately to the simple but universal law of the 'survival of the fittest.'" This is, however, a feature by no means always present. The flash of insight which Wallace de-

scribed did presumably happen to him, but Darwin himself seems to have reflected on the suggestion more calmly. No one can have accepted revelation more tardily and gradually, even cautiously and very timidly, than Darwin, whose dawning vision came only as the result of many years of hard work.

In a disquisition on this element Lessing wrote: "How many conclusions would seem theoretically irrefragable had not genius succeeded in demonstrating the contrary," a statement that applies peculiarly aptly to much of Freud's work. In describing a recent discovery in physics Dr. Gabor made the interesting remark: "This statement has that touch of offending common sense which is the hallmark of every truly important scientific discovery." Freud's discoveries satisfied this criterion in full measure. Many philosophers and psychologists have shown conclusively that in theory there can be no such thing as unconscious mental processes, and our common sense fully agrees; yet, as Charcot said in a phrase Freud was fond of quoting, "*ça n'empêche pas d'exister*." I think we shall agree that there was enough of this element of surprise with which Freud's work has been greeted to warrant our attaching at least this one to the attributes needed to qualify for the title of genius.

Allied to this feature of intuitive inspiration is the characteristic spontaneity with which the productions of genius appear. They can never be brought about by a deliberate effort of will, and nothing can ever force them. Lowell has wittily said that "talent is that which is in man's power; genius is that in whose power man is," and Voltaire with equal wit expressed it thus: "The works of genius are to compilations what love is to marriage; Hymen comes when one calls and Cupid when it pleases him." Most writers on the subject are agreed that the achievements of a genius are out of his power. Goethe, who could speak from personal experience, laid it down that "all productivity of the highest kind, every significant piece of insight, every discovery, every great thought that proves fruitful and leads to further consequences, stand in the power of no one, and are beyond all earthly might. A human being has to regard them as unhelped-for gifts from above which he has to receive and revere with joyful thanks." Another poet put it in this way: "Genius does what it must and Talent does what it can." It is clear that this attitude of passive surrender towards the flowing in of the valuable ideas must be significant for the psychology of the productive process.

A third feature which has often been noted is that of periodicity. Moebius, for example, made a study of the cycles of productivity displayed by Goethe, and the same feature has been noted with Beethoven and many other geniuses. Freud himself often maintained that his productivity was at its maximum in cycles of seven years, though he had to strain the evidence somewhat to make it fit this precise span. Still, his most original productions are only a year or two out from his estimate: "Cocaine"; *Aphasia*; *Interpretation of Dreams*; *Theory of Sexuality*; *Totem and Taboo*; *Beyond the Pleasure Principle*; *Inhibitions, Symptoms and Anxiety*; and the *New Introductory Lectures* make a series that approximate to this observation. As might be expected, the notion of periodicity has been interpreted in clinical terms of cyclothymia, but with only occasional evidence in support of this. Freud, for instance, despite plenty of external grounds for despondency, suffered from only one mild and transitory attack of depression in his whole life, and his variation in moods never transcended the normal ambit. It seems to me that most of these cycles in productivity are sufficiently explained by the natural rhythm of life, particularly the variations in libidinal tension that belong to this.

The features just described may be encountered indiscriminately with all forms of genius, and I shall now consider three or four further ones which are much more characteristic of scientific production than of artistic inspiration. The most obvious of these is the indispensable one of absolute honesty. It was Goethe who laid down the law that "the first and last task required of genius is love of truth."

Originality

Then we come to the somewhat vexed matter of originality. It is certainly a more frequent occurrence for a man of science to make a new discovery than for a poet to invent an entirely fresh theme or even phrase, but, on the other hand, the title of genius is only very occasionally bestowed on the discoverer of new facts or ideas in science. Here between what he calls the *new* and the *essentially new*. The simply *new* concerns discoveries of a new fact which may never have been known before. Or it may concern a theory which modifies a previous one by adding some new consideration or factor. The *essentially new*, however, signifies an entirely fresh and different way of looking at things. Wordsworth shortly defined an act of genius as "the introduction of a new element into the intellectual universe." Thus Einstein's theory of relativity, although it modifies and adds to Newton's theory, was not evolved out of it as an extension; it came about from looking at certain physical phenomena in a radically new way.

George gives two examples to illustrate his point, and they are worth quoting. As a result of Sir Joseph Thomson's classical experiments, the phenomena of atomic physics were for 30 years described in terms of a particle of electricity, the now familiar electron. This concept served admirably to account for a wide range of phenomena, but certain optical ones caused a difficulty. Then de Broglie, in 1925, introduced an entirely different way of regarding an electron—namely, in terms of a wave—and to this day both these concepts have to be used for different purposes without any conclusion having been reached about which of the two is the more fundamental. Then, again, for aeons—in fact, until the turn of this century—all disease had always been regarded as being due to something which was not present in health attacking the body, whether this was a malignant demon, a draught of cold air, or an infectious agent. Drugs and other forms of treatment were simply designed to and counteract the harmful things that were producing the illness. It was not until within living memory, in observations on scurvy culminating in Gowland Hopkins's brilliant experiments, that it occurred to anyone that various diseases could be due merely to the *absence* of something in the body. That was an essentially new way of looking at the matter, and it has resulted in our present mass of complex knowledge about the various vitamins.

Darwin's doctrine of natural selection is another good example of an entirely new way of regarding the complex phenomena of living creatures. This feature has been commented on in respect of Freud. I will quote from a recent writer: "From time to time men of outstanding gifts alter our outlook on the world in one relatively restricted field or in another. But changes in the fundamental categories in terms of which we interpret the world and each other, are rare the very framework of our thought and language, are rare in history; and more rarely still can we attribute such a change to one man. But about Sigmund Freud there can be no doubt."

A New Idea

Freud's genius is peculiarly interesting in that it has led to looking at mankind in an essentially new way, although what he actually discovered was not in itself so very new. It has been possible to trace most of Freud's ideas to earlier sources; whether he actually obtained them in that way or only from his personal investigations is another matter. That holds goods for the division of the importance of sexuality conflict between its two halves; the importance of repression in human life and even its specific connexion with the psychoneuroses; the significance of repression, and so on. In fact, so far as I know, there was only one idea he discovered which had never been previously recorded. It was a very important one: the universal fear of castration among men. Dr. Henri Ellenberger, who has devoted some years

of research to the matter, extending through mediaeval to classical times, assures me that in spite of the age-old custom of castration in various communities he has not been able to find any mention of the *fear* of it in the writings of any historian, philosopher, or even psychiatrist. I have, however, recently come across the record of a patient who suffered from complete impotence as the result of his dreading castration at the hands of his father as a small child, and who was restored to complete potency when that fear was removed. The episode took place some three thousand years ago, and the gentleman was given the name of Iphiclus, "famous might," so the cure was very thorough. Psychotherapists received high fees in those days. The particular one who effected this cure, Melampus, who was reputed to antedate Aesculapius as the first physician, received a third of a kingdom and the king's daughter for his wife as a reward for curing her of a frenzy. In those days marriage with an ex-patient was not frowned on.

That for three thousand years this dread fear was never mentioned is a testimony to the desperate efforts we make to prevent ourselves from becoming aware of it. Freud may of course have been cognizant of the story in Greek literature, but if so it would afford one more illustration of the peculiar nature of his genius. For this consisted not so much in the discovery of new things but in the fearless and pioneering exploration of them. Through his detailed investigations, and not at all by personal propaganda, he compelled a section of the community, those with ears to hear, to accept a number of unwelcome but extremely important truths. He took seriously what had previously been hinted at, often merely whispered, and there is no doubt that an unusually high courage was an essential element in the achievement of his genius. Furthermore, although some achievements of genius have an unmistakable relation to the atmosphere of the period when they were accomplished, so that one feels someone else would surely have done the same thing, this was assuredly not true of Freud. One may legitimately doubt if anyone else would have come forward had Freud not done so. We might well have had to wait another hundred years or more for someone of his stature.

Sense of the Significant

Closely akin to this mysterious feeling for what is true seems to go a sense of the really significant. This enables a genius, or compels him, to generalize a finding where a lesser mortal would have cautiously gone on collecting more evidence before venturing on a general statement. Freud, although he would be accounted a man of sober and reflective judgment, afforded several instances of this kind of superlative boldness and sureness. When he discovered in himself the fear of castration he felt instinctively that the same must be true of all men, and when he also came across the Oedipus complex he did not hesitate to hold it valid not only for all those now on this earth but also for those who populated it many thousands of years ago. These were breath-taking generalizations, and it is not surprising that so many have balked at accepting them or have tried to limit them to certain societies only.

This remarkable capacity for perceiving with somnambulant sureness what is absolutely and universally true is of great interest. It transcends the simple love of truth itself, essential though this may be. I think it must occur at special moments when there is an unusual, and often only temporary, fusion of all the elements in the mind in a peculiar degree of harmony. The sureness arises from the completeness with which the ego is receiving in an unquestioning fashion the message from the preconscious. At that moment there is a complete coincidence between the striving of the id, the permission of the super-ego, the acceptance by the ego, and the external perception of the problem being studied. Emerson well said that "to believe your own thought, to believe that what is true for you in your private heart is true for all men—that is genius." Schopenhauer made a similar point when he said: "Always to see the general in the particular is the very foundation of genius."

Power of Concentration

The third attribute worthy of mention here is that of the power of concentration. There is no doubt that in the majority of instances important scientific discoveries have meant a great deal of hard work as well as intense concentration. Buffon, the great naturalist, considered that genius was nothing else than a greater aptitude for patience than that possessed by other men, which is rather like Carlyle's well-known dictum that "genius is first of all a transcendent capacity of taking trouble." Ramón y Cajal, the distinguished neurologist, described the process of scientific discovery as follows: "The ideal case would be that of a scientist who during his period of mental incubation would pay no heed to any thought that is extraneous to his problem, like a somnambulist who listens only to the words of the hypnotizer." And another writer, referring to "the self-surrender so familiar to creative minds," says: "The concentration of such a state may be so extreme that the worker may seem to himself or to others to be in a trance." In that connexion there comes to my mind an account Freud's daughter gave me of the time when he was composing the great final chapter of *The Interpretation of Dreams* in the summer of 1899. She recollected that when he was interrupted by being called to a meal he walked as if in a trance, oblivious of his surroundings.

At this point we enter the realm of depth psychology, and numerous problems throng upon us. What is the significance of this extraordinary concentration and intensity? What powerful impulses are driving their way at such moments? For there is every reason to suppose that men of genius are characterized by possessing exceptionally strong emotions and usually a correspondingly strong capacity for containing them. The tension induced by the preceding efforts to find a solution gradually mounts until it reaches a climax. The great mathematician of genius, Henri Poincaré, in describing how he made his own discoveries, said: "One is struck by these appearances of sudden illumination, obvious indications of a long course of previous unconscious work. . . . These sudden inspirations are never produced except after some days of voluntary efforts which appeared absolutely fruitless." Einstein has given a very similar description, and in the Fliess correspondence there are numerous allusions to the exhausting stress and strain Freud experienced in the continuously hard work of attaining his various pieces of insight. Kretschmer speaks of the great scientists' "passionate emotions developing which drive their thought constantly in the same direction, producing the utmost tension until at last a short-circuit occurs: somewhere a spark leaps to a new spot where up till then no human thought had ever passed."

What is the relation of the conscious interest in a particular problem to the unconscious forces that have produced so much tension? Müller-Freienfels maintains that what is characteristic is the being thrilled and gripped by the problem in some mysterious way that transcends in strength the mere desire to know, but perhaps he underestimates here the strength of just that desire in the unconscious. It is, however, noteworthy that he compares the thrill in question with the emotion of passionate love, and we are familiar enough with the connexion between the sexual instinct and the desire to know; it is a matter that Freud expounded fully in his work on Leonardo. Evidently there must be a special coincidence between the unconscious impulses and some essential feature of the objective problem. In the preliminary cogitation various shiftings and similar mechanisms are going on in the unconscious, the purpose of which is to achieve a sufficient degree of harmony with the censoring functions of the super-ego by means of which the accompanying guilt is kept in abeyance. At the successful moment there must have been achieved a quite remarkable degree of integration between the ego, the super-ego, and the id. It is no doubt this successful degree of synthesis, the overcoming of all barriers, that accounts for the sense of elation at the final moment of triumph. As is well known, such a complete synthesis is rarely more than a temporary one. The

super-ego which has been circumvented soon resumes its sway, and elation is followed by self-criticism, disparagement, and even doubt about the solution reached. I have described at some length these phases which Freud underwent during and after one of his most difficult achievements: the composing of *Totem and Taboo*.

Prerequisites of Genius

I now come to a modest contribution which I think could be made to our knowledge of the conditions governing the productivity of genius. It had long struck me that an essential prerequisite of such productivity must lie in a particular scepticism on the part of the genius. He must have refused to acquiesce in certain previously accepted conclusions. This argues a kind of imperviousness to the opinions of others, notably of authorities. Furthermore, he often has the capacity of seeing the existence of a problem where others have passed it by; he has refused to take something for granted as being either without meaning or too insignificant to bother about. This aloofness sets him free to speculate and investigate. The classical example of scepticism being deliberately employed is of course that of Descartes, who tried to start by doubting everything. The task, however, proved harder than he had expected, and his scepticism did not prevent him from indulging in rather wild speculations in his theory of vortices.

I once asked Freud what he thought was the explanation of the extremely free thinking that scientific pioneers and discoverers must have. He did not answer the question directly, but he pointed out that such freedom is always obtained under the condition that another aspect of mental functioning is inhibited. The example he took was that of Forel. In the face of the puritanical atmosphere with which he was surrounded in Switzerland, Forel ventured to publish a book on sexual problems which at that time was considered shockingly outspoken. On the other hand, he became an extremely bigoted opponent of the custom of imbibing alcohol in any form. His fanaticism in this respect was so intense as to leave its mark on the present-day Zurich with its flourishing *Alkoholfreier Verein* that is to be seen nowhere else. He infected his successor Bleuler with the same fanaticism, and Jung attributed Bleuler's breach with him to the circumstance of Freud having induced Jung to depart from the faith and to taste the forbidden liquor.

It may well be that the compensatory inhibition of which Freud spoke is the explanation of a feature often remarked in men of genius—namely, a certain naïveté, marked simplicity, and ignorance of the ways of the world. One writer even commented on what he called the *scheinbare Dummheit* (apparent stupidity) often found in such men, though this must surely apply only to a small minority. I note, however, that Thomas Mann, in his famous description of Goethe, comments on "the union in one human being of the greatest intellectual gifts with the most amazing naïveté."

The scepticism and imperviousness to opinion of which I have spoken were prominent features of Freud's personality, and they extended over a wide field. Not long after getting to know him, however, I was struck by an exactly opposite feature, one which, it is true, operated in a far more limited field. I refer here to a curious credulity, a willingness to believe what he was told, whether it was really likely or not. To it I would ascribe his well-recognized difficulty in forming an accurate estimate of personal character, a deficiency of which he himself complained. In my biography I have given many examples of this credulity, which at times bordered on superstitiousness, but it is worth while commenting on what is perhaps the best-known example of it, since it was that feature which ultimately led him to make one of his very greatest discoveries. I refer to the years when he accepted as true the seduction stories of his patients, which I am sure the vast majority of physicians would have doubted at once and regarded as one more example of the unreliability of hysterics and their tendency to fabrication.

In relating this experience in later years Freud spoke of how despondent and baffled he felt when he found how

deceived he had been and that most of the stories were quite untrue. Baffled he doubtless was, but contemporary evidence in his letters to Fliess reveals that, so far from being despondent, he felt a quite inexplicable elation. He wrote the memorable words: "Can these doubts be only an episode on the way to further knowledge? . . . Between ourselves I have the feeling more of a triumph than of defeat." He could not know at that moment, though his unconscious evidently did, that he was on the brink of one of his most momentous discoveries—the significance of incestuous wishes in infancy.

Pascal pointed out that greatness is never at one extreme but consists of the union between two extremes, an idea which Sainte-Beuve later labelled the theory of the *entre-deux*. My own suggestion is a particular application of this.

In a proper scientific spirit I then wondered whether this observation I had made concerning Freud's personality could have any more general validity as a condition for the productivity of scientific men of genius, and the studies I have made of many of them encourage me to think that it may be so. Allow me to relate a few examples. I will start with the earliest in point of time, Copernicus. His work revolutionized our conception of man's place in the universe and reduced his glorious habitation to an insignificant speck of matter in space, so that Sir Arthur Balfour in one of his cynical moments could describe the story of mankind as "a disreputable episode in the history of one of the minor planets." Actually it is not certain that Copernicus was really convinced that the earth revolved round the sun, but he evidently ventured to doubt whether the sun went round it. So much for his scepticism. His reputation and the immortalizing of his name rest on that alone. But there is another side to the story, which throws light on the motives impelling him to his new conception.

It will be remembered that, starting from the Greek doctrines of perfect heavenly orbits, Ptolemy had constructed an extremely ingenious geometrical scheme of the universe as then known. He found it necessary, however, to introduce a number of what are called epicycles, and moreover to give some of them the form of an ellipse. The scheme worked fairly well for many centuries, but the progress in astronomical knowledge gave it what might be called increasing fits of indigestion which could be cured only by introducing more and more epicycles, so that ultimately the picture became one of bewildering complexity. Many attempts were made in the sixteenth century to simplify matters, including that by Copernicus. Now what really stirred Copernicus was a feeling of dismay and reprobation at Ptolemy's impiety in daring to depart from Aristotle's dictum that all the heavenly orbs and orbits must have the form of a perfect circle to conform with the perfection of form of a perfect circle to conform with the perfection of form of the Divine Creator. Copernicus had an absolute belief in Aristotle's infallibility. Therein lay his credulity. And it drove him to search for methods of remedying Ptolemy's irreverence. He then found that by imagining the sun as the centre of the solar system he could devise a scheme, however faulty it afterwards proved to be, that could be built up with the desirable perfect circles. So he died a happy man. He was not the first to do the right thing for a wrong reason—Columbus had given an even more spectacular example not long before. Nor was he by any means the last.

Credulity of Great Men

We then come to the greatest genius of all times, Sir Isaac Newton. It would need an extremely expert mathematician indeed to elucidate the elements of scepticism and credulity entering into his great discoveries in science, nor is it likely that the data for doing so exist. On the other hand, it is easy to show that both these attributes were prominent in Newton's personality. His published scientific work is marked by a rigid objectivity, and it was he who proudly proclaimed the famous sentence, "*Hypotheses non fingo*" (I never manufacture hypotheses). He resolutely refused even to speculate on the actual nature of light or of gravita-

tion, but contented himself with studying their mode of operation. Yet he had in earlier days spent much fruitless time in conducting experiments in alchemy, in the search for the philosopher's elixir, and the means of transmuting metals into gold, and this at a time when alchemy had long passed its prime. Most of Newton's biographers have suppressed the important fact that throughout his life theology was much more important to him than science, and, moreover, theology of a peculiarly arid and bigoted order. There was an astonishing contrast between the extreme credulity he displayed concerning the literal statements of the Old Testament and the scepticism he evinced concerning the cardinal doctrines of the New. He followed Bishop Ussher in dating the Creation from 4004 B.C., and on that basis and the data about the long lives of the patriarchs spent years in conjuring up a chronological history of all the nations of the world, in the course of which he came to unbelievably fantastic conclusions. He was especially engrossed in unravelling the obscure symbolism of the Books of Daniel and of Revelations. From the former he deduced that the tenth horn of the fourth beast must refer to the Roman Catholic Church and confidently predicted its downfall in the year 2000. Similarly, Halley's comet would probably after five or six revolutions fall into the sun so that the earth would be burnt up. He was also a devotee of Jacob Boehme's mysticism. Yet, on the other hand, although he was a constant adherent of the Church of England, he subscribed to the Arian doctrines which deny that of the Trinity and even went further in doubting the divinity of Jesus.

Newton had a markedly irritable and suspicious temperament, and much of the controversy that disfigured his life arose from his credulous belief in the statements of over-candid friends. In later life these qualities deteriorated for a while into paranoid delusions of persecution; perhaps in this connexion it is not irrelevant to remark that Newton never fell in love and never married.

Faraday, the supreme physicist of the nineteenth century, had also his vein of credulousness. He said: "In early life I was a very imaginative lively person who could believe in *The Arabian Nights* as easily as in the *Encyclopaedia*, but facts were important to me and saved me." Throughout his life he was an adherent of the obscure sect of Sandemanians, followers of the religious prophet Robert Sandeman, and for three years regularly preached sermons before them. One must place this in contrast with Faraday's exceptional intelligence in other spheres, since it would be commonplace otherwise.

Darwin was a man of far more placid temperament, and it is probable that any turmoil of emotions found their expression in the psychosomatic afflictions to which he was a martyr. Although destined for the Church, he came gradually to doubt the truth of the official religious doctrine that mankind had been created in God's image for the edification and glory of the Lord of the Universe; in this he was influenced by Lyell's work in geology and perhaps also by his grandfather's teaching on evolution. But his scepticism was tempered by a credulous attitude towards other authorities. Even after his great discovery of the operation of evolution through natural selection he still believed in Lamarck's doctrine of evolution through the inheritance of acquired characters, a doctrine his own work had rendered superfluous and indeed erroneous. It was because of it that he developed his extraordinary theory of pangenesis, according to which minute gemmules in the blood convey the acquired alterations to the germ cells, cells which we know now to be impervious to any such influence.

His friend and contemporary Huxley offers a very interesting contrast to the genius Darwin. Although possessing a wider knowledge than Darwin, and gifted with more originality and a greater intellectual daring, Huxley's actual achievements are of a different order. On first reading Darwin's theory he exclaimed: "How extremely stupid of me not to have thought of that." Now, Huxley was endowed with any amount of scepticism, of indeed a rather pugnacious brand. It has been said of him: "He allowed

himself no prejudice, no sentimentalities, no illusions." But there is no record in his life of any evidence of credulousness to match it and, according to my view, to enable him to make really great discoveries.

Perhaps it is worth mentioning in the present connexion the remarkable epidemic of belief in the cruder aspects of spiritualism that infected several of the leading English physicists early this century: Sir William Barrett, Sir William Crookes, Sir Oliver Lodge, and Sir George Stokes. The number of times the mediums in which they trusted were exposed as frauds made no difference to the tenacity of their beliefs.

Psycho-Analytical Considerations

It would not be out of place on this occasion if I concluded with a reference to some psycho-analytical considerations. The only point I wish to bring forward here is the suggestion of a possible correlation between the credulousness on which I have been laying stress and the characteristically receptive nature of genius. A credulous attitude betokens an uncritical, excessive open-mindedness towards environmental stimuli, and this must go hand in hand with a similar uncritical open-mindedness towards the ideas pressing forward from the preconscious and ultimately from the id. It can afford to be uncritical here because of the relaxing of the inner censorship when harmony is established for the moment between the three mental institutions, ego, super-ego, and id. All this, however, represents only the preliminary stage of the process—an essential one, it is true. It is followed by a far more critical stage during the final act of formulating the new theory or conception. In this stage there is a strict criticism of the incoming ideas combined with an exclusion or even oblivion of the outer world when outer stimuli are regarded as a hostile interference, as in the case of Archimedes they certainly were. The intense concentration of this stage may culminate in the state of trance mentioned earlier.

Now in the first stage the passive, almost self-effacing role of the ego in accepting the ideas pressing in from the preconscious must surely be associated with the more feminine aspect of the personality or, as Freud preferred to term it, "the attitude of passive aims." It cannot be chance that so many words describing the process are taken from bodily analogies. The very word "inspiration" signifies a taking-in act on the part of the body. Poets often speak of being pregnant with their fancies, and the words "to conceive" and "to produce" equally apply to bodily activities. A writer can describe his mood as being in labour with an idea or actually giving birth to one. Furthermore, it is noteworthy how often, as constantly happened with Freud himself, the fomenting gestation of thought that precedes that final illumination is accompanied by just that kind of bodily discomfort that suggests the pains of labour. That women have more direct means of expressing this instinct would then account for the undeniable fact of major creative thinking being almost a prerogative of the male sex. It is their substitute, the only one available to them, for the gift of bodily creation bestowed on women.

Conclusion

I will conclude by recalling your thoughts to the man in whose honour this address is given. It will probably be generations before all the implications of his ideas are fully worked out and the stimuli he provided for us fully acted on. Revolutions in thought such as he brought about do not happen very often in history, and it may well be long before another similar one takes place. We do not even know in what sphere of psychology to expect it; it might be one in the genetics of the mind or, on the other hand, in the field of social psychology. In the meantime what can we feel but gratitude towards the memory of a man who gave so richly and so generously? Truly one may well say with his favourite prince: "I shall not look upon his like again."

AMNION IMPLANTATION IN PERIPHERAL VASCULAR DISEASE

BY

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The purpose of this article is to report the effect on intermittent claudication of implanting human amnion into the thigh in 40 cases of peripheral vascular disease. This procedure was adopted because it had been observed (Troensegaard-Hansen, 1950; Shaw and Troensegaard-Hansen, 1952) that amnioplasty carried out for the treatment of leg ulcers in cases of peripheral vascular disease was followed not only by healing of the ulcer but also by a reduction in the severity of intermittent claudication. That such reduction might not be due solely to the healing of the ulcer was suggested by the fact that several patients claimed that their claudication was less than it had been before the ulcer appeared.

Material

The present series consists of 40 male patients. Their ages varied from 35 to 89, with an average of 60 years. They were selected as being in groups 1 and 2 of intermittent claudication (Professor Boyd's classification). The claudication was due to arteriosclerosis in 38 cases and to Buerger's disease in 2. Symptoms had been present for more than six months in the majority (Table I), and conservative treatment had been applied without significant effect in all of them. Three had been subjected to sympathectomy without effect on the claudication.

The pre- and post-operative condition of the patients was assessed by their tolerance to exercise, the presence or absence of rest pain, the radioactive sodium test, oscillometry, radiography, and skin temperature recordings.

Methods of Investigation

Tolerance to Exercise.—The criteria for tolerance to exercise were walking distance and ergometry. By walking distance is meant the distance which the patient can walk under controlled conditions before the onset of pain in the calf. By ergometry is meant controlled exercise on an ergometer. Two types of ergometers were used. In the first type, devised by Mr. N. C. Lake, the patient rhythmically depresses and releases a pedal, so raising a known weight through a standard distance once per second. This frequency was indicated to the patient by a swinging pendulum. The second ergometer was of the bicycle type, and was pedalled at a standard rate against a constant resistance. The patients' tolerance to these exercises was expressed as time (seconds) required to produce pain in the calf, and is referred to in Table I under ergometry as pain threshold in seconds. Rest pain was assessed in terms of severity, frequency, and duration.

Radioactive sodium tests (see below) were done on normals, on claudicants, and on patients having varied treatment.

Oscillometry was carried out, using a Pachon type of oscillometer. The maximum deflections were noted at different pressures and recorded (Table I).

X-ray examination of the patients' legs for evidence of arterial calcification was carried out.

Skin temperature of the limbs was recorded by means of a mercury skin thermometer.

Radioactive Sodium Test

The radioactive sodium test as described by Kety (1949) and modified by D. Walder (1953) was used for estimating the variations in blood circulation of the limb. This test has been used to determine changes in the arterial blood flow occurring after the use of certain vasodilators. As small variations can be detected the test is suitable for indicating changes that might occur following the treatment devised. Forty radioactive sodium tests have been done up to the time of writing. 24 cases in 16 cases both before and after implantation. 24 cases had only post-implantation tests, as these were early cases before the radioactive sodium test had been started. In this test from 0.06 to 0.15 ml. of saline containing 30 microcuries of radioactive sodium was injected into

the calf muscle to a depth of 2.5 cm. from the surface, and its rate of disappearance from the area was judged by the decrease in counting rate from a Geiger counter strapped to the calf, this being recorded on a ratemeter. For the first four minutes the patient stood at rest; he was then exercised by making him rise on his toes once per second, timed by a swinging pendulum for a period of two minutes. Finally, the readings were continued while he was at rest for a period of five to eight minutes. The fall in radioactivity was plotted logarithmically against time. In normal patients (Fig. 1) the fall was regular and the rate of fall increased during exercise. In a patient with intermittent claudication the graph deviated from the normal during the period of exercise (Figs. 2 and 3). The occurrence of the "hump" (A and B in Fig. 2) was thought to be due to poor arteriolar

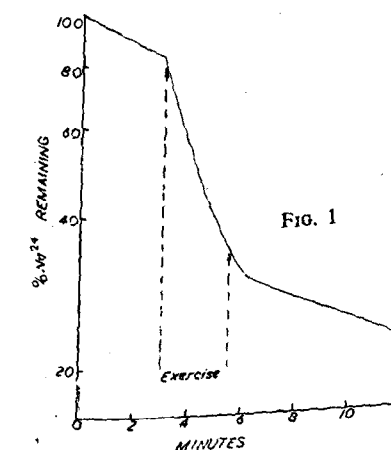


FIG. 1

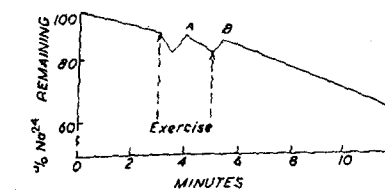


FIG. 2

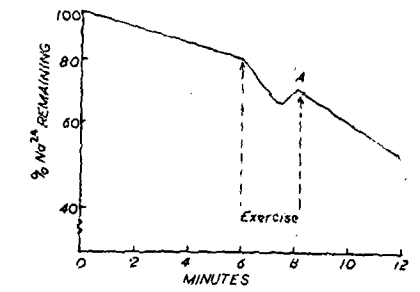


FIG. 3

FIG. 1.—Normal curve of left leg showing straight line in inter-exercise period. Return to pre-exercise level within one minute. FIG. 2.—Before treatment, showing claudication. A denotes inter-exercise hump. B denotes post-exercise hump. Shallow claudication. FIG. 3.—Claudication curve before treatment showing notched inter-exercise period.

TABLE I.—Data Following Amnion Implants in Intermittent Claudication

Case No.	Age	Diagnosis	Duration of Disease	Ergometry Pain Threshold in Seconds		²⁴ Na (Radioactive Sodium)		Pain Threshold to Walking		Oscillometry in Deflections		Follow-up and Results	Date of Implant
				Pre-op.	Post-op.	Pre-op.	Post-op.	Pre-op.	Post-op.	Pre-op.	Post-op.		
1	55	Arterio-sclerosis	7 mths.	20	None	Claudication graph	Normal	10 yds.	1 mile	Flicker	Flicker	First implant septic. No improvement. Reimplanted—satisfactory. Back at work. 8 months since implant. Good result.	9/2/55
2	56	"	1 yr.	45	240	"	"	75 "	1 "	1 "	1 "	First implant septic—no improvement. Reimplanted. Over 7 months since implant. Result good. Working as postman.	19/5/54
3	67	"	2 yrs.	90	300	"	"	50 "	1 "	Nil	1 "	Walking well. No pain at all. 9 months since implant.	5/1/55
4	66	Arterio-scler. + coronary thrombosis	4 "	40	None	"	"	100 "	1 "	1 "	1 "	First implant septic: no improvement. No calf pain at all. Reimplanted. Foot aches after 1 mile walking quickly. 8 months since implant.	2/11/55
5	57	Arterio-sclerosis	1 year	30	"	Not done	"	10 "	1 1/2 miles	1	5	Very good result. Completely normal. 3 years since implant.	31/10/52
6	53	"	1 "	20	150	"	"	50 "	1 mile	R. 1 L. 5	R. 5 L. 8	Completely normal. 1 year 7 months since implant.	24/3/54
7	78	"	13 yrs.	18	90	"	Not done	10 "	1 "	0	0	Walking briskly. No pain when last seen. 1 year since implant.	6/10/54
8	70	"	6 mths.	50	None	Cl. graph	Normal	100 "	7 miles No pain	R. 1 L. 0	R. 3 L. 4	Walking normally. Back to work. 7 months since implant.	13/4/55
9	50	"	2 yrs.	50	"	Not done	"	100 "	1 mile	1	1	Walks 1 mile up a slope with no pain. Pulsation previously absent in the foot is now felt. Excellent result. 1 year since implant.	7/12/54
10	53	"	4 "	12	50	"	Not done	50 "	2 miles	0	2	Walked 2 miles a day for 10 days with no pain at all. Started running after discharge from hospital with complete relapse. Classed as a failure.	11/12/51
11	89	"	3 mths.	Not done	Not done	"	"	Bedridden		0	0	Had a static senile gangrene of one toe. Within 10 days of implant gangrene became moist and spread over the foot. High amputation followed. Classed as a failure.	12/4/54
12	35	Buerger's disease	2 yrs.	14	90	"	Normal	50 yds.	1 mile	1	1	Result fair. 15 months since implant. Buerger's disease has been complicated by cerebrospinal meningitis and wasting of affected leg with bilateral deep thrombosis.	12/5/54

Continued overleaf

TABLE I.—Data Following Amnion Implants in Intermittent Claudication—contd.

Case No.	Age	Diagnosis	Duration of Disease	Ergometry Pain Threshold in Seconds		²⁴ Na (Radioactive Sodium)		Pain Threshold to Walking		Oscillometry in Deflections		Follow-up and Results	Date of Implant
				Pre-op.	Post-op.	Pre-op.	Post-op.	Pre-op.	Post-op.	Pre-op.	Post-op.		
13	71	Arterio-scler.	3 mths.	Not done	Not done	Not done	Not done	Not done	Not done	Not done	Not done	Static senile gangrene. Became moist, with rapid spread up foot within 10 days of amnion implant. High amputation. Classified as failure	14/7/55
14	74	"	3 "	"	"	"	"	50 yds.	1 mile	"	"	Good result. No claudication when last seen, has malleolar ulceration, which is healing. Ulceration impedes his capacity for walking. 6 months since implant	1/9/53
15	64	"	6 "	90	None	"	Normal	200 "	1½ miles	R. 4 L. 5	R. 8 L. 7	Very good result. Walking well. No pain. Over 5 months since implant	4/5/55
16	53	"	2 weeks	45	300	Cl. graph	"	40 "	1 mile	R. 0 L. 2	R. 2 L. 3	Eight months since implant. Good result. Walking well. Back at work	15/12/54
17	60	"	1 yr.	50	None	Not done	"	20 "	1½ miles	R. 1 L. 1	R. 1 L. 2	17 months since implant. Walking well. Implant went septic. Gets slight cramp after 1½ miles, occasionally after less than 1½ miles. Back at work. Result fair	10/3/54
18	64	"	2 mths.	35	135	"	"	50 "	1 mile	R. 1 L. 3	R. 2 L. 3	Very good result. There was some doubt whether this case was a typical claudication. 12 months since implant	8/10/54
19	71	"	2 yrs.	45	135	"	"	100 "	1 "	R. 1 L. 1	R. 2½ L. 1½	Very good result. After 1 mile quick walking is tired, but no pain in the calf. Untreated left leg still shows some claudication. He is due for another implant. 7 months since implant	5/1/55
20	69	"	6 mths.	Not done	Not done	"	Not done	Not done	Not done	Not done	Not done	Bilateral claudication. Implant done 2 years ago. Within 10 days of implant, existing dry gangrene spread. High amputation. Failure	18/12/53
21	73	"	6 "	"	"	"	"	20 yds.	1½ miles	"	"	Over 2 years since implant. Claudication completely dispersed. His hands, which were white (Raynaud's) are now pink and warm with no Raynaud's phenomenon. Result excellent	18/11/53
22	71	"	3 yrs.	1	75	"	Normal	20 "	1 mile	R. 2 L. ½	R. 2 L. 3	Result very good. Eight months since implant. Is walking well. No pains	22/12/54
23	59	"	1 yr.	Not done	Not done	"	Not done	Could not walk	2½ miles	Not done	Not done	Very good. Lost right leg earlier owing to gangrene. Despite sympathectomy this patient had claudication in his left leg. 4 years after implant. No claudication at all	1/8/51
24	59	"	2½ yrs.	26	None	"	Normal	100 yds.	250 yds.	R. ½ L. ½	R. ½ L. ½	Old case of bilateral Achilles tenotomy which prevents quick walking. Claudication was present, but abolished after implant. 15 months since implant	19/5/54
25	52	"	10 "	45	130	Cl. graph	"	100 "	½ mile	R. ½ L. ½	R. ½ L. ½	Eight months since implant. Right leg excellent; left leg only fair. His last left implant went septic. Needs another implant. Right leg—painless	12/10/55
26	49	"	9 mths.	90	260	Not done	"	50 "	1 "	R. 1 L. 1	R. 2 L. 1	Very good result. Can now walk up a steep slope. No pain at all. 8 months since implant	7/12/54
27	51	"	1 yr.	R. 90 L. 69	None	R. N. L. Cl.	R. N. L. N.	50 "	2 miles	R. 3 L. 0	R. 4 L. 2	Excellent result. Can go shooting or fishing for miles	16/8/55
28	54	"	14 yrs.	R. 45 L. 66	120	R. Cl. L. N.	R. N. L. N.	100 "	½ mile	R. ½ L. 1	R. ½ L. 1	Result good. No pain on walking ½ mile	12/10/55
29	58	"	4 yrs.	R. 90 L. 65	None	R. Cl. L. N.	R. N. L. N.	200 "	3 miles	R. 1 L. 1	R. 2 L. 2	Had bilateral sympathectomy—R. no improvement. Excellent result. Walks 3 miles easily	2/3/55
30	26	Buerger's disease	4 "	R. 60 L. 200	200	R. Cl. L. not done	R. N. L. N.	400 "	2 "	R. 0 L. 4	R. 3 L. 4	Left sympathectomy 1953—deteriorating left side. Very good result. Walks 3 miles	12/10/55
31	61	Arterio-scler.	4 "	R. 28 L. 26	180	R. Cl. L. Cl.	R. imp. L. N.	100 "	1 mile	R. 0 L. 0	R. 1 L. 0	Achilles tenotomy. Good result. No claudication after 1 mile	4/10/55
32	51	"	10 mths.	R. 60	R. None	R. poor clearance	R. N.	80 "	400 yds.	R. 4-5	R. 4-9	Good result; walks 400 yards comfortably. Feels great improvement in spite of short distances	29/11/55
33	68	"	3 mths.	L. 60 R. 180	L. " R. "	L. poor clearance	L. N. R. N.	200 "	1½ miles	L. 7-11 R. 0	L. 7-11 R. 5-8	Oscillometry increase—no pain on walking 1½ miles	1/7/55
34	68	"	2 yrs.	L. None R. 90	L. " R. "	L. " R. Cl.	L. N. R. N.	50 "	1 "	L. 4-5 R. 0	L. 5-10 R. 1	Very good result. No complaints	7/12/55
35	66	"	2 "	L. 65 R. None	L. " R. "	L. " R. Cl.	L. N. R. N.	10 "	½ mile	L. ½ R. 5-6	L. 5-6 R. 5-6	Left implant. Left leg normal. R. Fair result. Can now do her shopping. Stops at 150-200 L. yards, but quickly walks on	2/11/55
36	66	"	3 mths.	L. None R. 75	L. " R. "	L. " R. Cl.	L. N. R. N.	20 "	2 miles	R. 2 L. 0	R. 2 L. 2	Good result; back at work. Poor radioactive sodium clearance	8/1/56
37	63	"	1 yr.	L. 50 R. 50	L. " R. "	L. " R. poor clearance	L. N. R. imp.	200 "	3 "	R. 1 L. 0	R. 3 L. 3	Good result. Feels quite normal. Poor radioactive sodium clearance	9/11/55
38	74	"	3 yrs.	L. None R. 75	L. " R. "	L. " R. Cl.	L. N. R. N.	½ mile	1½ miles	L. 0 R. 0	L. 2 R. 4-8	Walks 1½ miles. 1 mile briskly. R. Result very good	16/11/55
39	61	"	6 mths.	L. 60 R. 60	L. " R. "	L. " R. Cl.	L. Cl. R. N.	½ mile	1½ miles	L. 0 R. 0	L. 5-6 R. 2	Excellent result in spite of sepsis and only improvement on sodium test	26/10/55
40	58	"	6 "	L. None R. 120	L. 180	L. Cl. graph	L. imp.	300 yds.	1½ "	L. 4-6 R. 4½	L. 4-9 R. 6½	Results have been dramatic. Can now walk ½ mile up a steep slope. Has walked 1½ miles without pain	14/12/55

circulation with a capillary reflux, thus raising the sodium level. Although the curves are as a rule reproducible it has been found so far impossible after implantation to reproduce the pre-implant "hump" in three cases in spite of their being exercised to exhaustion. The slope of the curves varies, and it was thought the steeper the slope the greater the vascularity of the limb. However, it must be considered that the site of

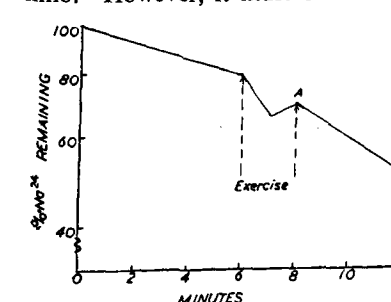


FIG. 4.—Same case as Fig. 3. Right leg after control implant, showing claudication curve. Note inter-exercise hump at A.

the injection must in some way be responsible for the slope; thus an injection made into vascular muscle must give a steeper clearance than one made into fascia, fat, or areolar tissue.

Lastly, we have tried to find some explanation of the

hump of the claudication graph. Accordingly, radioactive isotope sodium was injected into the calf of a normal patient. The arterial flow in the thigh was blocked by a sphygmomanometer cuff, the pressure of which was raised above the systolic blood pressure. The graph compared with that of a patient suffering from mild intermittent claudication. In the same case

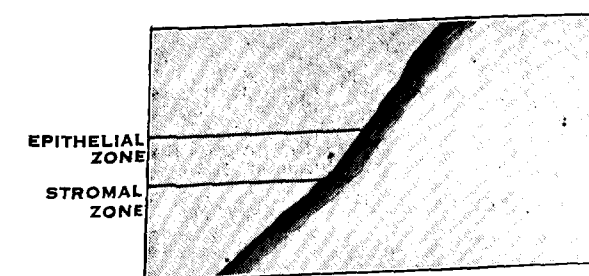


FIG. 5.—Macerated inactive amnion showing loss of cell nuclei. (×175.)

the venous flow was then occluded by a sphygmomanometer cuff with a pressure just sufficient to block the venous return. The radioactive sodium test in this case, however, showed no hold-up. It is therefore assumed

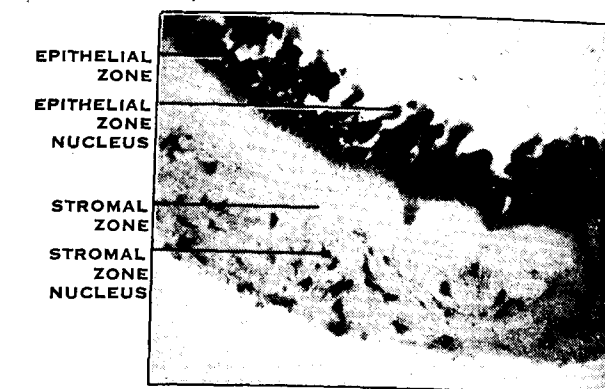


FIG. 6.—Active amnion with nuclei in stroma and epithelium. (×175.)

that the features of the radioactive sodium test are attributable to arterial flow and its variations, and not to venous occlusion.

Procedure of Amnion Implantation

Human amnion was collected immediately after delivery and stored at 0° C. for five days. It was then cleaned on the chorionic side only, care being taken not to damage the epithelial layer. The tough adherent mucus was removed, after which the membrane appeared to be clear. The amnion was boiled for three minutes and was then ready for immediate use. For storage purposes this procedure must be followed by stretching and drying in warm air, with subsequent re-boiling before use

to ensure sterility, but this does not seem quite so effective as the former method for immediate use.

The amnion was then implanted under local analgesia in the form of two pieces each 7 by 5 cm. tightly rolled

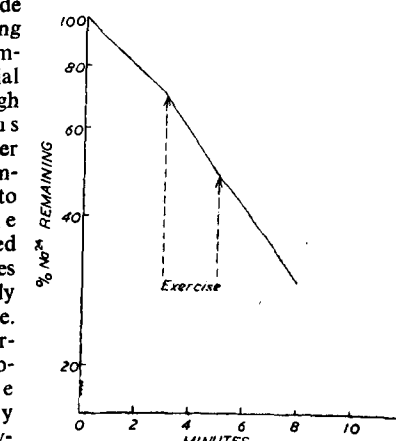


FIG. 7.—Same case as Figs. 3 and 4. Normal curve after satisfactory implant.

TABLE II.—Details of Six Specimen Control Cases

Case No.	Age	Diagnosis	Duration of Disease	Ergometry Pain Threshold in Seconds		²⁴ Na (Radioactive Sodium)		Pain Threshold to Walking		Oscillometry in Deflections		Follow-up and Results
				Pre-op.	Post-op.	Pre-op.	Post-op.	Yards	Miles	Pre-op.	Post-op.	
1	55	Arterio-sclerosis + Diabetes. Coronary disease	7 mths.	20	No change	Cl. graph	Cl. graph	10 yds.	No change	Flicker	No change	Patient states no change. Claudication as severe as before
2	56	Arterio-sclerosis	1 year	45	"	"	"	75 "	"	½	"	No change
4	66	Arterio-sclerosis + cor. thrombosis	4 years	40	"	"	"	100 "	"	½	"	" "
7	78	Arterio-sclerosis	13 "	18	"	"	"	10 "	"	0	"	" "
16	53	"	2 weeks	45	"	"	"	40 "	"	R. 0 L. 2	"	Improved for ten days, then relapse
18	64	"	2 mths.	35	55	"	"	50 "	"	R. 1 L. 3	"	Two months slight improvement. Relapse after 14 days

It would be unjustifiable on present evidence to draw any conclusions about the resting levels of the circulation in the muscles concerned before and after treatment. However, it is noticeable that sometimes the slope of the radioactive sodium curve is steeper after implantation than before. This has been interpreted as being due to an increase in the circulation, but it is possible that the slope of the curve may depend on whether the injected radioactive sodium has initially lodged in tissue of high or low vascularity. Patients who complain of claudication state that their pain is diffuse, but if they are questioned carefully one finds the pain localized to the following sites: high in the calf or low down just above the upper limit of the Achilles tendon, the middle of the shin, and the dorso-medial and dorso-lateral aspects of the foot. Only too often do these patients show tender areas which have been corroborated by other workers. It is therefore natural to suppose that certain muscles show signs of ischaemia in preference to others and that special sites are commonly affected.

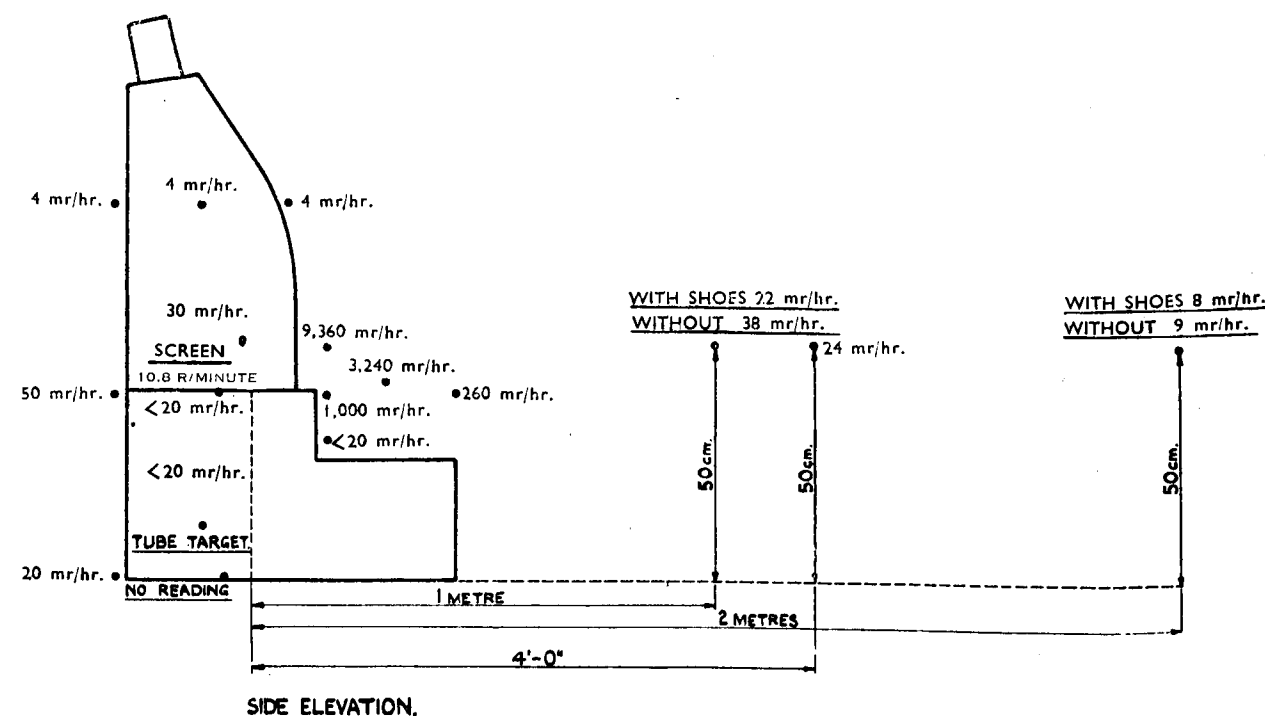
The cone of scattered radiation which emerged from the foot opening of the machine spread out as would be expected from the geometrical arrangement of the useful beam area and the foot-opening area.

Some of the scattered radiation measurements were repeated with the addition of a demonstration pair of shoes, complete with wooden feet and legs, inserted into the machine as a dummy customer.

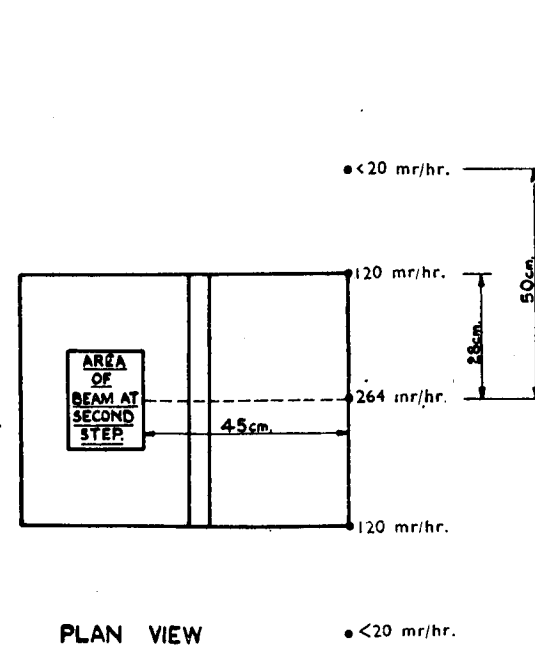
Minor radiation leaks were found around the wooden base of the machine where the top (which includes viewing-hood and foot platform) unscrews from the base when maintenance is required on the x-ray equipment.

American Radiation Measurements

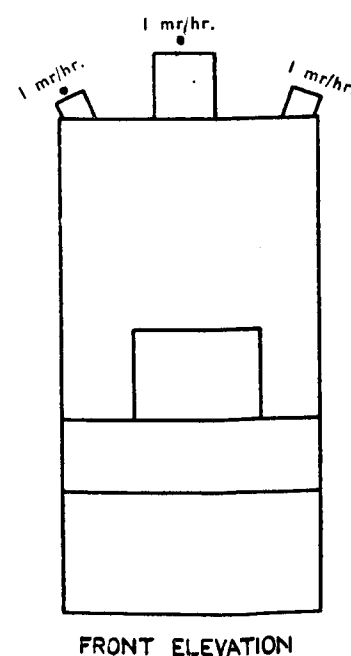
In the *British Medical Journal* (1950) some American results are quoted and references given. The figures quoted in this paragraph are taken from these references. The American fluoroscopes described ran at about 50 kV, 3 to 8 mA tube current, and focus skin distance 7.5 to 20 cm. There is no mention of any added filtration. Many machines had a push-button timer, giving exposures of 5 to 45 seconds; about 20 seconds was the most popular time. Many measurements were quoted, made on 12 machines, by means of a Victoreen r meter in a shoe, and the range of dosage was from 30 to 350 r per minute. Values for the radiation



SIDE ELEVATION.



PLAN VIEW



FRONT ELEVATION

Test on recent model shoe-fitting fluoroscope. (Filter described as 0.5 mm. aluminium and 1.5 mm. bakelite.) Dosages, unless otherwise stated, were measured without shoes on platform, and were measured when "Man" button was pressed. "Woman" dose is approximately 75% of this, and "Child" dose approximately 60%. A 1/4-in. (6-mm.) sheet of rubber simulating shoe soles reduces dosage received by feet while on platform to one-third.

scattered out through the foot opening were nearly all above 100 mr per hour at 10 feet (3 metres) distance, and 15 mr per hour at 25 feet (7.6 metres) distance. Close to the machines, almost all the radiation dose rates quoted were higher than the corresponding results in the Diagram (which relate to a British-made machine).

Possible Hazards from Shoe-fitting Fluoroscopes

In discussing the radiation dose rates described above, it is useful to consider the people at risk. Thus there is the customer in the shoe-shop who may have a brief look at his feet for a few seconds in the fluoroscope on the one or two occasions each year when he buys shoes. Alternatively, there is the customer who may peer at the screen picture for some time, with each of several pairs of shoes in one shop, and then go on to other shops and repeat the procedure. As well as irradiating his feet, the customer is subjected also to scattered radiation which reaches him through the foot opening of the machine and through the material of the viewing hood.

A special case of irradiation of the customer arises with children. The shoe-fitting fluoroscope does enable a parent to see an image of the child's feet in its shoes, and so form some idea of the fit of the shoes. However, from the point of view of radiation dosage, children are regular customers in the shoe-shop, and may have new shoes as often as every three months. Possible radiation effects to be considered include skin erythema, and there arises the general question of irradiating growing tissue, with the special case of irradiating the epiphyses of the foot. Cases are described in the literature in which the epiphyses round the knee were irradiated to slow down or stop growth of the leg (Spangler, 1941). Another case is described by Frantz (1950), in which a haemangioma of the leg and thigh of a baby was irradiated with 1,600 r of 135 kV x rays (4 mm. aluminium filter) during a period of six months; as the child grew there was gross shortening of the irradiated leg, as compared with the gross shortening of the irradiated leg, as compared with the unirradiated one. Bisgard and Hunt (1936) describe experiments on the irradiation of femurs in young rabbits 3-5 weeks old. Subsequent microscopical examination showed cell damage in the epiphyses after 300 r or 200 r doses, but not after 100 r doses.

Besides irradiating customers, scattered radiation from these fluoroscopes irradiates the shop assistants. In a busy shop, with several assistants, a machine may be used many times a day, so that the dose accumulated by assistants over a period of time should be considered. There is the possibility also of irradiating the "people next door" (including above and below), but this is unlikely because the fluoroscope radiation is at low kV and so is readily absorbed in building materials such as brick and concrete. Along with the shop assistants one may include the customers in the shop; however (apart from actually using a fluoroscope), they will receive much less radiation than the shop assistants.

In addition to radiation hazards from fluoroscopes there is also the possibility of electrical hazards. In effect, one stands on a wooden box containing a generator giving several mA at about 50 kV. A substantial, well-earthed, and preferably x-ray-proof housing for this equipment is obviously desirable.

Radiation Hazards—Discussion

Comment here is confined to the measurements made on British machines, and the American results quoted above are not considered beyond noting that most of these American results are much higher than the corresponding British ones.

In considering the irradiation of the customers' feet by the useful beam, a standard of comparison is required. In the Recommendations of the International Commission on Radiological Protection* (1954), it is recommended that

*Generally abbreviated to I.C.R.P.

maximum permissible levels of radiation dose, for large populations, be kept below one-tenth of those recommended for radiation workers. In the particular case of irradiation to extremities such as the feet, this large-population maximum permissible dose is 0.15 r per week. Assuming that averaging of weekly dosage over a three-monthly period is permissible, this is equivalent to about 2 r per three months. The recent type of British machine (with its additional 0.5 mm. aluminium filter) gave a dose rate in shoes of about 4 r per minute. Thus the permissible 2 r per quarter year would allow, for example, three exposures of 10 seconds each, or two exposures of 15 seconds, and so on, in each three-monthly period. The dose rates measured in the shoe-shop machine were twice those of the recent type machine, which suggests either using shorter exposures or reducing the useful beam intensity, to keep doses within the permissible limit.

Useful beam intensities are progressively reduced when the "Woman" and "Child" control buttons are used; the reduction is from 100% ("Man" button) to 60% ("Child" button). The I.C.R.P. recommendations refer to adults, and suggest also that lower limits are desirable for children. It may be desirable also to alter such limits for children of different ages. Although the reference quoted above shows that 100-200 r is required in a single dose to give detectable changes in epiphyses, children must be regarded as regular shoe-fitting fluoroscope viewers for periods of many years, so that it is the dose accumulated over a period of time which is the one to be considered, and this is the type of dosage considered by the I.C.R.P. in drawing up its recommendations on permissible weekly dose.

The "large population" figure of 0.15 r per week quoted above is suggested as an administrative level below which repeated radiation monitoring of the exposed personnel is not required. However, there is a further consideration, as, for example, the many papers at the International Conference, Geneva (1955), which discussed the genetic aspects of the total radiation dose accumulated by a population. A brief discussion of shoe-fitting fluoroscope doses and population dose is given in the next section.

It is interesting to compare shoe-fitting fluoroscope doses with those measured during x-ray diagnostic procedures. The I.C.R.P., for example, gives these figures for diagnostic fluoroscopy at 60 kV pulsating, 3 mA, and 35 cm. target-skin distance:

Equivalent filter	1.5 mm. Al	2 mm. Al	3 mm. Al
Average surface dose rate	7 r/minute	4.5 r/minute	3 r/minute

Other authors (Ardran and Crooks, 1952) also discuss fluoroscopy with additional aluminium filters up to 3 mm. thick. Comparing their results with 3-mm. filters with their results with no additional filter, they report reduced skin dosage with the 3-mm. filters, but no significant reduction in screen brilliance where the beam went through a patient; where there was no patient in the beam there was a reduction in screen brilliance. Applying these results to the shoe-fitting fluoroscope suggests that increased filtration would reduce dose to the customer while diminishing the screen brilliance only outside the outline of shoes; and a reduction of glare from the brightly lit periphery of the screen would assist observation of the foot image. In the present machines the tube runs at about 50 kV; a higher kilovoltage and more filtration may give as bright an image with less customer dosage.

From the results given in the Diagram, a calculation could be made of the dosage received by shop assistants standing in the area of scattered radiation; this would be compared with the value of 0.15 r per week used above. It is difficult to estimate how many times a machine is used in a week, to estimate the individual exposures are, and where the assistants stand; and so measurements were made by issuing film badges to some assistants, who wore them for a week. Only a minimal radiation dose (less than 10 mr) was

measured on these films. The *British Medical Journal* (1950) quotes American results: 77 shoe salesmen carried film badges at work; two-thirds of these badges received no detectable amount of radiation, and of the rest only two received a dose around the maximum permissible level, and that at foot level (one of these film badges was carried in the trouser turn-up). It appears, therefore, that so long as the customer is adequately safeguarded shop assistants will receive little radiation dose.

Total Radiation Dose to the Population

Shoe-fitting fluoroscopes make some contribution to the total dose of radiation accumulated by the whole population of this country. Total dose is of interest because of its connexion with genetic effects in the population (International Conference, 1955), and the dose to be considered is that received by the gonads.

To compute the dose contributed by shoe-fitting fluoroscopes to the population of this country for a period of say a year, it is necessary to assume various typical figures about the machines used. The dose rates in question around a typical machine (see Diagram) are the 4 mr per hour figure against the viewing-hood for the customer examining his feet, and might be between 30 and 4 mr per hour for the nearest shop assistants, and about 4 mr per hour for other customers sitting in the vicinity of the machine (these values are not the actual tissue dose rates used in the calculation). It might be estimated that, for the whole population, each person examines one pair of shoes a year with a fluoroscope, and also that each exposure lasts 10 seconds. Other average figures might be three assistants exposed to the radiation from each machine and about 30 pairs of shoes examined each working day in each machine. If these figures are used, and multiplied by the estimated number of machines in use in the country, a typical value for the gonad dose to the whole population in a year can be determined.

As a basis for comparison, we may consider the background radiation, which is the radiation everyone receives continuously from cosmic radiation and from the small amounts of natural radioactive material in our surroundings. If the population dose from shoe-fitting fluoroscopes is compared with that received by the population from background radiation it is found that the shoe-fitting fluoroscope dose rate is of the order of only 1/1000 of the natural background dose rate. Therefore the genetic aspect of shoe-fitting fluoroscope doses is negligible, and will still be so even if the various figures assumed above are increased considerably.

Possible Control Measures

Various control measures could be applied to shoe-fitting fluoroscopes; dosage to customers' feet could be limited by specifying a maximum dose rate in the useful beam, perhaps also with limits on the kilovoltage and current of the x-ray tube. The specification of some minimum filtration in the useful beam is very desirable, and some form of timing device may be necessary to limit the length of each individual exposure. If viewing could be done by a special shop assistant who kept partly dark-adapted (full dark adaptation is used in diagnostic fluoroscopy), a less bright fluorescent image could be used and the radiation doses would be reduced. To limit the dose to shop assistants, the minimum screening of the x-ray equipment and viewing-hood could be specified, or a maximum permissible dosage rate fixed, to be measured against the outside of the equipment. The effect of scattered radiation coming from the foot opening of a machine could be minimized by pointing the foot opening towards a wall and away from the centre of a shop. It may here be noted that the machines tested could be used for a limited number of short exposures before the radiation dose from them reached the limit recommended by the I.C.R.P.

The I.C.R.P. states clearly that the overall responsibility for the protection of personnel from radiation rests with the head of a radiological department; this will be the manager

in a shoe-shop. Manufacturers of machines could be asked to make sure that their instructions for the use of their machines describe these responsibilities. In the absence of a manager, responsibility would be delegated to another member of the shop staff who understands the hazards involved and the appropriate control measures. For the customer there could be warning notices, to draw his attention to the dangers of excessive exposure to x rays, and perhaps a reminder could be issued to the customer each time the machine is used.

New machines would be expected to conform to the specified requirements on installation, and some form of periodical checking would be desirable to ensure that these requirements continue to be met.

A Ministry of Health committee has already begun work on the drafting of proposals for control measures; these proposals will be submitted to the appropriate committees of the Medical Research Council for criticism; and they will be discussed with interested parties in the shoe trade.

Summary

The shoe-fitting fluoroscope is a familiar object in many shoe-shops. Results of measurements of radiation dose in and around British machines are presented. The hazards to adult and child customers from these doses of radiation are discussed. It is suggested that regulations are needed, in the public interest, to control doses of radiation given by these machines, and possible control measures are suggested. The machines tested could be used for a limited number of short exposures before the radiation doses from them reached the limit recommended by the International Commission on Radiological Protection. A Ministry of Health committee is considering proposals for control measures.

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Southern Europe, from Spain to Bulgaria, according to reports given at a recent W.H.O. conference in Athens on malaria, has achieved remarkable progress in reducing the incidence of the disease. Before the introduction of D.D.T.-spraying at the end of the last world war there were about four million cases of malaria a year in this area. The figure is now estimated to be less than 10,000. Progress was also claimed for the Eastern Mediterranean countries, a reservoir of malaria throughout the ages. In this region of some 170 million people there are said to be 100 million who live in areas where malaria is a threat. As late as 1949 about 40 million people regularly suffered attacks of malaria. Since malaria campaigns have been extended this figure has been reduced to about 14 million. The conference, attended by some 50 eminent malariologists, decided that it would be technically possible to eradicate malaria from the countries that surround the Mediterranean and the wider areas which constitute the European and Eastern Mediterranean regions of the World Health Organization. Dr. PAUL RUSSELL, of the Rockefeller Institute, said the solution of administrative and financial problems was the key to success in malaria education. Resistance to modern insecticides was also discussed, but, despite the hazard, an optimistic view was taken of the possibility of eliminating the disease. Professor GEORGE MACDONALD reported that experiments at the Ross Institute in London had shown that mosquitoes inherit resistance to insecticides according to Mendelian laws.

TECHNIQUE FOR BY-PASS OPERATIONS IN FEMORAL ARTERIAL DISEASE

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The results of resection and end-to-end grafting in the treatment of obstruction of the femoral artery due to obliterative arterial disease have been disappointing, there being a very high incidence of further thrombosis. This has led many surgeons to reconsider the by-pass type of operation recommended by Kunlin *et al.* (1951) and more recently used by F. B. Cockett (1953, personal communication), Crawford and de Bakey (1955), and Linton and Menendez (1955).

So far as the positioning of the patient is concerned, those authors appear to have used the positions designed for complete exposure of the femoral and popliteal vessels. The usual position, with the patient lying on the affected side and the unaffected leg flexed, gives good access to the lower femoral and popliteal arteries but obscures the upper femoral.

Method

A method of operation has been devised which gives good simultaneous access to the common femoral and popliteal arteries by two surgeons operating together in a synchronous combined procedure. The patient lies on the unaffected side, and a small wooden table, designed so that its legs are firmly engaged on the operating table, is placed over the normal leg (this table was designed by J. Crawford Adams for use in hip (arthroplasty operations)). The table is covered with a "sorbo" rubber pad on which the diseased leg rests (Fig. 1).

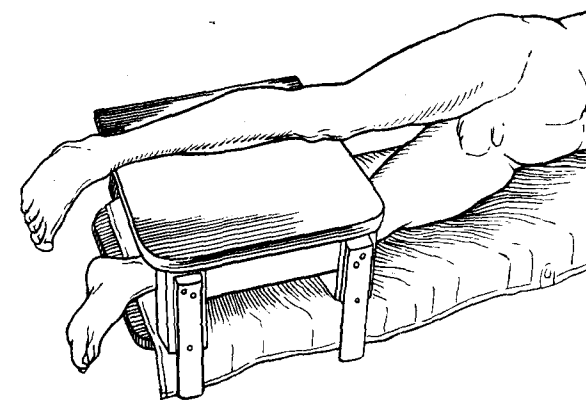


FIG. 1.—The operative position, showing the type of table used to support the diseased leg.

The position is maintained with the normal back rest and chest support used in kidney operations. These are placed fairly high so as to allow slight rotation of the patient should a better access to popliteal or groin incision be required. One surgeon sits opposite the popliteal fossa and the other faces the groin. Each assistant sits opposite his surgeon.

The popliteal incision is made first in order that the popliteal artery may be inspected and its suitability for end-to-side

anastomosis assessed. Should it be suitable, the second operator makes a small vertical incision exposing the common femoral artery bifurcation, while the first operator continues his popliteal dissection. A tunnel is then made from one incision to the other, this being started with an index finger from each end. In some patients it may be possible to complete the tunnel by digital dissection, but in others a long instrument such as a sponge-holding forceps or Lloyd Davies artery forceps is passed. A plane is found easily from the upper end passing deep to the sartorius medial to the femoral artery. The tunnel may be made to transverse the adductor magnus by enlarging the normal arterial hiatus or a fresh opening may be made. This is the only point where even slight difficulty has been found, and slow, careful exploration with a finger from the lower incision may be needed. The exact anatomical site of the tunnel is difficult to determine throughout its length, but it is probably within the subsartorial canal for most of its distance. This dissection is almost bloodless. A tube is then introduced through the lower incision and guided through the tunnel by the instrument from the upper end. An oesophagoscope has been found to be a useful tube (Fig. 2). It is

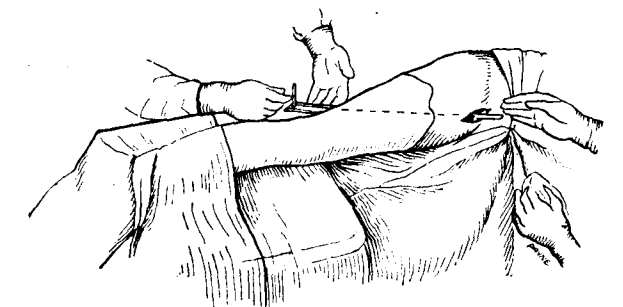


FIG. 2.—The passage of an oesophagoscope from popliteal to femoral incision.

essential to ensure that the graft will pass easily through the tube. The purpose of the tube is to allow the graft to be threaded through the tunnel without any possibility of uneven tension or kinking or twisting. The graft has a number of small silk sutures or ink marks placed in a straight line down its length as a further precaution against twisting. The graft or implant is then drawn through the oesophagoscope with long biopsy forceps and the oesophagoscope withdrawn. After carefully assessing the length required, the ends of the graft are trimmed and each operator proceeds to make his end-to-side anastomosis, the lower being to the popliteal artery and the upper to the common or superficial femoral. The method of anastomosis is that used by F. B. Cockett. With this technique a by-pass procedure is a relatively short operation. It may be done by two surgeons, working synchronously, in little over an hour. In single-handed surgery the position is of advantage as it allows good access without turning the patient. Slight adjustment can be made to the position by rotating the leg and patient through a few degrees so as to improve the lighting and access without any change in the towelling.

The by-pass type of operation is of too recent introduction for any opinion to be formed on its merits, but it was thought that this simple technique might be of use to others who are experimenting with by-pass operations.

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NITROFURANTOIN IN CHRONIC URINARY INFECTION ASSOCIATED WITH RENAL CALCULI

BY

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In the recent literature there have been numerous references to the use of nitrofurantoin (N-(5-nitro-2-furfurylidene)-1-aminohydantoin; "furadantin") in the treatment of urinary infections. Many reports consist of series of cases of urinary infection, both acute and chronic, associated with varying complicating factors such as urinary stasis, prostatectomy, or urolithiasis, which greatly increase the difficulty in interpreting the results of therapy (Norfleet *et al.*, 1953; Kaplan and Hobgood, 1954; Draper *et al.*, 1954; Hasen and Moore, 1954; Waisbren and Crowley, 1955). In some reports an improvement in the patient's symptoms was claimed as evidence of successful treatment, although the urine was not rendered sterile. The only report of its use in Great Britain appears to be that of Heffernan *et al.* (1955), which gives the results of treatment in 12 cases of infection following prostatectomy or associated with carcinoma of the prostate, in none of which the urine was rendered sterile.

Nitrofurantoin has a wide spectrum of antibacterial activity against both Gram-positive and Gram-negative organisms. *In vitro* it is active against *Staph. pyogenes*, *Str. pyogenes*, *Str. faecalis*, *Str. mitis*, *C. diphtheriae* and diphtheroids, *A. aerogenes*, *E. coli*, and many strains of coliform organisms, many strains of *Proteus*, *Paracolon* species, *Salmonella*, and *Shigella*, and *N. gonorrhoeae*. Although some strains of *Ps. pyocyanea* show *in vitro* sensitivity, most workers have not found it clinically useful against infections with this organism. It has been used with success against infections with most other organisms which show *in vitro* sensitivity.

The results of nitrofurantoin therapy in 21 cases of urinary infection associated with renal calculi, or persisting after the removal of calculi, are reported here. The patients have been followed for a minimum period of three months after the end of treatment. Only those cases in which the urine was rendered sterile are regarded as successful. Sensitivity tests of the infecting organisms were carried out, and were repeated on cessation of therapy in the unsuccessful cases.

Selection of Cases

The patients were chosen arbitrarily from the out-patients attending the Stone Clinic, attached to this department. They all had a chronic urinary infection associated with the presence of a calculus (8 cases) or persisting after the removal of a calculus (13 cases). They had been observed by me to be infected with the same organism for periods varying from 3 to 24 months. In some patients the urine was known to have been infected before they came under my care, but this is not noted in Table I. All the patients had received adequate courses of sulphonamides and sometimes antibiotics without success, and in some cases these had been repeated several times. In the females a catheter specimen of urine, or a mid-stream boiled bottle specimen in the males, was obtained immediately before the treatment was begun. This was repeated on the last day of treatment, or the day following it, and again three months later. Two patients who did not attend at the end of the course of

nitrofurantoin have been excluded from the series. Details of the patients are shown in Table I. They were all ambulant and afebrile, and none complained of symptoms that could be directly attributed to the presence of infection.

Dosage

It was decided to give a large dose of nitrofurantoin despite the increased likelihood of toxic effects, because the infections had all proved resistant to treatment with other agents. The patients were weighed and given tablets to correspond to a dosage of 10 mg. per kg. body weight per 24 hours. They were instructed to take the tablets during a meal to prevent nausea, as has been recommended by Trafton *et al.* (1955). If nausea was severe or vomiting occurred the dose was gradually reduced until this was controlled, the treatment being continued at the highest level the patient could tolerate. Fourteen patients succeeded in taking the complete course of 10 mg. per kg. per day for 14 days. Three completed the course at a dose of 7 mg. or more per kg. per day. Two did not persist with

TABLE I

Case No.	Calculus	Duration of Infection (Months)	Organism and Sensitivity	Previous Treatment	Nitrofurantoin Sensitivity	Results of Nitrofurantoin Treatment	
						Immediate	3 Months
1	-	6	Coliform PR, OR, CR, StR	Sul, C	2+	Unchanged	Unchanged
2	-	19	Enterococci PR, OS	Sul, O	2+	Coliform NR	Coliform
3	-	7	Coliform PR, OS	O	4+	Sterile	Sterile
4	+	12	Coliform PR, OR, StR, CS	Sul	2+	Proteus NS 2+	Coliform
5	-	8	Enterococci PR, OS	"	4+	Sterile	"
6	-	3	<i>Staph. pyogenes (aureus)</i> PR, OS	O, C	8+	"	Sterile
7	-	5	<i>Proteus</i> PR, OR, StR, CS	O, Sul	2+	Coliform NS 2+	Coliform
8	+	17	Coliform PR, OS	" "	1+	Enterococci Unchanged	Unchanged
9	+	15	Coliform PR, OS	Sul, O, sulpha-dimidine	8+	Coliform NS 4+	Coliform
10	+	6	Enterococci PR, OS	O, Sul	8+	Sterile	Sterile
11	-	8	Enterococci PR, OS, CS	C, Sul	2+	"	Enterococci
12	-	24	Coliform PR, OS	Sul	3+	Proteus NS 3+	Coliform
13	-	6	Coliform PR, OS, StS, CS	O, Sul	*3+	Unchanged	Unchanged
14	-	4	Coliform PR, OS	O, sulphonamides	8+	Sterile	Sterile
15	+	21	<i>Proteus</i> PR, StS, CS, slightly OS	Sul, C, streptomycin	*2+	Unchanged	Unchanged
16	-	3	<i>Staph. pyogenes (aureus)</i> PS, OS	Penicillin	8+	Sterile	Sterile
17	-	18	Enterococci PR, OS	O, Sul	8+	"	"
18	+	17	Coliform (aerogenes)	Sul	1+	"	Coliform
19	+	8	Coliform PR, OS	C, sulpha-dimidine	"	Unchanged	"
20	+	7	Coliform PR, OS	" Sulpha-triad "	4+	Sterile	Proteus 2 weeks later
21	-	6	Coliform	"	"	Diminished growth	Coliform

* Resistant colonies.

P, penicillin. O, oxytetracycline. St, streptomycin. C, chloramphenicol. Sul, sulphamethizole. R, resistant. S, sensitive. Sensitivity tests were carried out using the standard disk technique. Nitrofurantoin sensitivity: 1+, zone of no growth 2.5-5 mm. around 381 µg. disk; 2+, zone of no growth 2.5-5 mm. around 174 µg. disk; 3+, zone of no growth 2.5-5 mm. around 86 µg. disk; 4+, zone of no growth 2.5-5 mm. around 33 µg. disk; 5+, zone of no growth greater than 5 mm. around 381 µg. disk; 6+, zone of no growth greater than 5 mm. around 174 µg. disk; 7+, zone of no growth greater than 5 mm. around 86 µg. disk; 8+, zone of no growth greater than 5 mm. around 33 µg. disk.

the treatment after seven days, even at a reduced dose, because of severe vomiting. Two patients had 7 mg. or more per kg. for 9 days and 7 days respectively.

Bacteriology

Each urine specimen was taken in duplicate, and cultures were taken in the hospital laboratory and personally by me in an attempt to exclude the possibility of contaminated urine. In all cases the results were in agreement. No attempt was made to identify separate strains of the different organisms cultured, as this was not intended to be a bacteriological study. The standard disk method was used for determining the sensitivity of the organisms to nitrofurantoin, the disks containing 381, 174, 86, and 33 µg. of nitrofurantoin respectively. An effort was made to make the inoculum as standard as possible, and the cultures were read at 6 hours and again at 18 hours, it being emphasized by Richards *et al.* (1955) that these factors influence the apparent *in vitro* sensitivity to nitrofurantoin.

Results

The results for individual patients are shown in Table I. Ten patients (48%) had sterile urine on the fourteenth or fifteenth day—that is, immediately after the conclusion of treatment. In four patients (19%) the original organism was replaced by another organism. In seven cases (33%) the original organism was still present at the end of treatment. In six patients (28%) the urine was sterile three months after the cessation of treatment. In one patient the original organism had reappeared, and two others had an infection due to a different organism. One patient reappeared with a urinary infection due to a different organism two weeks after the course of treatment. Two patients have been followed for five months. In one the original infection has recurred, although the urine was sterile at three months, but there is a large calculus in one kidney. The other patient's urine has remained sterile for five months, although she repeatedly relapsed after a few days when given courses of sulphonamides.

Bacteriology.—Nitrofurantoin appears to be particularly useful against infections with *Enterococcus*, *Staph. pyogenes*, and *Proteus*, as can be seen in Table II.

TABLE II

Organism	No. of Times Isolated	No. of Times Eradicated
Coliform	11	3
Coli (aerogenes) .. .	1	1
Enterococci	5	5
<i>Staph. pyogenes (aureus)</i> .. .	2	2
<i>Proteus</i>	2	1

Toxicity.—As might be expected from the relatively large dose of nitrofurantoin, toxic symptoms often occurred. These are shown in Table III. As already stated, only 14

TABLE III

Toxic Symptom	No. of Times
Nausea (slight)	5
Nausea (moderate to severe) .. .	9
Vomiting	4
Headache	3
Flushing	2
Prostration	1
Skin rashes	0

of the 21 patients were able to tolerate the complete course. Seven patients did not notice any abnormality while taking nitrofurantoin. The toxic symptoms were similar to those reported by other workers, except for the occurrence of transient attacks of flushing in two patients. Although almost all the patients were women, none was free from toxic symptoms. The drug was given to one child aged 2½ years without any ill-effect. There were no instances of skin rash in this series, but rash has since occurred with two other

patients. In most cases toxic symptoms were controlled by slightly reducing the dosage, but in a few it was not possible to continue the treatment.

Discussion

In this study the number of cases was small and a detailed statistical analysis did not seem warranted. It was felt that the patients could form their own controls, since they had been continuously infected with the same organism for prolonged periods, and it was therefore unlikely that the infection would disappear spontaneously. The fact that the urine was sterile in one-third of the patients three months after the end of treatment increases the value of these results.

The cases in which the infecting organism was replaced by another organism have here been regarded as failures, although this has not been the practice of some other workers (Richards *et al.*, 1955). The replacement of a coliform infection by *Proteus*, for instance, is unlikely to prove beneficial to the patient. However, the occurrence of such cases suggests that the incidence of cure is likely to be higher in cases without the complicating factor of calculus damage.

The sensitivity of the infecting organism to nitrofurantoin, as would be expected, corresponded fairly well with the result of treatment. In all the successful cases except one the organism appeared to be very sensitive to nitrofurantoin; in the remaining case it appeared to be only slightly sensitive. It has also been noted by Mintzer *et al.* (1953) that *in vitro* tests may occasionally fail to correspond to the clinical effectiveness of the drug. In one unsuccessful case the organism appeared to be very sensitive *in vitro*, but there is a large calculus in one kidney.

In one of the unsuccessful cases the sensitivity of the organism appeared to have somewhat decreased after 14 days of treatment, but in the others the sensitivity was unchanged. In two cases resistant colonies were noted in cultures both at the beginning and at the end of treatment, although they did not seem to have increased in number. This suggests that two strains of the same organism of differing sensitivity were present or, alternatively, that there were resistant mutants of the same strain. The presence of such resistant organisms in an otherwise sensitive infection is of potential importance in cases in which it might be desirable to give a prolonged course of treatment.

In this group of patients infection had been present for long periods and had proved refractory to treatment with other drugs. The difficulty of eradicating urinary infection in the presence of a calculus is well recognized. The fact that infection frequently tends to persist, or occur for the first time, after the removal of a calculus is not often mentioned. In this type of patient it is particularly important to cure the infection, in view of the part it may play in increasing the incidence of recurrence of calculi. There is also the added danger of chronic pyelonephritis to the function of an already traumatized kidney. The urine became sterile in 48% of these cases, although only 28% remained sterile three months later. The high relapse rate, and the fact that in some cases the original infection was replaced by another one, does not detract from the therapeutic value of nitrofurantoin. They merely indicate that the damaged renal tract is especially prone to become infected. In cases of refractory urinary infection it would appear that nitrofurantoin is a drug of considerable value.

Summary

Nitrofurantoin was used in the treatment of 21 cases of refractory urinary infection associated with the presence of renal calculi or persisting after the removal of calculi. In 48% of cases the urine became sterile after 14 days. In 28% the urine remained sterile for three months.

The *in vitro* sensitivity of the organism corresponded fairly well with the result of treatment. Resistant colonies were observed in otherwise sensitive infections,

and the presence of such resistant organisms might prove to be of importance if it was desired to give prolonged treatment.

Toxic symptoms were often encountered, but could usually be controlled by slightly reducing the dosage.

This work was carried out during the tenure of a grant from the Medical Research Council. The furadantin was kindly supplied by Duncan, Flockhart and Co., of Edinburgh. I wish to thank the Department of Clinical Pathology of the Royal Victoria Hospital for help in this study, and the Department of Microbiology, Queen's University, for advice and guidance, and for the use of the facilities of the department. I am grateful to Mr. E. Morrison, and the other surgeons of the Royal Victoria Hospital, Belfast, who allowed me access to their patients. I wish to thank Nurses P. Crawford and R. Hand, who collected the urine specimens

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URINARY SYMPATHIN EXCRETION OF NORMAL INFANTS AND OF INFANTS WITH PINK DISEASE

BY

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The condition known variously by the name of "pink disease" and by a number of other descriptive or eponymous titles was described by Feer (1923) as a disorder of the vegetative nervous system. The fact that he employed atropine in treatment, however, suggests that he may have failed to appreciate the full significance of his hypothesis.

A very severe case of pink disease which was admitted to the Royal Edinburgh Hospital for Sick Children in October, 1953, appeared to one of us (J. W. F.) to show so many suggestive features of an overacting sympathetic nervous system that it was thought justifiable to embark on the determination of the infant's urinary sympathin (adrenaline and noradrenaline) excretion. The result was of sufficient interest to stimulate the investigation of further cases and of control subjects.

Method of Investigation

Urine was collected accurately for 24-hour periods from 19 healthy infants, most of whom were resident in nurseries under the care of the local authority, usually because of some temporary dislocation of family life. A number were

convalescing from minor illnesses in hospital, and in these cases the collections were obtained over the 24 hours immediately before discharge. Urine was collected similarly from four infants who presented the undoubted clinical features of pink disease.

All the control subjects and three of the affected infants were males in whom accurate urine collection was possible by means of small-sized latex colostomy tubing which was strapped to the penis and allowed to drain into a specially prepared collecting bottle. The fourth patient with pink disease was a female, and great difficulty was experienced in obtaining an accurate collection of urine despite the use of an indwelling catheter.

The urine was collected in bottles containing 5 ml. of 2N H₂SO₄ and 0.5 ml. of chloroform to stabilize the sympathin. Aliquots of the measured 24-hour specimen were used for assay. One aliquot (50–100 ml.) was submitted to acid hydrolysis by heating at pH 2 (adjusted with 2N H₂SO₄) for 20 minutes in a boiling-water bath. This treatment releases some (Euler and Hellner, 1951) but not all of the catechol amines excreted in a conjugated form (Euler and Orwén, 1955). The sympathin excreted in the free state was determined, using another aliquot of the urine which was not submitted to acid hydrolysis.

The sympathin determinations on the hydrolysed and unhydrolysed urine were carried out by a method to be described in detail elsewhere by Crawford and Law. It consists essentially in the extraction of the sympathin by passage of the diluted urine at pH 7 through a column of a weak cation exchange resin "amberlite IRC-50" previously buffered to pH 7–7.5. The adsorbed sympathin is recovered from the column by elution with dilute sulphuric acid. Most of the inorganic salt in the eluate, brought to pH 3.5 with dilute sodium hydroxide, is precipitated by the addition of 2–4 volumes of a mixture of equal volumes of acetone and ethanol. The supernatant is evaporated to dryness at 35° C. under reduced pressure. The residue is dissolved in distilled water (3 ml.) to give the "final urine extract." The sympathin content of this solution is determined fluorimetrically, using Lund's (1949, 1950) method modified in such a way that equal quantities of adrenaline or noradrenaline or mixtures of the two amines give similar intensities of fluorescence (Crawford and Law, unpublished).

When individual determinations of adrenaline and noradrenaline in the urine extract were required, separation of the two amines was effected by submitting an aliquot of the final urine extract to paper chromatography (Crawford and Outschoorn, 1951, modified as described by Vogt, 1954). The concentrations of the separated amines in the eluates from the appropriate paper strips were determined fluorimetrically.

The method of extraction of urinary sympathin described by Euler and Hellner (1951) was used in the first case of pink disease investigated (Table III). The sympathin in the urine aliquot is adsorbed on to aluminium hydroxide formed in the urine by the addition of aluminium sulphate followed by adjustment of the pH to 7.5 with dilute sodium hydroxide. The separated precipitate is dissolved in dilute sulphuric acid and the inorganic salts are removed by precipitation with acetone-ethanol mixture (see above) after adjusting the pH to 3.5. The supernatant is evaporated to dryness under reduced pressure at 35° C. The residue was dissolved in 0.9% (w/v) sodium chloride and the sympathin concentration in terms of noradrenaline determined by bio-assay, using the rat's blood pressure preparation (Crawford and Outschoorn, 1951).

A recovery of 82% (S.D. 6) was obtained by the amberlite IRC-50 method in 51 experiments in which adrenaline or noradrenaline (3–30 µg.) was added to urine. No significant difference (P=0.05) in the recoveries of adrenaline or noradrenaline, or in the recoveries from hydrolysed and unhydrolysed urine, was found. Similar control experiments in which the two amines were separately determined following extraction by the amberlite IRC-50 method and separation by paper chromatography showed a recovery of 50%

(S.D. 9) for 2 to 15 µg. of either amine (10 estimations). Again the recoveries for adrenaline and noradrenaline did not differ significantly (P=0.05).

The figures cited in the tables are corrected values, the correction factor for each experimental result being obtained from a recovery experiment carried out concurrently with the analysis.

Excretion of Sympathin in Normal Infants

Determinations of the sympathin excretion in single 24-hour urine samples from each of 14 healthy male infants aged 6–18 months gave a mean value of 16.5 µg. (S.D. 4.0) for hydrolysed urine and 13.2 µg. (S.D. 3.4) for the sympathin excreted in the free state (Table I). The results for

TABLE I.—Urinary Sympathin Excretion by 14 Normal Male Infants

No.	Age in Months	Body Weight (Kg.)	Volume of Urine (ml.)	Sympathin (µg./24 hours)		% as Free Sympathin
				Hydrolysed Urine	Unhydrolysed Urine	
1	6	6.5	405	13.9	11.6	84
2	6	7.45	345	23.4	13.4	58
3	6	7.2	370	22.8	14.3	63
4	9	10.3	430	16.3	11.7	72
5	9	10.0	410	15.4	12.7	83
6	10	8.8	360	16.7	10.8	92
7	12	10.4	370	13.3	10.8	81
8	12	10.4	152	14.4	11.0	77
9	12	9.6	418	16.8	16.3	97
10	12	7.25	570	13.1	10.1	77
11	12	7.75	305	18.1	16.3	90
12	13	10.0	448	7.6	6.4	85
13	13	6.4	199	17.6	14.9	84
14	18	10.9	389	21.5	20.4	95
Mean	10.7	8.78	389	16.5	13.2	81
S.D.				4.0	3.4	11.3
Fiducial limits (P=0.05)				14.1–18.9	11.3–15.2	74–88

hydrolysed urine are similar to those given by Burn *et al.* (1953), who found 12–18 µg. (in terms of noradrenaline) in the 24-hour urine samples of three children aged 3–24 months.

Separate determinations of the adrenaline and noradrenaline excretion by five normal male infants of 10–12 months showed 69% (S.D. 4.7) of the free sympathin to be noradrenaline, while of the sympathin in hydrolysed urine noradrenaline accounted for 61% (S.D. 5.8) of the total (Table II).

Clinical History and Sympathin Excretion of Infants with Pink Disease

Case 1

The patient, aged 9 months, was the second child of healthy unrelated parents. His original progress was entirely satisfactory, but at 7 months he developed chicken-pox, complicated by a severe attack of bronchitis, which was clearing at 8 months when he developed whooping-cough and further respiratory infection. His symptoms of increasing anorexia

TABLE II.—Urinary Excretion (µg./24 hr.) of Adrenaline and Noradrenaline by 5 Normal Male Infants

No.	Age in Months	Body Weight	Volume Urine in 24 Hours	Hydrolysed Urine			Unhydrolysed Urine		
				Adren.	Noradren.	Total	Adren.	Noradren.	Total
1	10	5.45 kg.	475 ml.	8.3 (45%)	10.2 (55%)	18.5	3.9 (37%)	6.7 (63%)	10.6
2	10	5.5 "	540 "	8.8 (46%)	10.3 (54%)	19.1	3.7 (32%)	7.9 (68%)	11.6
3	12	9.1 "	495 "	5.9 (34%)	11.4 (66%)	17.3	2.4 (24%)	7.4 (76%)	9.8
4	12	9.1 "	485 "	5.5 (36%)	9.8 (64%)	15.3	3.0 (30%)	7.1 (70%)	10.1
5	12	9.4 "	670 "	8.2 (35%)	15.2 (65%)	23.4	5.5 (30%)	13.0 (70%)	18.5
Mean	11.2	7.7 "	533 "	7.3 (39%)	11.4 (61%)	18.7	3.7 (31%)	8.4 (69%)	12.1
S.D.				1.52	2.22	2.99	1.17	2.6	3.6
Fiducial limits (P=0.05)				5.4–9.2	8.6–14.1	15.0–22.4	2.25–5.15	5.2–11.6	7.6–16.7
				Mean noradrenaline % = 61			Mean noradrenaline % = 69		
				S.D., 5.8			S.D., 4.7		
				Fiducial limits, 53–68			Fiducial limits, 63–75		

and irritability had followed the onset of pertussis. There was no history of exposure to mercury in teething, grey, or worm powders, in ointment, disinfectant, or nappy washes. The development of classical and very severe pink disease was progressive, and the infant became so profoundly anorexic that tube-feeding was necessary. He was extremely miserable, had typical cold and puffy red hands with peeling developing after some weeks; sweating was profuse, and resulted in the typical body rash which the infant rubbed and scratched continuously. He was uncomfortable in any position, had a persistent tachycardia, was hypertensive (140/106), was photophobic, and had marked dilatation of the pupils. He shed his four teeth, and his tongue became small, hard, and blanched, the tip eventually sloughing. The abdomen became progressively distended with gas until it caused him distress.

At this stage rectal examination revealed his bladder to be grossly distended, the wall apparently being thin and relaxed. Micturition was hesitant and dribbling, the difficulty being similar to that sometimes observed after a dose of ephedrine. After an ounce or so of urine had been passed by dribbling micturition, catheterization produced a large residuum. Neither then nor later was any obstruction demonstrated, and it became the practice to assist the infant to empty his bladder completely twice daily by pressure on the abdominal wall and from the rectum.

Investigation of the patient's urinary output of mercury in 24 hours at an early stage failed to reveal anything abnormal and his serum sodium and chloride were normal, although it should be stated that he had been receiving half-strength saline frequently each day as the excessive loss from the skin was obvious.

Much of the clinical picture suggested overactivity of the sympathetic nervous system, and the urinary sympathin excretion was determined. The result was given as 74 µg. of pressor substance (in terms of noradrenaline) in 24 hours (Table III).

TABLE III.—Urinary Excretion of Sympathin (µg./24 hr.) in All Cases

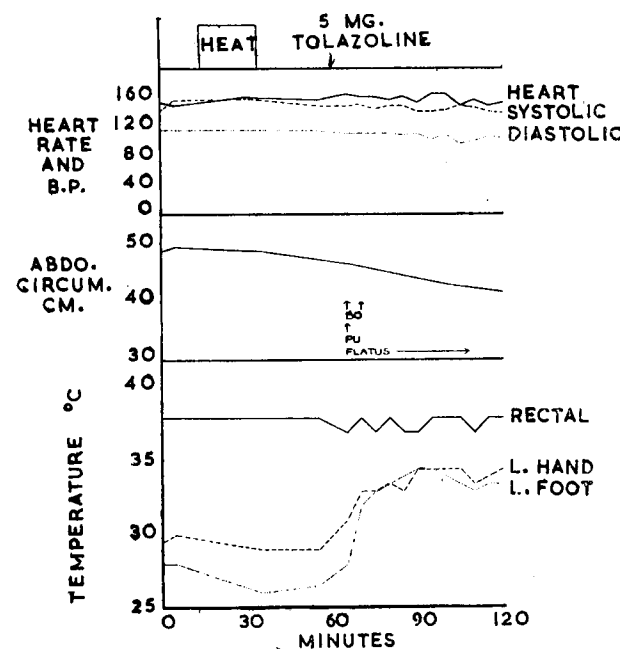
Case	Collection	Unhydrolysed Urine	Hydrolysed Urine	% as Free Sympathin
1	1	Not done	74*	
2	1	41	41	100
	2	20	21.5	93
	3	42	49	86
3	1	43	Not done	
	2	40	" 36"	100
	3	37		
4	1	13	17	77
	2	19	23	83

* Extraction by the method of Euler and Hellner (1951). Extracts assayed on rat's blood pressure preparation with (—) noradrenaline as standard.

It was decided to observe the effect of reflex heat and of an anti-adrenaline drug on the patient, and the result may be seen on the graph. Skin temperature readings were recorded with a thermistor and the rectal temperature with a

premature-baby thermometer. The pulse and blood pressure were also recorded, and as some measure of the effect on the relaxed bowel the abdominal circumference was measured around its maximum point. As may be seen, reflex heat (provided by an electric blanket to the right arm, leg, and half of trunk) failed to produce release of the vasospasm, but within five minutes of injecting tolazoline ("prisco") the skin temperature was rising to normal and remained there, the bowels opened copiously, and urine passed normally. There was only a slight fall in the blood pressure, but it is known that tolazoline may not influence hypertension successfully because of its potentiating effect on cardiac output.

The results were so satisfactory that it was decided to begin treatment with this substance. Initially the oral route was employed, but, possibly owing to delayed gastric empty-



Effect of reflex heat and tolazoline in Case 1.

ing, the signs of pink disease were uninfluenced. Intramuscular injection of 5 mg. every six hours was started, with complete control of the vasospasm. The hands and feet were warm, and sweating became normal. The baby was happier, abdominal distension decreased, and urinary function improved but was impeded by a more or less continuous priapism which seemed to be due to the drug. The tongue became normal in appearance apart from the healing irregular anterior margin.

Treatment was continued for five days, and at that time only the gross wasting, some fullness of the abdomen, and weakness remained. On the fifth day of treatment, however, the temperature rose steeply and widespread signs of bronchitis appeared. Chlorotetracycline was given, but the patient rapidly deteriorated, dying in 24 hours.

Post-mortem examination was carried out by Dr. A. R. Macgregor. The main features noted were a purulent bronchitis and a patch of bronchopneumonia. Nothing peculiar to pink disease was noted. Chromaffin tissue was subjected to careful histological examination and no abnormality was found. The genito-urinary tract was normal. Sections of the tongue showed that muscle necrosis formed the floor of the ulcerated margin, granulation tissue was forming, and there was much polymorph and mononuclear infiltration. Beyond the areas of necrosis cellular infiltration was noted for some distance, but the arteries in the healthy parts showed no pathological changes, and in the infiltrated areas nothing was found that could not be explained as secondary to the surrounding inflammation.

Case 2

A boy aged 6 months, the second child of healthy unrelated parents, had been well until six weeks before admission, when he began to lose weight and to be restless, fretful, and sleepless. His appetite deteriorated. For one week he had been very photophobic, and for a few days had been sweating profusely, a rash had appeared on the trunk and limbs, and his hands and feet had become pink and cold. There was no history of exposure to mercury.

On examination he had clearly lost weight and there was obvious photophobia. A sweat rash was present and the hands and feet were typically pink, puffy, and cold. The heart rate at rest was 144 a minute, and the systolic blood pressure 130 mm. Hg. The abdomen was a little full and the bowel was constipated, but the bladder was not enlarged. Blood biochemistry, urinalysis, and lumbar puncture gave normal results. No abnormal urinary excretion of mercury was found.

During the next few days his appetite improved, but the clinical condition was unchanged. One week after admission a 24-hour collection of urine was obtained and the sympathin excretion determined (see Table IV). On the following day

TABLE IV.—Urinary Excretion of Sympathin ($\mu\text{g./24 hr.}$) in Case 2

Collection Date	Treatment to Urine	Extract from Amberlite IRC-50	Eluates from Paper Chromatograms		
			Adren. Fraction	Noradren. Fraction	Total
1 9-10/5/54	Hydrolysed	41	13.9	26.8 (66%)	40.7
	Unhydrolysed	41	11.2	26.2 (70%)	37.4
2 23-24/5/54	Hydrolysed	21.5	4.1	15.4 (79%)	19.5
	Unhydrolysed	20	3.7	13.6 (81%)	16.7
3 26-27/5/54	Hydrolysed	49	Not done		
	Unhydrolysed	42			

his temperature rose to 101° F. (38.3° C.) and after 24 hours pus cells appeared in the urine. The infection was cleared with sulphadimidine, but during the next week the signs of pink disease became more pronounced. In the third week of his stay in hospital his response to reflex heating (see Table V) was negative, and a further 24-hour collection for

TABLE V.—Case 2, Skin Temperatures in Degrees Centigrade

Date		Cubicle Temperature	Hands		Feet	
			Right	Left	Right	Left
24/5/54	Original	20.5	28	27	22	22
	1-hour Heat	22	25	22.5	21	21
	1 hour	21.5	37	23	21.5	21.5
	1½ hours	21.5	34	26	21.5	21.5
26/5/54	Original	23	33	26.5	24	24
	1-hour Heat	23	29.5	24.5	23	23
	1 hour	23	37	24.5	22.5	22
	1½ hours	23	35	35	21.5	21
1/6/54	Original	20	33	32.5	21.5	22
	1-hour Heat	21	33	33	21	21
	1 hour	21	37	35	21.5	21
	1½ hours	21	35.6	34.5	22	22

Temperatures were recorded at five-minute intervals, but, for reasons of space, only selected time intervals are given here. The temperatures were always stable for 20 minutes before heating began, and the latter was applied for 30 minutes by means of a pre-heated electric blanket.

sympathin determination was obtained. Chlorpromazine treatment was begun at once in dosage of 10 mg. six-hourly by intramuscular injection. After 48 hours his clinical condition appeared to be worse, and although his right hand was warm the other extremities did not respond to reflex heating. Urine excreted over 24 hours was again collected and the sympathin content determined. His temperature, which had been unstable, rose again owing to a coliform urinary infection, which was treated with sulphonamide. It was decided to observe the effect of "hydergine," which is a

mixture of equal parts of dihydroergocornine, dihydroergocryptine, and dihydroergokryptine. This was given by subcutaneous injection in dosage of 0.03 mg. three times a day, but his signs remained uninfluenced. While the question of using hexamethonium was being discussed he began to improve and no treatment was given. He was discharged convalescent, and remained well.

Case 3

A boy aged 11 months, the first child of healthy unrelated parents, had made good progress from birth until the age of 9 months. He then became progressively irritable, miserable, anorexic, photophobic, and sleepless. His mother commented on the redness of his hands and feet, and she had noted him to be "soft and floppy." For one month before the development of symptoms he had been having one mercurial powder each day. When seen by one of us (J. W. F.) his condition was beginning to improve. He weighed 1.5 lb. (680 g.) less than he had done two months previously. He was apyrexial, but the heart rate was 168 a minute at rest. He was hypotonic, photophobic, and miserable; his feet and hands were pink and cold, and there was particularly his hands were pink and cold, and there was slight peeling. The blood pressure was 160/100 at rest. His abdomen was a little distended with gas, and the rectum was not filled with small pellet-like scybala. The bladder was not palpable. The lower two central incisor teeth had erupted and were obviously loose. The pupils were not abnormally and dilated. Other pathological processes were excluded, and the diagnosis was in no doubt. Urine was collected over three 24-hour periods and analysed for sympathin (Table III).

As the infant was clearly improving no treatment was attempted, and it was possible to discharge him for convalescence at home.

Case 4

The patient, a girl, aged 7 months, was the fifth child of healthy unrelated parents. From the third month she had appeared to be restless, "wriggling as if in pain," and miserable at night. Three weeks before admission she developed photophobia of increasing severity. Her appetite rapidly deteriorated, she lost weight, and she became increasingly irritable.

On admission she was very cross and obviously uncomfortable. She wriggled about in the prone position and on her knees with her head firmly buried in the pillows. When faced with the light she closed her eyes tightly and often attempted to cover them with her hands. There was no obvious eye trouble. The hands and feet were cold and distinctly pink, but showed only minimal peeling. A mild heat rash was visible over the abdomen. The heart rate was 180 a minute at rest, and the systolic blood pressure was 130 mm. Hg. The abdomen was a little full but there was no loading of the bowel, and although the bladder was palpable rectally it was not abnormally distended. Other pathological conditions were excluded and the diagnosis was certain.

Urine collections were attempted, but the sex and the baby's extreme restlessness rendered accuracy impossible. All faecal contamination had to be excluded. An indwelling catheter was inserted, and a plastic apron was so attached to the perineum that urine escaping from around the catheter should have been directed into the collecting-bottle. The volumes of urine were so small in each 24 hours (60-70 ml.) that their completeness must be doubted. The results are given in Table III. This infant improved steadily on oral tolazoline.

Discussion

Many and widely varying hypotheses have been advanced in attempts to explain the cause and clinical features of this strange condition. Among these are encephalitis (Francioni and Vigi, 1928), preceding bacterial infection (Rodda, 1925), viral infection (Cobb, 1933), mercurial hypersensitivity (Warkany and Hubbard, 1948, 1951), arsenical poisoning

(Meyer and Weise, 1933), "arseno-plumbism" (Calvin and Taylor, 1935), ergot poisoning (Debré and Nevot, 1939), avitaminosis B (Orton and Bender, 1931; Warthin, 1926), avitaminosis E (Forsyth, 1941), emotional deprivation (Leys, 1950; Leys and Cameron, 1952), allergy (Helmick, 1927; Fanconi and Botsztein, 1948), adrenocortical hypofunction (Cheek and Hicks, 1950), adrenocortical hyperfunction (Cheek, 1954), and a neurosis of the vegetative nervous system (Feer, 1923; Selter, 1927). Of these the possible part played by mercury has attracted the greatest attention in recent years.

Hamilton (1819), in Edinburgh, wrote a classical description of the clinical features of mercurialism, and attention was drawn to their resemblance to pink disease by Warkany and Hubbard (1948, 1951). Not all the features of mercurialism are present, however, in pink disease, nor are all the features of the latter to be noted in mercurial poisoning. Not all affected babies excrete abnormal amounts of mercury in their urine. Hypersensitivity of some infants to the mercury content of medicaments absorbed from the alimentary tract or from the skin has been postulated, but Holzel and James (1952), in comparing two regions in England, found that the disease appeared to be commoner in the region using less mercurial teething powder. Dimercaprol has not fulfilled its earlier promise in treatment (Southby, 1953), and it has even been reported as having been used successfully in patients who excreted no mercury before, during, or after treatment (Houet, 1952). Doubt concerning the role of mercury in the causation of pink disease has been expressed recently by McCance (1955).

Similarly, the parts played by other toxic materials, by vitamin deficiency, and by emotional deprivation have been called in question, and it is clear that no one of these factors is responsible for all cases of pink disease.

There is no convincing evidence of the presence of an encephalitis, although it must be remembered that the condition is sometimes seen in association with the Guillain-Barré syndrome. Feer (1923) was impressed by the apparent disturbance of autonomic balance, and he described pink disease as a "disorder of the vegetative nervous system." Orton and Bender (1931) reported finding in their cases degeneration of cells in the lateral horn of the cord, which they considered to be the effector cells of the splanchnic sympathetic. Like the other inconstant histological changes in the central nervous system, however, these may have resulted from the prolonged illness rather than have been evidence of the basic disorder. Stolz and Wöringer (1926) claimed to have found hyperplasia of chromaffin tissue in pink disease, but this has not been substantiated by others.

Many of the clinical features of our cases, and particularly of the first, provide evidence which is suggestive of overaction of the sympathetic nervous system. Arteriolar spasm and the closure of the precapillary sphincters produce capillary anoxia and are responsible for the production of the cold pink, puffy hands and feet, and they were responsible for the necrosis of the tongue in the first case. Hypertension is a logical sequel. Sympathetic activity may be seen in the tachycardia, the bowel and bladder relaxation, and the pupillary dilatation which may be observed. Objection has been raised, however, to the condition being a pure sympathetic overaction in view of the excessive sweating which is such a feature of pink disease. Although cholinergic, it is nevertheless a sympathetic function, and could be explained on the basis of the disturbance being a diencephalic one with resultant stimulation of both the adrenergic and the cholinergic sympathetic nerve endings. It had been hoped that further information on this point might have been obtained by treating the second case with chlorpromazine, but this controversial drug shed no light on the matter.

Alternatively it is possible that the excessive sweating may be a compensatory mechanism for losing heat, in view of the impaired heat regulation resulting from arteriolar spasm. Undoubtedly the heavy sweating is responsible for the prickly-heat rash which so many infants show, and for the reduced plasma chlorides, especially in less temperate

climates than our own. It is more difficult to explain the excessive salivation and the hypotonicity, although the latter may be the result simply of anorexia, poor calorie intake, and sleeplessness, while these in turn may be due to itching, discomfort, and even pain. Excessive salivation may result from sensory stimulation of the mouth, and in Case 1 this may have arisen from the necrotic changes in the tongue. No explanation for the photophobia presents itself, although spasm of the retinal vessels was suspected in our first case. The arteriolar spasm responsible for the pinkness and coldness of the hands and feet is variable. It is common to discover the hands more severely affected than the feet at one examination, only to find the position reversed in the same child a little later. Furthermore, spontaneous relief of spasm in the hands may take place when the feet are still involved, or vice versa, and while the blood pressure is still raised and the heart rate rapid.

These observations would be compatible with a centrally determined variation in sympathetic stimulation in various efferent nerves, or changing sensitivity of end organs to a circulating sympathomimetic substance. Leys (1950) considered that the signs could be explained only on the basis of a disturbance of the whole autonomic system at the diencephalon, and suggested that the condition was a "diencephalopathy." McCance (1955) was of the opinion that pink disease is essentially a manifestation of gross overactivity of the sympathetic system.

Vulliamy (1952) demonstrated very clearly that the arteriolar spasm existing in pink disease was too intense to allow of release by reflex heat, whereas the injection of an adrenergic blocking agent, tolazoline, resulted in almost immediate vasodilatation. Relief of symptoms in six of seven cases treated with tolazoline was noted by Peterson and Laughmiller (1954). It is possible that this is the result of the histamine-like action of tolazoline, and not of its anti-adrenaline activity; but Bower (1954), who reported failure or delay in the response of infants with pink disease to reflex heating, confirmed the release of arteriolar spasm by such ganglion-blocking agents as hexamethonium bromide and pentolinium tartrate. All of these drugs are capable of abolishing most of the signs of pink disease, with the exception of photophobia. These observations on the results of treatment provide suggestive evidence of a possible part played by sympathetic overaction.

Attempts to prove such overactivity, however, by demonstrating the presence of abnormal amounts of sympathomimetic substance in the plasma have met with variable success. Glanzmann (1937) suggested that the adrenal medulla produced an increased secretion of adrenaline in children with pink disease. He found that plasma from affected cases when diluted with Ringer's solution resulted in dilatation of the pupil of the enucleated frog eye, whereas similar dilutions of plasma from normal children had none. This mydriatic effect he attributed to adrenaline. Cheek (1951) investigated the adrenaline content of the plasma in affected and control cases, and found no significant difference, but scrutiny of his results has led to doubt about their value.

The urinary excretion of sympathin is probably a more reliable index of the daily output of adrenaline and nor-adrenaline than efforts to detect them in the plasma. Burn *et al.* (1953), in a preliminary report, recorded normal urinary sympathin excretion in two cases of pink disease. The present investigation was undertaken shortly after the publication of their letter and before it had come to our notice. The result in the first case indicated that sympathin excretion might in fact be increased in pink disease and stimulated further studies, and the determination of the normal range became necessary (Tables I and II). The results obtained in Cases 1 and 3, and with one exception the results obtained in Case 2, demonstrate that urinary sympathin excretion in these infants was greater than in the normal control group (Table III). The results in Case 4 were apparently within normal limits, but there was some doubt about the completeness of the urine collection. The results of separate determinations of adrenaline and nor-

adrenaline in two of the urine samples from Case 2 (Table IV) indicate that there was no marked change from the normal in the proportions of adrenaline and nor-adrenaline in the urinary sympathin.

The variability of the physical signs in individual cases suggests that if they are the result of sympathetic overactivity the intensity of sympathetic stimulation varies from time to time along the various efferent nerves of the sympathetic outflow. Should such clinical features be the result of stimulation at the sympathetic nerve endings rather than the response to a circulating sympathomimetic substance, then more intensive signs would be expected to follow the production of a very much smaller total quantity of pressor substances. This would explain why the urinary output of sympathin in pink disease is less than in phaeochromocytoma, although the clinical pictures may resemble each other so closely as to be mistaken for one another (Hubble, 1951; Vulliamy, 1952).

The sympathetic nervous system is known to be responsible for the maintenance of the *milieu intérieur*. Stress results in its increased activity, and many different physical or emotional insults could produce its overaction. At an age when the immature central nervous system may react to the stress of febrile or other incidents in certain children by convulsive seizures it seems at least plausible that the posterior hypothalamus may react to certain insults in certain predisposed subjects by prolonged and exaggerated activity on the part of the sympathetic system. Pink disease has been recorded in the course of Schüller-Christian disease, and was attributed to granulomatous irritation of the posterior hypothalamus (Stahlie and Winkel, 1950).

The physical signs of the condition, its resemblance to the effects of a phaeochromocytoma, and its response to ganglionic and adrenergic blocking agents are suggestive of such a mechanism.

The present investigation has shown that in infants suffering from pink disease the urinary excretion of sympathin may be greater than in normal control infants who were subjected to similar restraint during the period of urine collection. While these results indicate that sympathetic overaction can be present in children with pink disease, they do not provide evidence that this is invariably so. Definitive treatment of pink disease will require to be the treatment of the underlying case, whether that be toxic, infective, or emotional, but ganglionic and adrenergic blocking agents may be used to relieve symptoms by decreasing sympathetic tone.

Summary

The physical signs of pink disease and their response to adrenolytic substances suggest that they may be produced by an overacting sympathetic system.

Such babies may have a higher daily excretion of sympathin than controls of the same age.

Pink disease may represent the misdirected zeal of an inexperienced defence mechanism to a number of obnoxious stimuli in certain predisposed infants.

Our thanks are due to Professor R. W. B. Ellis and to Professor J. H. Gaddum for their advice and encouragement; to Professor Ellis, Dr. J. O. Forfar, and Dr. D. M. Douglas for permission to investigate cases under their charge; to Dr. H. P. Tait for granting permission to make urine collections in a number of the city residential nurseries; and to the nursing staff of these nurseries, of the Royal Edinburgh Hospital for Sick Children, and of the Edinburgh Northern Group of Hospitals who supervised this difficult task.

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HYPERTHYROIDISM DEVELOPING DURING P.A.S. THERAPY

BY

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AND

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Since the bacteriostatic effect of P.A.S. on tubercle bacilli in man was described by Lehmann (1946), its relative clinical value and toxicity have been amply confirmed. Among its many toxic effects one must include its effect on the thyroid gland. Medical reports on this subject are few. Madigan *et al.* (1950) were the first to mention an increase in skin temperature in patients who were receiving P.A.S. therapy, although the rectal temperature remained normal. They attributed the finding to the direct pharmacological effect of P.A.S. resulting in peripheral vasodilatation—an effect seen in febrile as well as afebrile patients. The increased heat loss in afebrile patients was compensated by an increase in the basal metabolic rate.

Komrower (1951) drew attention to the fact that P.A.S. was responsible for the thyroid enlargement in his patient, who developed clinical myxoedema during P.A.S. therapy over a period of about six months. Clausen and Kjerulf-Jensen (1951) reported somewhat similar findings in three cases, and four more cases were reported by Bergqvist and de Maré (1952). Further reports came from Librach (1952) and Davies and Galbraith (1953).

A series of 11 cases of thyroid enlargement during P.A.S. therapy was reported by Brinkman and Coates (1954) from the Trudeau Sanatorium, Trudeau, New York. Two of their cases developed myxoedema as well as thyroid enlargement. The enlargement appeared after 4 to 12 months' treatment with P.A.S., except in one case in which goitre appeared after seven weeks' treatment. In addition, Hamilton (1953) recorded an unusual finding of exophthalmos with a hyperplastic-hypothyroid type of enlargement.

The gradually increasing number of reports of the thyroid gland being affected during P.A.S. therapy are

all on the hypothyroid type. The following case presents the opposite picture—that is, hyperthyroidism, hitherto not mentioned, apart from the high basal metabolic rate alluded to by Madigan *et al.* (1950).

Case Report

A Thai married woman aged 32 attended the out-patient department for treatment of pulmonary tuberculosis in November, 1953. She had been treated by her doctor for the previous two years with apparently little improvement. Physical examination at that time proved the lesion to be in the left upper lobe, confirmed by x-ray examination. Sputum examinations were positive for tubercle bacilli. Her temperature was 37.7° C. (99.8° F.), pulse 118, respirations 24, and body weight 47.1 kg. (7 st. 5½ lb.). She was given P.A.S. (12 g. daily) and isoniazid ("rimifon") (300 mg. daily). After a pneumoperitoneum a few days later her condition improved steadily, and by December, 1954, her weight was 53.3 kg. (8 st. 5½ lb.), pulse 88, respirations 20, temperature 36.7° C. (98° F.), and sputum examinations were negative. However, she began to notice that her neck was somewhat enlarged, and by January, 1955, it was so obvious that she had to wear a scarf to conceal it. She felt easily tired, irritable, and hot even in relatively cool weather. Her weight dropped to 51.6 kg. (8 st. 1½ lb.) in spite of a voracious appetite.

The B.M.R. was +25.1%; cholesterol, 140.2 mg. per 100 ml.; neck measurement, 33 cm.; respirations 20; temperature 36.5° C. (97.7° F.); pulse 104. When the cause of the thyroid enlargement was realized P.A.S. was discontinued and streptomycin was given together with isoniazid. Subsequent to the withdrawal of P.A.S. the hyperthyroid state improved steadily—B.M.R. was +16.8%; cholesterol, 200 mg. per 100 ml.; neck measurement, 31 cm.—with no symptoms referable to hyperthyroidism. By November, 1955, the B.M.R. was +13.3% and the neck measurement 31 cm. (apparently her normal size).

Discussion

The clinical pattern and laboratory findings in this case leave us with no alternative but to conclude that P.A.S. caused thyroid enlargement and hyperthyroidism. It may be argued that the basal metabolism may be high even in afebrile cases, as previously noted by Madigan *et al.* in patients during P.A.S. therapy, but the fact that the B.M.R. changes in our case were correlated with blood cholesterol levels during and after cessation of the drug would be strongly in favour of hyperplastic hyperthyroidism. However, determinations of radioactive iodine uptake and of protein-bound iodine in the serum, especially the latter, could settle the problem, but unfortunately these were not available to us.

Isoniazid by itself is known to cause thyroid enlargement, but this was not the responsible factor in our case, as the drug had been given throughout the treatment period. Angel *et al.* (1955) discussed the role of P.A.S. in the production of thyroid enlargement with or without myxoedema. They investigated the iodine metabolism of the surviving thyroid slices, and were of the opinion that P.A.S. does not inhibit the accumulation of inorganic ¹³¹I in thyroid tissue, but is rather like thiouracil and somewhat weaker in action. P.A.S. inhibits the formation of di-iodotyrosine and thyroid hormone, and the action is a direct one, although the possibility of an additional indirect action cannot be entirely excluded. Macgregor and Somner (1954) and Brinkman and Coates (1954) found iodine ineffective in the relief of goitre due to P.A.S., but remissions of the symptoms and goitre were seen following the use of thyroid. Balint *et al.* (1954) reported some benefit from iodine.

The mechanism, outlined above, of the role of P.A.S. in the production of goitre does not seem to fit in with what happened in our case, undoubtedly a case of hyperthyroidism. It may be possible that in this case the P.A.S. in some way, (?) acting like thiocyanate, blocked the formation of thyroid hormone by excessive production of thyrotropin

leading to thyroid hyperplasia; instead of the gland behaving as in hypothyroidism, the patient's diet intake may have contained enough iodine to overcome the blockage by sudden excessive formation and release of thyroid hormone (Paschkis *et al.*, 1941). Alternatively, all the cases so far reported might have had a transient period of hyperthyroidism followed later by hypothyroidism, which might have happened in our case had we continued with the drug for a longer period.

Summary

A case of P.A.S.-induced hyperthyroidism is reported. An attempt is made to explain the mechanism. The literature on hypothyroidism and thyroid enlargement caused by P.A.S. is briefly reviewed.

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GONADAL AGENESIS WITH TETANY AND SEVERE OSTEOPOROSIS

BY

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In 1938 Turner described a syndrome occurring in a group of 10 women, all of whom exhibited sexual infantilism, short stature, cubitus valgus, and webbing of the neck. Varney *et al.* (1942), reporting further cases, noted an increased excretion of urinary gonadotrophins. Albright *et al.* (1942) stressed the fact that the syndrome was associated with ovarian insufficiency, and that this was due to primary agenesis and was not secondary to pituitary hypofunction. In these and subsequent reports many further congenital abnormalities have been noted with varying frequency, and osteoporosis of a degree and distribution similar to that sometimes found in senile patients has often been observed. Much less commonly a similar syndrome has been described in men, and other cases have been seen in which one or more of the developmental abnormalities have been lacking.

One abnormality that has been found not infrequently in these patients is coarctation of the aorta. As this lesion occurs much more commonly in males, it seemed noteworthy to Polani *et al.* (1954) that it should be so often present in a group of people most of whom were women. They considered the possibility that their patients, though possessing genitalia of infantile female appearance, might in fact be genetic males. Animal experiments have shown that if the gonads are destroyed before sexual differentiation has occurred, the subjects will develop feminine genital tracts regardless of the true genetic sex (Jost, 1947). Polani and his group, using a method for sexing a subject by examination of the skin nuclei (Hunter *et al.*, 1954), found that three

apparently female patients with Turner's syndrome and coarctation of the aorta were in fact genetic males.

If, as seems likely from these findings, most patients with Turner's syndrome are males, it is not surprising that efforts to treat their "ovarian" agenesis by substitution therapy with female sex hormones have failed to be very satisfactory. It also now seems preferable to use the term "gonadal agenesis" to describe the condition.

In the following case the patient suffered from gonadal agenesis and spontaneous tetany of unknown immediate cause. In addition, marked generalized osteoporosis was noted radiologically. This combination does not seem to have been noted previously, and so seems to merit description even though no good cause for the association can be suggested.

Case Report

A domestic servant aged 25 was referred to Dr. C. E. Dent at University College Hospital by Dr. B. Miles, of Hereford, for investigation of her tetany. She had never menstruated, but, apart from this, had felt normal until 1953, when she began to suffer from episodes of painful cramps and stiffness of the hands and feet, infrequent at first but gradually becoming more common and more severe. By the beginning of 1955 severe attacks were occurring every two to three weeks. She had been well otherwise, apart from a respiratory tract infection two months before admission. Complete dental clearance, apparently for caries, had been carried out early in 1953. She said that she was the backward member of her family. Her parents were not related, and they and five siblings were well and of normal stature.

On examination she was a co-operative but rather simple patient (I.Q. 75), who looked older than her years. No abnormality was noted in the cardiovascular, respiratory, or alimentary systems. Her height was 60 in. (152 cm.) and her span 61 in. (155 cm.). There was no webbing of the neck, but the carrying angle was increased and slight ptosis was present. The axillary hair was sparse, but there was a growth of fine downy hair on the trunk and limbs. The nipples were infantile and there was complete absence of breast tissue. Although she did not exhibit tetany spontaneously while in hospital, Chvostek's and Trousseau's signs were always positive. She showed no tendency to overbreathe.

Mr. G. R. Clare, who examined the patient under anaesthesia, reported: "The labia majora were firm and of normal shape. On the medial surface the labia minora were represented by two small skin tags which were about 2 cm. long. The clitoris was anatomically normal but smaller than usual. The vestibule, remnants of hymen, and vagina were normal in size, but the vaginal skin looked less well oestrogenized than usual for a woman of this age. The cervix and body of the uterus were infantile, measuring 2.5 cm. from external os to fundus uteri. The ovarian ligaments were palpable on both sides. The distal part of these appeared thicker. No separate gonad was palpable. The whole appearance of the genital organs was one of marked hypoplasia except for the vagina, which was of normal size."

Investigations.—Plasma electrolytes: sodium, 146 mEq/l.; potassium, 4.55 mEq/l.; chloride, 102.5 mEq/l.; bicarbonate, 25.4 mEq/l.; calcium, 8.4–9 mg./100 ml.; inorganic phosphorus 4–5 mg./100 ml.; magnesium, 2 mg./100 ml. Alkaline phosphatase, 10.2 King-Armstrong units; blood pH determined by Dr. Wynn, St. Mary's Hospital, 7.45; blood urea, 21 mg./100 ml. Electrophoresis of the plasma proteins was normal apart from a slight increase of alpha-globulin. Electrocardiogram: prolonged QTc (0.45 second) and T wave inversion in leads II and III and V₁–5. The patient absorbed 95% of her dietary fat in a five-day period. The 24-hour urinary output of 17-ketosteroids,

HAEMOLYTIC ANAEMIA IN SICKLE-CELL TRAIT

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It is generally accepted that cases of sickle-cell trait show no haematological abnormality other than sickling (Chernoff, 1955). Edington and Lehmann (1955), however, suggested that the trait itself may be "by no means harmless," and ascribed the cause of death in an African woman with the sickle-cell trait to a haemolytic crisis, possibly precipitated by a superadded infection. Griffiths (1955) has referred to a sickle-cell crisis occurring in a case of sickle-cell trait during pregnancy. No details were given.

We give below an account of a patient with the sickle-cell trait in whom a haemolytic episode developed during a superadded infection.

Case Report

The patient, a 35-year-old Jamaican, was admitted to Whittington Hospital on February 17, 1955, complaining of general malaise and cough. Three days before admission he felt cold and hot in turn and had vague body pains. On the day before admission he had difficulty in breathing and developed a pain in the right side of his chest, with a cough which produced a small amount of white phlegm.

His previous history was difficult to obtain; all that could be elicited was that he had landed in England from Jamaica five months previously, that he had suffered from unspecified "fever" in his home country, and that he had been working with a fellow Jamaican who had a cough which produced a bloodstained sputum for which he was being treated as an out-patient at another hospital.

Physical examination showed the patient to be a well-nourished negro with a temperature of 105° F. (40.6° C.), pulse 100, and respiration rate 24. Examination of the chest suggested consolidation at the bases of both lungs, with scattered rales and crepitations over the lung areas. Abdominal examination revealed a barely palpable spleen. Examination of the other systems was negative.

Special Investigations.—The initial blood count was: Hb. 60% (8.9 g.); red cells, 3,110,000 per c.mm.; P.C.V., 28%; M.C.V., 93 cubic microns; M.C.H.C., 32%; reticulocytes, 4%; white cells, 3,100 per c.mm. (Standard techniques as in Wintrobe, 1951.) Examination of the blood film showed marked anisocytosis and increased polychromasia of the red cells. Some target cells, "raspberry"-shaped and spiculated forms, together with one normoblast, were seen. A sickling test with 2% sodium bisulphite was positive in 10 minutes. The E.S.R. (Westergren) was 9 mm. in one hour. The serum bilirubin was 1.4 mg. per 100 ml. and the urine contained a great excess of urobilinogen. The direct Coombs test, cold agglutinin test, and specific haemolysis tests were negative. Complement-fixation tests with the antigens of influenza A and B, psittacosis, and Q fever were persistently negative, and the M.G. streptococcus titre was negative at 1 in 4. The Wassermann reaction and Kahn test were negative. Paper electrophoresis of a haemoglobin solution (barbitone buffer pH 8.6, 0.06 M solution) revealed a pattern of haemoglobin A plus haemoglobin S, the latter pigment comprising one-quarter to one-third of the total haemoglobin mass. Foetal haemoglobin tested for by the alkali denaturation technique (Singer *et al.*, 1951) was 0.12% (within normal limits). No other abnormal haemoglobins could be demonstrated. Sternal marrow showed slight hypoplasia with active normoblastic erythropoiesis. The myeloid series and

17-ketogenic steroids, and 17-hydroxysteroids (determined by Dr. J. D. Nabarro) was within normal limits. The 24-hour urinary output of gonadotrophins was between 20 and 80 mouse units. Reports on vaginal smear (Dr. G. I. M. Swyer): "Mainly mucus and debris. The few cells are of basal type—that is, very hypo-oestrogenic."

Bone x-ray films showed delayed epiphyseal fusion. There was marked diffuse osteoporosis affecting both central and peripheral bones. This was most gross in the pelvic bones, spine, and long bones of the limbs, but the skull and small bones of the hands and feet also showed definite though less marked changes. There was no specific evidence of osteomalacia or hyperparathyroidism—that is, no signs of cyst formation or subperiosteal erosion and no Looser's zones. Report on biopsy from cortex of tibia (Dr. H. Sissons): "Osteoporosis. The cortex is thinned but is otherwise normal. No evidence of osteomalacia is present, and the histological appearance of the intracellular matrix of the bone is normal."

The patient's genetic sex was determined by Dr. Swyer by examination of the skin nuclei and those of the polymorphonuclear leucocytes, and proved to be male.

Course and Treatment.—In an attempt to exclude an endocrine deficiency as the cause of the tetany, methyl-testosterone, 20 mg. daily for two periods of six days, and stilboestrol, 2 mg. daily for two periods of six days, were given. The calcium and phosphorus levels rose and fell slightly during this time, but the changes did not seem to be related to the treatment. The simultaneous calcium balance study also showed no significant changes, but was unfortunately very inaccurate owing to curious fluctuations in bowel function. Neither form of therapy nor the raising of the plasma calcium level to 9.7 mg./100 ml. with intravenous calcium gluconate succeeded in abolishing the Chvostek or Trousseau sign.

Discussion

There can be little doubt that this patient has gonadal agenesis in association with some of the other congenital defects of Turner's syndrome. Although such patients not infrequently have osteoporosis limited to the spine, infrequently have osteoporosis such as this has not generalized and marked osteoporosis as this has not been mentioned, nor has the tetany. In the few cases in which serum calcium levels have been recorded they have been normal or slightly raised, as found by Albright *et al.* (1942).

The cause of this patient's tetany remains obscure. Although the serum calcium level was somewhat low, it was hardly low enough to produce tetany without the operation of some additional factor. Also the tetany persisted even when the calcium level was raised almost to normal. None of the other known causes of tetany was apparent in this case.

Although it seems reasonable to suppose that the co-existence of the rare condition of gonadal agenesis with the equally rare conditions of marked clinical tetany and generalized osteoporosis could hardly be a chance occurrence, no cause for the association could be shown.

Summary

A case of gonadal agenesis is described in which, in addition to many of the usual features, spontaneous tetany and generalized osteoporosis also occurred. No metabolic explanation for this association can be offered.

I am grateful to Dr. C. E. Dent, in whose department the balance studies were performed, for permission to publish this case and for assistance with the preparation of this paper.

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megakaryocytes were normal and there was a small increase in plasma and reticulum cells. No abnormal cells were seen. Culture of sputum yielded a growth of *Staph. aureus* sensitive to penicillin, chlortetracycline, chloramphenicol, and streptomycin. Blood culture yielded a coagulase-negative staphylococcus. Acid-fast bacilli were not detected in sputum, gastric washings, laryngeal swabs, or faeces. C.S.F. was normal and the Widal reaction was negative.

Despite treatment with "estomycin" there was no improvement in the clinical condition, but within 48 hours of starting chloramphenicol the patient felt better and his temperature returned to normal. The temperature stayed normal for only 48 hours on chloramphenicol alone and estomycin was restarted and chloramphenicol stopped. Two pints (1,140 ml.) of blood was transfused on February 26 as the haemoglobin had fallen to 52% (7.7 g.). The serum bilirubin indirect reaction was 1 mg. per 100 ml. on February 19 and increased amounts of urobilinogen continued to be excreted in the urine for a period of three weeks. The temperature continued to swing wildly, and on February 27 signs of an effusion developed over the right lower lobe. Paracentesis was performed and the fluid showed small numbers of leucocytes—almost all lymphocytes—with large numbers of red cells. No bacteria were seen in the films stained by the Ziehl-Neelsen method. Routine and Löwenstein-Jensen cultures were sterile. The patient's general condition improved slightly, but the chest signs remained unchanged. On March 16 signs of bilateral iridocyclitis developed.

Further Investigations.—X-ray examination of the chest on March 29 showed fine diffuse miliary foci throughout both lungs, and the appearances were reported as being suggestive of acute miliary tuberculosis. The E.S.R. was 30 mm. in one hour and the Mantoux test was positive at 1 in 1,000. On April 1 the total serum proteins were 6.4 g. per 100 ml. with an albumin:globulin ratio of 0.7:1. Paper electrophoresis of the serum proteins showed a marked increase in globulin. The serum calcium was 11 g./100 ml. and Sulkowitch's test on the urine showed moderate amounts of calcium. Liver biopsy was carried out on April 7, and this was reported on by Dr. C. C. Bryson as showing slight focal chronic inflammatory reaction, fine pericellular fibrosis, and one minute "miliary" epithelioid focus.

On cortisone, isoniazid, and streptomycin the patient's lung condition had practically cleared after one month, but the iridocyclitis was still active. The E.S.R. was now 6 mm. in one hour. The mean corpuscular fragility test (Parpart *et al.*, 1947), which was carried out on May 2 (65 days after transfusion), was 0.375% NaCl equivalent (normal range 0.400 to 0.438% NaCl). On June 13 the peripheral blood picture was as follows: Hb, 100% (14.8 g.); white cells, 6,700 per c.mm. (neutrophil polymorphs 82%, eosinophil polymorphs 1%, lymphocytes 15%, monocytes 2%); platelets, 213,000 per c.mm.; film: normal. No haematological abnormality other than sickling could now be detected.

Discussion

In thalassaemia minor, infection, sometimes of an obscure nature, has been reported to be associated with decreased activity of the bone marrow and a drop in the haemoglobin level steeper than usual, while during periods of freedom from infection the drop in haemoglobin level is more gradual (Matoth *et al.*, 1955).

Weiss (1953) concluded that the sickle-cell trait was associated with a significantly increased incidence of the acute exudative form of pulmonary tuberculosis in American negroes, and stated that "the sickle-cell trait, ordinarily of no particular importance, may assume clinical significance in relation to other disease states." However, Vandepitte *et al.* (1953) could not confirm this association in Africans in the Belgian Congo.

Edington and Lehmann (1955) question the accepted view that the sickle-cell trait is a benign congenital anomaly and refer to the finding of haematuria due to pathological

lesions in the kidneys in such cases. In their case of sickle-cell trait death was due to haemolytic crisis and septicaemia associated with the expulsion of a hydatidiform mole in a 23-year-old woman. Post-mortem histology revealed the characteristic findings of a sickle-cell crisis. They considered that "the terminal crisis was probably initiated by the septicaemic condition and was directly responsible for death."

In the case referred to by Griffiths (1955) a sickle-cell crisis occurred in a case of sickle-cell trait during pregnancy. In a personal communication Griffiths confirms that "gross intravascular haemolysis" was present and that other possible causes of haemolysis were not demonstrable.

In our case a haemolytic anaemia developed in a patient with sickle-cell trait during an infection. This anaemia was probably precipitated by the intercurrent disease—sarcoidosis or (atypical) tuberculosis. It is significant, however, that changes in red-cell morphology in the first blood film suggested the need for a sickling test. It is appreciated that both sarcoidosis and miliary tuberculosis *per se* can (rarely) be associated with a haemolytic anaemia. Nevertheless in view of the findings of Edington and Lehmann (1955) and Griffiths (1955) it seems reasonable to suggest that the red cells in cases of sickle-cell trait may be more susceptible to haemolytic mechanisms during intercurrent infections or pregnancy. If this assumption is correct other similar cases should soon be reported.

It is, of course, possible that this man was a heterozygote for the thalassaemia gene and that he was symptomless until under increased stress sickle-cell thalassaemia disease became manifest. We consider this possibility as virtually excluded—though of course only a family study could give a decisive answer—for the following reasons: foetal haemoglobin was absent, the adult haemoglobin was present in a considerably greater proportion than the sickle-cell haemoglobin, and the fragility was only slightly decreased, being of the same order as seen by us in two other cases of sickle-cell trait. There are few references to accurate osmotic fragility tests in cases of sickle-cell trait. Chernoff (1955) states that the osmotic fragility is normal in sickle-cell trait and "somewhat decreased" in sickle-cell anaemia. We have since found a low normal fragility (0.400%) and a decreased fragility (0.382% NaCl) respectively in two further cases of asymptomatic sickle-cell trait. These cases had no anaemia and were discovered only on routine sickling tests. Electrophoretic and foetal haemoglobin studies showed them to be apparently simple S-trait cases. It appears that more observations on the osmotic fragility test in sickle-cell trait cases should be made. In any case, it would appear that we can no longer accept the view that the sickle-cell trait is a harmless anomaly unassociated with anaemia or morphological changes in the red blood cells under all conditions.

We wish to thank Dr. H. E. S. Pearson, physician in charge of the case, Miss M. Crowley, biochemist, and Miss A. Wallace, senior technician.

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The National Association for Mental Health has established a public information committee under the chairmanship of LORD FEVERSHAM. Its objects are to acquaint the public with the possibility of preventive measures against mental illness, the need for education in principles of mental hygiene, and "the great need to stimulate and support programmes of research in the mental health field." The committee includes psychiatrists, educationalists, and others.

Medical Memoranda

Perforating Wound of the Portal Vein

Injuries to the portal vein following abdominal trauma are rare. Santos and Carichio (1950) discovered reports of 20 such cases, and in three of these the portal vein had been injured by a gunshot wound of the abdomen (Hallopeau, 1910; Romanis, 1916, 1916-17; Giorgi, 1920, 1921). In a personal communication Sir Gordon Gordon-Taylor also recalls a case of portal vein injury during the 1914-18 war. A case of perforating injury of the portal vein following an abdominal wound by an industrial gun is reported because of its rarity and the unusual missile.

CASE REPORT

A man of 38 was admitted to hospital one hour after accidentally shooting himself in the upper abdomen with a cartridge-fired nail-gun, which is used in the housing industry and is able to drive a 1½-in. (4.4-cm.) nail through a railway sleeper. In this instance the nail passed through the upper abdomen and loin and then pierced both the ceiling and the roof of the house in which the accident took place. He became shocked within a few minutes of the accident and developed pain in both shoulders while being conveyed to hospital.

On examination he showed classical signs of gross internal haemorrhage and shock. His blood pressure was 55/30. In the middle of the epigastrium was a ½-in. (1.3-cm.) charred puncture wound, and a small ½-in. (0.6-cm.) exit wound was found in the loin just to the right of the first lumbar vertebra. Upper abdominal tenderness and guarding, with a positive release sign, was present. Bowel sounds were heard and rectal examination was negative.

Immediate resuscitation with dextran and blood was begun, and antitetanic and anti-gas-gangrene serum, along with penicillin and streptomycin, were given.

Chest x-ray films were normal and x-ray examination of the abdomen showed no free gas under the diaphragm, no foreign body, and no bony damage to the lumbar spine. A provisional diagnosis of intraperitoneal haemorrhage due to liver injury was made. After transfusion with 3 pints (1,700 ml.) of blood, the patient's condition had improved sufficiently for him to undergo operation.

Operation under general anaesthesia was begun three hours after wounding. The exit wound of the back was excised and sutured. The patient was then turned over and the abdomen was opened by an upper midline incision and the puncture wound excised. A large quantity of dark fluid blood was immediately encountered in the peritoneal cavity and 3 pints (1,700 ml.) was aspirated. There was a small penetrating wound on the upper aspect of the neck of the pancreas. On opening the lesser sac no blood was found. Reflection of the upper border of the neck of the pancreas to expose the source of the retroperitoneal haemorrhage produced brisk venous haemorrhage, which was controlled by digital pressure. Mobilization of the duodenum and pancreas was carried out to expose the portal, splenic, and superior mesenteric veins. Two oblique lacerated wounds some 7-8 mm. in size were found on the anterior and posterior surfaces of the portal vein at the point of junction of the three great veins. After exposure of the site of injury haemorrhage could be controlled only by digital compression, and the assistance of a second surgeon became necessary. Linen tapes and bulldog clips could then be applied to the three major vessels with satisfactory control of the haemorrhage. The perforations were closed with

an atraumatic, continuous, everting fine silk arterial suture. The suture lines were "watertight" on removal of the controlling clips and tapes.

Further exploration revealed no injury to adjacent structures or to any other contents of the abdomen. The puncture wound of the liver was excised and sutured. The upper abdomen was drained and the incision closed in layers.

The patient's condition at the end of the operation was satisfactory. Six pints (3,400 ml.) of blood was administered intravenously during the operation to replace blood loss.

Post-operatively, he was maintained on intravenous infusions, gastric suction, and heavy dosage of penicillin and streptomycin. No anticoagulants were used. He made steady progress for 48 hours after operation, when he had sudden pain in the right hypochondrium and a rigor with a temperature of 104° F. (40° C.). The only abnormal finding was some tenderness in the right hypochondrium. The chest was clear clinically and radiologically. A retroperitoneal infection was considered the most likely cause of his symptoms, and intravenous chlortetracycline was given for three days. Blood culture taken at this time proved sterile. He subsequently ran a low-grade pyrexia, and three days after operation he developed jaundice, which lasted for six days. A further rigor, with a temperature of 103° F. (39.5° C.), occurred on the ninth day, and intravenous chlortetracycline was again used, for five days. The haemoglobin had now fallen to 56%, and after transfusion with 2 pints (1,140 ml.) of blood it rose to 68%. A minor rigor occurred on the eleventh day, but thereafter the temperature fell to normal. The most likely explanation of these rigors was that a low-grade portal pyaemia developed after injury and suture of the portal vein.

Subsequent progress was uneventful and he was discharged from hospital one month after operation. When last seen, six months after operation, his haemoglobin was 100%, and all liver function and blood chemistry values were normal.

COMMENT

Four similar cases have been reported in the literature. In 1910 Hallopeau successfully repaired a gunshot wound of the portal vein in a 35-year-old woman. In 1920 Giorgi reported a similar case in a 35-year-old man, but the patient died five months later from an ascending urinary infection. During the 1914-18 war Gordon-Taylor successfully dealt with a portal vein injury in a soldier. Romanis (1916, 1916-17) had a case similar to that of Gordon-Taylor, but although repair of the portal vein was successful the patient died on the ninth post-operative day from a secondary haemorrhage from an eroded renal artery. In all the cases quoted above the wound involved only one surface of the portal vein.

Although laceration of the portal vein is a serious injury it is of note that none of the patients died as an immediate result of the injury. This is all the more remarkable, as four of the cases occurred between 1910 and 1920, when facilities for transfusion were almost non-existent. The fact that the patients were 38 years of age or younger probably played an important part in their survival. Santos and Carichio (1950) believe that portal vein bleeding is tolerated better than other forms of haemorrhage.

The present case is unusual in that the missile pierced both the anterior and posterior surfaces of the portal vein and so double suture was necessary.

The treatment of a linear wound of the portal vein where no loss or destruction of the vein wall has occurred is best carried out by suture. This method was used successfully in three of the five cases. Where a defect of the vein wall exists operative repair presents a difficult problem, as suture may unduly narrow the lumen. Moreover, ligation of the portal vein in man for periods longer than 20 minutes is

said to be fatal except in hepatic cirrhosis (Thole, 1939). A vein graft may not be immediately available to repair such defects of the vein wall.

Operating upon dogs, Csillag *et al.* (1953) have successfully repaired 20-mm. defects of the portal vein by suturing a serosal covered loop of bowel over the defect. They think that this method may be life-saving in cases of traumatic defects of the great abdominal veins in humans.

We thank Mr. H. Gordon Ungley for permission to publish this case and for his help and advice in the preparation of this article, and Sir Gordon Gordon-Taylor for kindly allowing us to publish details of a personal case of portal vein injury and for helpful criticism.

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Intestinal Obstruction as a Late Complication of Fibrocystic Disease of Pancreas

The three main clinical types of fibrocystic disease of the pancreas were first clearly distinguished by Dorothy Andersen in 1938. They are: (1) intestinal obstruction in the newborn infant; (2) persistent respiratory disorders in the young baby; and (3) the "coeliac syndrome" with wasting, failure to thrive, and fatty stools in the young child.

The separation of the disorder into these three groups raises the interesting question why they tend to occur in different age groups, and especially why intestinal obstruction should be comparatively common in the neonatal period yet very rare later. In 18 of Bodian's (1952) 116 cases of fibrocystic disease of the pancreas neonatal obstruction (meconium ileus) occurred; yet in none of his case records is there a description of intestinal obstruction occurring after early infancy. In the literature describing some hundreds of cases I have been able to find only two instances of this complication. The first (Levy, 1951) was in an infant of 7 months on whom laparotomy was done; the tentative diagnosis of intussusception was not confirmed, and at the subsequent necropsy it was demonstrated that the intestinal obstruction had been caused by putty-like material blocking the small bowel. The second (Fisher, 1954) occurred at 15 months of age, and in this case the obstruction was relieved successfully by ileostomy and pancreatin therapy.

The following report describes a case in which intestinal obstruction, occurring at 16 months, was overcome by medical treatment.

CASE REPORT

A baby girl was first admitted to hospital at 9 weeks with a history of failure to thrive despite her good appetite. She was the second child of healthy parents whose first child had died at 2 years from "pneumonia and coeliac disease." The diagnosis of fibrocystic disease of the pancreas in the present case was made from the typical clinical appearance, and was confirmed by the absence of trypsin from specimens of faeces and duodenal juice. She was discharged home, much improved, at 3½ months on a dried milk

preparation with pancreatin granules, 10 gr. (0.65 g.) before each of five feeds daily. With only one mild and temporary relapse at 5½ months, when the dosage of pancreatin was increased, she remained well until her present admission to hospital at the age of 16 months.

The recent history was of mild upper respiratory infection two weeks before admission, when the child seemed "off colour" and lost her appetite. Two weeks later she became absolutely constipated and had one small food vomit. Because of the anorexia no further pancreatin was given by her mother. The following day two very small hard lumps of faeces were passed, but two days later glycerin suppositories and two enemata produced no faeces or flatus and she was then admitted to hospital.

On examination she was a rather underweight and irritable child with bouts of abdominal pain. The abdomen was distended and resonant, with audible bowel sounds but no visible peristalsis. A mass was palpable in the right iliac fossa, rather vague in outline and doubtfully indentable. The rectum was empty and no blood or mucus was passed. A barium enema showed a filling defect in the caecum, thought to be either a faecal mass or, less probably, an ileocolic intussusception. As the patient's general condition was good, it was decided to keep her under observation for some hours. On the following morning she started to vomit large quantities of dark brown fluid, and hourly gastric aspiration with intravenous glucose and saline drip was instituted. Laparotomy was now decided upon, but was postponed until adequate hydration had been restored. That evening a small amount of flatus was passed per rectum and operation was further postponed. Olive oil enemata were given four-hourly, alternating with oral pancreatin, 40 gr. (2.6 g.) four-hourly, and were well tolerated throughout the night. Next day five dark yellow sticky stools were passed, with consequent relief of abdominal distension. Oral fluids were now tolerated and intravenous infusion was discontinued. A course of chlortetracycline was given for the respiratory infection. She continued to have three or four soft stools each day, and her recovery thereafter was uneventful.

COMMENT

In this case of fibrocystic disease of the pancreas early acute intestinal obstruction occurred at 16 months. It was evidently caused by inspissation of small-bowel contents and is presumed to have been due to the omission of pancreatin during an acute infection. This state of affairs is symptomatically analogous to meconium ileus in the newborn. One wonders if there is some difference between faeces and meconium to account for the markedly different incidence of intestinal obstruction in neonates and in older children; and, also, what part pancreatin does in fact play. It appears from the three reported cases that in inadequate dosage it may precipitate obstipation, and yet some children with fibrocystic disease of the pancreas do not obstruct although they have never had pancreatin.

The necessity for surgery in these cases seems to depend on the evidence for and against intussusception. In our case there had been no blood passed per rectum and the x-ray appearances were more typical of faecal obstruction than of intussusception. The child's good general condition allowed us to temporize, and a medical regime of oral pancreatin and oil enemata rapidly relieved the obstruction.

I am grateful to Dr. John Apley for permission to publish this case and for all his help.

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Reviews

NURSING OF THE NEWBORN

Nursing Care of the Newly Born Infant. By W. S. Craig, B.Sc., M.D., F.R.C.P.Ed., M.R.C.P., F.R.S.E., in collaboration with M. F. G. Buchanan, M.B., Ch.B., M.R.C.P., D.C.H., R. J. Pugh, M.B., Ch.B., M.R.C.P., D.C.H., and Miss M. Pattullo, R.G.N., S.C.M. Chapter on Mothercraft contributed by Miss M. J. W. Taylor, R.G.N., S.C.M., M.T.D. (Pp. 472+viii; illustrated 35s.) Edinburgh and London: E. and S. Livingstone. 1955.

The outstanding feature of this well-produced volume is its illustrations, of which there are no fewer than 224. The book is intended primarily for pupil midwives and should prove extremely valuable to them and, indeed, to all paediatric nurses and others who have to care for the newborn. Stress is laid on the development of the normal infant, and the pathological conditions are dealt with subsequently. The physiology and pathology of breast-feeding are clearly explained and the principles of nutrition well discussed. Minor disorders—a very important section—trauma, congenital malformations and infections follow, and then a chapter on the care of the premature infant. The last four chapters are devoted to selected clinical problems, the treatment of emergencies, selected nursing problems, and laboratory and therapeutic aids.

It is unfortunate that the dose of vitamin K advised is 5 mg. four-hourly—which is certainly a dangerous overdose for any premature baby. The illustration of a subcutaneous infusion shows the fluid being given by syringe into the axilla, and it is suggested that hyaluronidase should be added to the fluid before administration. This is not the best method. In discussing oxygen therapy no mention is made of retrolental fibroplasia, nor is there any instruction about controlling the oxygen tension. Resuscitation is thoroughly considered, and the overriding importance of gentleness is stressed repeatedly. However, in case the midwife's patience gives out, insertion of a finger into the baby's mouth, artificial respiration, mouth-to-mouth insufflation, and smart tapping of the buttocks are all recommended, and intragastric oxygen is to be preferred, few midwives will have this available and may therefore be tempted to apply these other remedies, which may be to the detriment of the infant. Professor Heaf is misnamed Heath, and the reference to vaccination in the index is given as p. 426, but there is no mention of the subject there. Apart from these and a few other minor considerations the book is to be thoroughly recommended.

WILFRID GAISFORD.

AMINO-ACID METABOLISM

A Symposium on Amino Acid Metabolism. Sponsored by the McCollum-Pratt Institute of the Johns Hopkins University. Edited by William D. McElroy and H. Bentley Glass. (Pp. 1,048+vi; illustrated. £5.) Baltimore: Johns Hopkins Press. London: Oxford University Press. 1955.

This volume consists of papers by some 80 contributors, and discussions on these, presented at a symposium on amino-acid metabolism held at the Johns Hopkins University, under the sponsorship of the McCollum-Pratt Institute, on June 14-17, 1954. A feature in the planning and publication of these contributions was the selection of one or two participants who would summarize the present state of knowledge of the metabolism of a group of closely related amino-acids. The book is arranged according to these various groups and in the order in which they were presented at the symposium. Thus under Part 1 is a general consideration of amino-acid metabolism; Part 2 includes the metabolism of glutamic acid, proline, ornithine, citrulline, and arginine; Part 3, the metabolism of histidine, leucine,

isoleucine, valine, and lysine; Part 4, the metabolism of methionine, cysteine, and threonine; Part 5, the metabolism of glycine and serine; Part 6, the metabolism of aromatic amino-acids; and finally there is a summary by Dr. Bentley Glass.

Our understanding of the expanding interrelationships of the several groups of amino-acids probably constitutes the most outstanding feature of recent advances in amino-acid metabolism. From the beginning to the end of the symposium great stress has been laid on the numerous transaminations that occur and on the amino-acid pool, to which at least sixteen amino-acids contribute. But these form only part of the interrelationships where glutamic and aspartic acids stand at a crossroad from which, as Bentley Glass states, "there radiate the connections between the tricarboxylic acid cycle and the ornithine-citrulline-arginine cycle; and the proline-hydroxyproline pathway projects from glutamic acid in yet another direction." Then histidine connects on the one hand with pentose metabolism, and in its own demise participates in the synthesis of the nucleotides and of the new methyl groups needed in making methionine, choline, etc.; while in a third connexion it links back to the crossroads where stands glutamic acid. Valine, leucine, and isoleucine are synthesized by parallel and interconnecting paths, and through their degradation terminate in aceto-acetate, fatty acid metabolism, and the Krebs cycle. In their synthesis valine and isoleucine are tied up to threonine and homoserine, and through the latter to the complex consisting of the methionine-homocysteine-cystathionine-cysteine-homoserine group. Lysine metabolism also hinges round glutamic acid as the nodal point. The aromatic amino-acids trace back to the carbohydrates, and in their degradative metabolism they are assembled into pigments, hormones, auxins, and vitamins. And so one could go on, for the number of different amino-acids is now over the 50 mark. This symposium also demonstrated that we now have a deeper insight into the mechanism of action of various coenzymes, in particular of folic acid derivatives. One of the most important discoveries is the ferrous-sulphydryl type of enzyme.

This is a book for the biochemical specialist written by an international group of experts but presented in a very readable form. The editors and the publishers are to be congratulated on an outstanding production.

D. P. CUTHBERTSON.

SURGICAL DIAGNOSIS ILLUSTRATED

Surgical Diagnosis. By Philip Thorek, M.D., F.A.C.S., F.I.C.S. Drawings by Carl T. Linden. (Pp. 320+xi; illustrated. 96s.) Philadelphia and Montreal: J. B. Lippincott Company. London: Pitman Medical Publishing Co. 1956.

This is a very unusual book, both from the brevity of its text and the profusion of its illustrations. To have covered the whole subject of surgical diagnosis in 300 pages is a remarkable feat, but to have provided illustrations which might almost replace the text is even more remarkable. Still the more remarkable is the fact that both are so good. The author has a quite exceptional power of compressing all the essentials of description in the briefest possible space; the artist has an equal power of expressing the descriptions in visual forms. It is a very rare and happy combination.

The book might perhaps be best described as a luxury synopsis—a gold mine to the senior student, or still more to the experienced surgeon who wishes to refresh his knowledge with a minimum of effort. To the ordinary student it would be somewhat of a snare, for the science and practice of surgery cannot be learnt from pictures, even of this quality. But later on when he comes to revise the knowledge and the greater his experience the more will he appreciate at their true value the cogency of the text and the superb artistry of the illustrations.

HENRY SOUTTAR.

BRITISH MEDICAL JOURNAL

LONDON

SATURDAY AUGUST 4 1956

GLUCAGON

Soon after the discovery of insulin it was noted that certain extracts of the pancreas might induce a rise rather than a fall in the level of blood sugar when injected intravenously into animals. The name glucagon was applied to this hyperglycaemic factor of the pancreas as early as 1923.¹ Since then many commercial preparations of insulin have been shown to contain this factor, especially American preparations. British and Danish preparations are crystallized by a different method and are free of hyperglycaemic activity.²

Glucagon can be extracted from the pancreas of various mammals,^{3,4,6,8} including man,⁷ and also from the gastric and duodenal mucosa^{3,4,8} and from the abdominal lymphatics and spleen.⁸ A similar substance has been isolated by some workers from the urine of normal human beings,⁹ from diabetic patients, and from the urine and blood of animals made diabetic with alloxan,¹⁰ though others have not confirmed this.⁷ Glucagon appears to be an endocrine secretion of the pancreas. It is not found in the external secretion³ and can still be recovered in normal amounts after ligation of the pancreatic duct^{3,4} and after destruction of the β -cells of the islets by alloxan.^{3,4,6} This suggests that it may be secreted by the α -cells. The suggestion is supported by the occasional occurrence of familial hypoglycaemia in infants with otherwise normal endocrine and hepatic functions, in whom no α -cells can be found and in whom there is no hyperplasia or adenoma of the β -cells.¹¹ Conversely, hyperplasia of the α -cells is found

in a strain of mice with hereditary obesity and hyperglycaemia.¹² Conclusive proof of the origin of glucagon from the α -cells is, however, still lacking. Treatment with cobaltous chloride damages or destroys α -cells but reduces the glucagon content of the pancreas only partially¹³ or not at all.^{8,14} Synthalin A is said to destroy α -cell function more completely and to lead to hypoglycaemia.¹⁷

Glucagon is a polypeptide, similar to insulin in its physical properties but differing in its amino-acid content.¹⁸ It has recently been crystallized.¹⁹ Its primary action is to stimulate phosphorylase activity in the liver, thus increasing glycogenolysis and leading to hyperglycaemia.³ There are several reasons for regarding the liver as the primary site of action of glucagon. Glycogenolytic activity can be demonstrated in liver slices.³ The effect of glucagon *in vivo* is greater when it is injected directly into the portal circulation than after intravenous injection.²⁰ After intravenous injection of glucagon in man the glucose content of the hepatic vein is raised more abruptly than the peripheral venous content.²¹ The effect of glucagon is enhanced when the liver glycogen content is high¹⁶ and is depressed when this is reduced in animals by a prolonged fast^{4,6} or in man by hepatic cirrhosis.²¹ The hormone is without effect in animals after removal of the liver.^{4,6,22} The action of glucagon is impaired in the presence of diabetic ketosis in animals, again probably as the result of reduced glycogen in the liver.²⁴ In man, labile diabetics are inclined to show less response to intravenous glucagon than obese diabetics or normal people,^{25,26} but this is not invariably so.⁵

The precise role of glucagon in the regulation of carbohydrate metabolism and in the pathogenesis of diabetes mellitus is not fully understood. It is not antagonistic to insulin, in the sense that it does not inhibit the peripheral utilization of glucose²⁷; rather, the two hormones seem to act in synergism. Perfusion experiments on the pancreas²⁸ and experiments involving anastomosis between the pancreatic circu-

lation of one animal and the systemic circulation of another²⁴ suggest that the secretion of both hormones is regulated by the blood-sugar level and that their activity is reciprocal. Secretion of glucagon is stimulated by hypoglycaemia and secretion of insulin by hyperglycaemia. Irregular oscillations in the fasting level of blood sugar have been observed in man and in the dog. The venous level falls as the arterial level rises and vice versa, suggesting that the fluctuations are related to the supply and utilization of glucose. The fluctuations are abolished by eviscerating the animal, thus depriving it of all sources of glucagon, and are restored by injecting glucagon, but they are unaffected by abolishing adrenal medullary activity with ergotamine and by removing the adrenal glands.²⁹ It has been suggested that the main function of glucagon is to make the liver glycogen stores available for insulin activity at the periphery, but if insulin is absent or is present in relatively low concentrations glucagon may actually promote deposition of glycogen in the liver, since its effect upon phosphorylase activity is reversed in the presence of high concentrations of glucose.⁶ There is also evidence that glucagon may be concerned in the satiety mechanism, since gastric motility and hunger sensations can be depressed by intravenous administration in man.³⁰

The diabetic state resulting from total pancreatectomy in man or in animals is less severe and requires smaller doses of insulin than severe spontaneous diabetes mellitus or diabetes due to alloxan.^{31,32} Moreover, dogs from which 90 to 95% of the pancreas has been removed require more insulin than those subjected to total pancreatectomy.³³ Again, spontaneous diabetes in man and alloxan diabetes in animals improve after total pancreatectomy, and sensitivity to insulin increases.^{34,35} These phenomena suggest that the secretion of glucagon by the α -cells persists in the pancreas of human diabetics and of animals with alloxan diabetes, and that the removal of this hyperglycaemic influence explains the benefit which results from subsequent removal of the pancreas. Whether glucagon is important in the pathogenesis of diabetes mellitus is quite another matter. Only when given by intravenous infusion does it enhance the glycosuria of animals subjected to partial pancreatectomy, and even then the effect is transient.²³ Even high doses of glucagon given over a long period do not induce diabetes mellitus.³⁶ Finally, there is no significant difference in the glucagon content of the human pancreas at necropsy as between diabetic and non-diabetic subjects.⁷

The relationship of glucagon to pituitary growth hormone is pertinent to its possible role in diabetes

mellitus. The administration of growth hormone has been shown to liberate glucagon into the portal blood in animals^{24,37} and to produce a transient hyperglycaemia in man.³⁸ The hyperglycaemic substance found in the urine of normal animals disappears after hypophysectomy.⁹ There is also evidence that the α -cells are influenced by the growth hormone. They diminish in number and size, at least temporarily, after removal of the hypophysis, while the β -cells are unaffected,³² and in mice with hereditary obesity and hyperglycaemia the hyperplasia of the α -cells is abolished by the same procedure.¹² α -Cells predominate over β -cells in the embryo; the proportions are equal in the newborn, and with advancing childhood the ratio of α -cells to β -cells gradually falls, reaching 1:4 by the end of the growth period. In human diabetics α -cells predominate, especially in childhood, but the disproportion is not as great as in diabetes due to alloxan in animals, and the proportion of α -cells varies from case to case and does not parallel the severity of the diabetes nor the requirements of insulin.³² Though administered growth hormone is undoubtedly concentrated in the islets (as shown by isotope experiments),³⁹ and though it undoubtedly induces islet hyperplasia, the specific effects upon the α -cells are much less predictable and vary considerably according to the species of animal studied and the staining technique used.¹⁵

There is some evidence that glucagon plays a part in lipid metabolism. Different workers disagree about its effects on ketosis. Some say that it inhibits ketosis,⁴⁰ others that it has no influence.^{6,36} Still others believe that the pancreas contains two factors, one of which increases ketosis, while the other inhibits it.²⁴ Glucagon also depresses the synthesis of fatty acids and promotes their oxidation, as shown by the rate of incorporation of labelled acetate.⁴¹ Destruction of the α -cells by cobaltous chloride in rabbits leads to hypercholesterolaemia.⁴² Glucagon has been shown to restore the serum lipids to normal after pancreatectomy in animals, but these results may have been due to contamination by insulin.⁶ Possibly such effects as glucagon has on lipid metabolism are purely secondary to those exerted on carbohydrate metabolism.³⁵

Undoubtedly there is good evidence that glucagon is a second hormone of the pancreas. It is probably secreted by the α -cells of the pancreatic islets, and it may be under the control of the growth hormone. Glucagon appears to be one of the factors concerned in the regulation of the level of blood sugar both in health and in the diabetic state, but its role would seem to be no more than a subsidiary one.

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ANTIBODIES AGAINST CANCER

Ever since the discovery of antibodies as a defence mechanism against microbial disease, the idea of employing them against cancer has been an attractive one. The quest justifies itself on the grounds of the marvellous specificity of antibodies and the varied manifestations of the immune mechanism. But if there is no antigenic difference between cancerous and normal tissue then all these efforts are in vain. The best-established evidence on the question, that of E. Weiler¹ and of M. Seligmann and colleagues,² is to the effect that cancer cells merely lack an antigen which the corresponding normal cell possesses. To make practical use of this negative feature of the cancer cell will require something akin to genius. T. S. Hauschka,³ reviewing the situation in 1952, wrote, "Eventual demonstration of specific neoplastic antigens appears dubious, since the critical results to date have been largely negative."

Nevertheless, a cancer antigen may be sitting in the cell waiting to be discovered and made use of. The hypothesis is in any case impossible to disprove. A cancer antigen may be defined as a substance present in the cancer cells and absent elsewhere in the body which is antigenic either in its own host or in another. The old idea of a substance peculiar to all the tumours of a species is giving way to more modest views, of a substance peculiar to certain kinds of tumour or even a substance peculiar to each individual tumour. But the old idea has by no means been completely rejected. There are two main biological ways of attempting to detect such a cancer antigen—namely, by showing that the tumour evokes a specific immune reaction either in its own host or else in another host. Either of these methods could yield evidence of a cancer antigen which might remain undetected by the other, though in general the more delicate discrimination might be expected to occur in the host of origin. It is for this reason that the failure of Weiler and of Seligmann *et al.* to find a cancer antigen need not cause despondency, for the method they used was to inoculate the tumour into another species, which may have been incapable of making the subtle distinction necessary.

J. B. Graham and R. M. Graham,⁴ on the other hand, recently examined the sera of 48 cancer patients

for antibodies to their own tumours by the complement-fixation technique, using as antigen an extract of the tumour containing chiefly desoxy-nucleoprotein. They found antibodies in twelve sera, the majority of negative sera coming from patients with far-advanced lesions. The cancers were mainly squamous-cell carcinomas of the cervix. It could be argued that the antigens concerned may also be present in normal tissue or that they may be irrelevant to host resistance to the tumour; for example, they may be bacteria or moulds infecting the tumour or even abnormal secretory products of the tumour, whose destruction would not hinder tumour growth. The authors' results suggest, however, that there was a relationship between these antibodies and a favourable prognosis. Further evidence of this kind, on a sound statistical basis, would contribute more than anything to a solution of the problem. Another recent report of a positive kind comes from Japan, where K. Kobayashi and H. Kawasaki,^{5,6,7} following up the early German work in this field, found antigens present in cases of human gastric cancer which were absent from normal gastric mucosa. They prepared antibodies in rabbits, and antigens by extracting the tumours either with alcohol or saline. This result would appear to contradict the earlier-mentioned work, but gastric cancer may be a special case, or different substances may have been extracted. Hardly any two extraction methods are the same. Recent developments suggest that the most promising substance to extract may be the nucleoprotein, as done by Graham and Graham.

R. W. Baldwin^{8,9} has studied tumour immunity using a highly inbred strain of rats and transplanted tumours which had recently been induced in the same strain. He caused the transplant to regress by means of ligation or by injection into it of an alcoholic extract, and found that in some cases of slow-growing tumour the animal was immune to further implants of the same tissue. The author is inclined to attribute the result to a genetic divergence of the tumour from its strain of origin rather than to a specific cancer antigen. The wisdom of this is confirmed by an accompanying paper of A. and L. Cohen,¹⁰ who report an apparent spontaneous mutation in such a transplanted tumour in its very first passage. This finding illustrates the weakness of attempts to detect specific cancer immunity with transplanted tumours: they are all open to the possibility of non-specific genetic divergence. It is becoming more and more evident that only the cure of a tumour in its own host, preferably where metastases exist, will carry any real conviction in these *in vivo* studies. In the special case of the so-called virus tumours of

fowls and certain mammals, antisera prepared against the virus associated with the tumour have often been completely effective in destroying the tumour. If certain forms of human cancer, for example leukaemia, were found to be caused by a virus then spectacular therapeutic results with antisera might be expected. A clinical study recently published by A. A. Strauss and colleagues¹¹ gives an account of their successful treatment of cancer of the rectum by electrocoagulation. They believe that the theoretical basis of this treatment is that partial destruction of the tumour allows the body's immune mechanism to hold in check the remaining cancer cells. The evidence for this explanation is, at best, suggestive, though it may eventually be substantiated.

In short, the evidence so far gathered that cancer can evoke a specific immune response is slender. But it is certainly sufficient to justify further study, particularly by the new techniques in immunology which appear from time to time; the recent development of a method for studying the surface antigens of human epidermal cells is a case in point.¹² Finally, it may be said that therapeutic measures based on the immune hypothesis, provided they can prove their worth, are by no means to be discouraged.

SUSPENSE CONTINUED

On Monday this week Mr. R. H. Turton, the Minister of Health, said in reply to a question in the House of Commons that the present average net earnings of a general medical practitioner are £2,222 a year, and that the corresponding figure for 1939 was £938. The Minister thus once again gives a misleading picture. He should have compared the present average with the average computed on the basis of what general practitioners should have been earning in 1939 according to the recommendations of the Spens Committee: and this figure is £1,111, not £938. Once more the Minister persists in ignoring the Spens recommendations. Lieutenant-Colonel Lipton asked Mr. Turton whether he would admit "that but for the difficult economic circumstances at the time, he would consider that the doctors have a good case for an increase." Mr. Turton reiterated that "in present circumstances it would not be right to give consideration to a claim for a general increase in remuneration." Thereupon Dr. Edith Summerskill asked the question which every doctor in the Health Service is now asking: "How does the Minister reconcile that answer with the recommendations of the Spens Committee?" Mr. Turton's reply to this was as follows: "The Spens Committee did not lay down any contractual obligation in this matter. It

based its recommendation on what should be the level at which doctors entered the National Health Service."

This reply needs looking at closely. Mr. Turton seems to be referring only to the G.P. Spens Report, as the questions were directed to the earnings of general practitioners. The omission of reference to the Consultants Spens Report was therefore fortuitous, but the same principles govern both. The first part of Mr. Turton's reply suggests that the Government is trying to wriggle out of the matter by denying there was a contractual obligation. Does the Minister really think this will wash? The Government of the day in 1946 accepted the recommendations of the committee it had itself set up, and the profession accepted them too. Is the Government of 1956 going to repudiate these? The second part of Mr. Turton's reply is curious. It should be read in the context of the terms of reference of the G.P. Spens Committee:

"To consider after obtaining whatever information and evidence it thinks fit what ought to be the range of total professional income of a registered medical practitioner in any publicly organized service of general medical practice; to consider this with due regard to what have been the normal financial expectations of general medical practice in the past, and to the desirability of maintaining in the future the proper social and economic status of general medical practice and its power to attract a suitable type of recruit to the profession; and to make recommendations." (Our italics.)

"To consider this with due regard . . . to the desirability of maintaining in the future the proper social and economic status of general practice" are the operative phrases in the terms of reference. It was these words that persuaded both general practitioners and consultants that they could enter a National Health Service with at least some confidence of fair treatment at the hands of successive governments. Mr. Turton probably knows that the future did not come to an end in 1948, 1951, or even in 1956, but is a continuing process. If he persists in his attitude of appearing to repudiate the two Spens Reports, then the medical profession will be faced with the gravest position that has arisen since the appointed day in July, 1948, and no doubt the representatives of the Negotiating Committee who met the Minister of Health on Wednesday made this clear to him.

PILLS ON THE CARPET

During 1950-4 ferrous sulphate tablets caused 39 accidental deaths in England and Wales, 38 of these being of children aged 1-4, the remaining one being of an adult woman. Children in this age group, and most

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particularly those aged 1-2 years, are specially at risk to this cause of death. While this is for the obvious reason that they explore the environment by putting interesting bits of it into the mouth, J. O. Craig¹ has produced evidence suggesting that many of the poisoned children have exaggerated oral traits. In 25 cases of accidental poisoning of young children seen by him he took careful histories from the mother in order to find out whether the child showed in its behaviour any signs of oral craving. To compare with these he obtained from the mothers the "oral histories" of 25 children in a surgical out-patient department. In the poisoning group he classified 6 cases (24%) as normal, and in the control group 18 cases (72%). Moreover he found that a number of mothers whose children had been poisoned were exceedingly emphatic about their children's oral cravings, and he found some evidence too that certain of the children whose history was normal nevertheless probably had oral tendencies. The existence of pica in children has in the past often been brought to notice in relation to lead poisoning, though the fact that it is common in mild degrees in all strata of society must be well known to every observant layman. In Craig's control series, for instance, the severity of oral traits was considered to be "moderate" or "marked" in six cases (24%). Given a teeming population of exploratory toddlers, therefore, about a quarter of whom may be expected to seek oral gratification of their curiosity to a noticeable extent, it is not surprising that medicines, pills, and tablets, especially pills and tablets, should fall into their clutches. What is surprising perhaps is the prominence of medicaments² as causes of death, for deaths are relatively uncommon from such agents as petrol, paraffin, cleaning materials, and poisonous plants, though they do occur.

When this topic was discussed in the Section of Child Health at the B.M.A. Annual Meeting at Brighton the speakers expressed themselves very strongly on the danger of pills and tablets that resemble sweets.³ Dr. Keith Simpson handed round some samples of pills that were indistinguishable from sweets, and the risk of marketing such preparations is clear. Even so, the drug manufacturers are not altogether to blame; they fulfil a demand, and a demand that comes from our own profession, which no doubt in turn is reflecting the patients' wishes. The director of one firm making ferrous sulphate tablets has recently stated⁴ that, though his firm now markets white and virtually tasteless tab. ferr. sulph. co. N.F. (in response to comments in the professional press), they are not being prescribed; the demand "is for the coloured, sugar-coated tablets." While a toddler putting anything and everything into his mouth might not discriminate much between a coloured and a plain tablet, it seems reasonable to suppose that at least some children are more attracted to the bright and colourful than to the plain white (or perhaps black). Again, there is much to be said for invariably marketing certain preparations in "cello-

phane" envelopes or small packets. Ferrous sulphate might well be one of these, as suggested by I. O. B. Spencer,⁵ and the antihistamines and barbiturates are also a special danger. Doctors and chemists can help too by telling parents about the dangers to children of some of these drugs, especially those that are relatively harmless to adults.

NEW MORTUARIES

The publication of a White Paper¹ on the planning of mortuaries is an encouraging sign to those who work in public mortuaries that in future something may be done for this neglected type of local government building. Even to-day in our most populous regions as well as in country districts there are public mortuaries which are little more than accommodation for the dead, and they may or may not be fitted with a refrigerator. These buildings do not have the publicity appeal of new infant welfare clinics or mass x-ray machines; no votes are likely to be gained by the erection of a modern mortuary; consequently the development of this public service has been stringently economical. While it is not the misfortune of every family to have to visit a public mortuary to identify a relative—an experience that must be harrowing and likely to remain in the memory for a lifetime—anything that can be done to create pleasant and clean surroundings is surely worth while. Moreover, the working conditions for the pathologist should also be considered, not only so that his work may be efficient and accurate, but also to facilitate the demonstration and teaching, mainly postgraduate, which a modern mortuary provides.

The White Paper is therefore particularly welcome at a time when it is possible that some rationalization of mortuary services may be possible, and it should prove a useful guide to county architects and builders. An anomaly exists at present in many places, including London and Middlesex, that the mortuary is provided by the borough council, which is responsible for its maintenance as well as for the remuneration of the mortuary keepers, but it is used by coroners and pathologists, who are paid by the county council. Such is the pride of many borough councils that they would rather maintain a small and inadequate mortuary of their own than share with an adjacent borough in the development of a suitable mortuary and so halve their maintenance costs.

The general principles outlined in the White Paper are sound, though presumably of necessity in this short publication many important details have been omitted. For example, clerestory windows provide excellent natural lighting, while studio roofs are to be avoided. Terazzo flooring is cold but very clean, while composition floors break up in the damp. Electric points for inspection lamps and saws should be readily available. Features such as these can easily be studied if coroners and pathologists are consulted (as is suggested) in the planning of a mortuary, rather than the details being

¹ *The Planning of Mortuaries and Post-mortem Accommodation*, Ministry of Housing and Local Government, H.M.S.O. (6d.), 1956.

¹ Craig, J. O., *Arch. Dis. Childh.*, 1955, 30, 419.

² Swinscow, D., *ibid.*, 1953, 28, 26.

³ *British Medical Journal*, 1956, 2, 163.

⁴ Robinson, C. W., *Lancet*, 1956, 1, 1015.

⁵ Spencer, I. O. B., *British Medical Journal*, 1951, 2, 1112.

left to a sanitary inspector, as has happened many times. Perhaps more should have been said on the choice of mortuary attendants. It is clearly no more practicable for a busy and skilled pathologist to sew up the cadavers than it is for a surgeon to wash and sterilize his instruments. To carry the analogy a little further, few surgeons would nowadays shave and prepare an abdomen or scalp for operation. The pathologist could likewise be helped if skilled assistance was available for such tasks as loosening the calvarium and exposure of the sternum. A reasonable salary and conditions of work should attract the right men as attendants. The policy of appointing an unskilled labourer to the post of mortuary keeper on grounds of economy is unjustified, and can go far to nullify the improvements which a modern mortuary can provide. The second part of the White Paper describes the planning of a mortuary without post-mortem accommodation. It is difficult to envisage a mortuary where no necropsies would ever be required, and the purpose of these pages is obscure.

ATOMIC HAZARDS

On October 17 next the nuclear power station at Calder Hall, Cumberland, will begin a regular supply of electricity to the Central Electricity Authority's grid. Britain's place in the forefront of research in atomic energy and its application to peaceful purposes will thus be signally marked, though some years will elapse before enough power is available to relieve the coal shortage. Meanwhile other reactors are being constructed, and the safe disposal of atomic waste will be an increasing problem. Some of it is being discharged into the sea, and studies of radioactivity in fish, seaweed, and sand have been progressing for some years now.¹ Natural radioactivity in the sea is at an exceedingly low level, radioactivity in the sea is at an exceedingly low level, and plants living more than a few hundred feet below the surface receive much less natural radiation than those living on land. Whether this affects their rate of evolution is a speculation that might be worth pursuing; such a study could indeed provide useful data on the commutagenic effects of natural radiation, and only considerable technical difficulties have prevented more being done on these lines. Possibly the relative lack of ionizing radiations in the ocean depths has allowed life to develop more slowly there, and might even account in part for the survival of the coelacanth. But because the rate of interchange between surface and deep water varies in different parts of the world, and active materials vary in the rates at which they decay, the particular places chosen for the disposal of waste have to be studied with some care. Apparently the Black Sea is one of the best depositories for fissile material, since the time taken for the deep water to move near the surface and be replaced by new water mixing downwards—the flushing time—is about 2,500 years. In the Atlantic and Caribbean the flushing time is probably only a few hundred years,

and the water now at the bottom of the Atlantic may have been at the surface in Arctic latitudes only 150 years ago. While short-lived fission products can be safely disposed of in the ocean depths, there is still some uncertainty about the safety to commercial fisheries, and thus to man, of dumping there such long-lived fission products as radio-strontium.²

The more immediate health hazards to which the British Atomic Energy Authority's workpeople are exposed seem to be so well controlled that its second report¹ can say "employment in the Authority is safer than in most comparable industries," and in the year covered (April 1, 1955, to March 31, 1956) there has been no case of occupational illness or death, and no fatal accident.

ZOXAZOLAMINE

A new substance, zoxazolamine, has recently been examined for its power to relieve spasticity in muscles. W. Amols¹ tested it on 28 patients with a variety of neurological disorders, and found that, when it was given alone, its effect was too small to be clinically useful, but if it was given with chlorpromazine then muscle relaxation was obtained. The dose of chlorpromazine varied from 10 to 50 mg. by mouth, and the dose of zoxazolamine was 500 mg. by mouth. Favourable results were obtained in most patients with spastic extremities. Those with decerebrate rigidity, torticollis, or disease of the basal ganglia were not benefited. Patients with grand mal seizures were made worse.

Zoxazolamine² has also been given to 100 rheumatic patients in whom the muscular stiffness made remedial exercises impossible. To these no chlorpromazine was given, and good results were obtained in 85; in these relief of the stiffness and aching was often complete within 30 minutes after taking the dose. In most patients the dose was 500 mg. three or four times a day. There were toxic effects in 43 patients, and in 13 of these the effects were serious enough to make further treatment impossible. They suffered from chills and fever, burning of the eyes, and rashes. The drug has also been given to children with cerebral palsy who had spasticity.³ Large doses varying from 30 to 140 mg. per kg. body weight produced a decrease of muscle tone on passive flexion, but there was no consequent improvement in function in about half of the patients, and a high proportion of patients experienced side-effects.

A still further report⁴ has been made on the use of this drug in spastic adults. A relaxing effect was best seen in patients with lesions of the spinal cord and was undoubted in 14 out of 18. The effects on patients with diseases affecting the brain, especially paralysis agitans and paraplegia, were less predictable and in some the drug made the symptoms worse. On the other hand, in one patient with encephalomyelitis, who suffered from severe spasms of the adductors of the thigh, great relief was given.

¹ Amols, W., *J. Amer. med. Ass.*, 1956, 160, 742.

² Smith, R. T., Kron, K. M., Peak, W. P., and Hermann, I. F., *ibid.*, 1956, 160, 745.

³ Abrahamsen, E. H., and Baird III, H. W., *ibid.*, 1956, 160, 749.

⁴ Rodriguez-Gomez, M., Valdes-Rodriguez, A., and Drew, A. L., *ibid.*, 1956, 160, 752.

¹ *Second Annual Report*, United Kingdom Atomic Energy Authority, H.M.S.O., 1956 (2s. 6d.).
² *The Biological Effects of Atomic Radiation*, Summary Reports from a Study by the National Academy of Sciences, Washington, U.S.A., 1956.

MEDICAL BLOOD PREPARATIONS

BY

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This is the first of two articles by Dr. Bogomolova, one of the delegation of Russian doctors who visited Britain last autumn as guests of the B.M.A. Her second article, on "Blood Substitute Solutions," will appear next week.

Blood transfusion as a method of treatment has become widely used in every field of medicine. Scientists, however, have not confined themselves to studying the method of blood transfusion ; they have long since come near to finding means of utilizing the individual fractions of blood in treatment.

As far back as 1932 Filatov and Kartashevski, of the Leningrad Institute of Blood Transfusion, worked out the problem of transfusing blood plasma and erythrocytes, isolated from each other (Kartashevski and Filatov 1934), and plasma transfusion has now found wide application in medical practice for shock, burns, hypoproteinaemia, etc.

As is well known, blood plasma, in its turn, may be subdivided into a number of components, the so-called fractions. Each of these plasma fractions is endowed with a definite physiological activity, in proportion to which its use may be evaluated. For example, albumins are applied as a blood substitute in controlling shock. Globulin is a particularly important fraction of the plasma proteins. It is known that the concentration of immune antibodies in a purified gamma-globulin is 25 times greater than in whole blood. Fibrinogen is a protein of great physiological importance in blood coagulation.

In addition to using individual fractions of blood, it is possible to combine them and thus utilize interaction of the individual fraction. In recent years the Leningrad Institute of Blood Transfusion has produced several such preparations. The substances so obtained may be divided into the following groups: blood substitutes; haemostatics; stimulating preparations—that is, substances which accelerate the healing of wounds and sores; preparations for the treatment of anaemia; plastic preparations—that is, those required for plastic restorative purposes in surgery.

Blood Substitutes

Mention should be especially made of dried blood plasma. We have elaborated methods of storing dried plasma which enable us completely to avoid infecting patients with the virus of hepatitis. These methods consist in adding to the blood an antiseptic (tripoflavin) or sulphamides and then extracting the plasma and drying by the vacuum-freezing method (Krotova, 1952; Krotova and Depp, 1952).

The method of transfusing the erythrocyte mass, one of the blood fractions, has lately found wide application. We have proved that preserved erythrocytes can be kept for 30-40 days (Krotova, 1952).

Another preparation belonging to the group of blood-substituting media—namely, dried haemoglobin—is worth mention. Up till now it had not been obtained in a pure state, since, as a rule, a part of the haemoglobin is transformed into methaemoglobin in the process of drying. We have now worked out a method of preparing restored haemoglobin in a dry state (Andrianova, 1955). It is a red powder that contains no impurities and readily dissolves in water.

and-salt solutions. A small dose of dried haemoglobin added to the blood serum suffices to raise the effectiveness of the latter.

Haemostatics

The second group of preparations comprises those intended for local haemostasis. These include the haemostatic sponge, dry thrombin and fibrin "cotton-wool," antiseptic biological tampon, fibrin powder, and haemostatic suppositories.

Haemostatic sponge is produced from blood plasma; it is of porous structure and looks like an ordinary rubber sponge. The haemostatic sponge is very hygroscopic, and, when applied to the bleeding spot, absorbs the blood and brings about its rapid coagulation (Bogomolova, 1951). It has been proved that the sponge left in the tissues of the body during haemostasis completely dissolves.

The neurogenic factor has been found to play an important part in the mechanism of action of the haemostatic sponge. Experiments on dogs have shown that sponge mechanically occludes the bleeding vessel and causes greater coagulation of the blood flowing from the bleeding-point; it acts also, above all, on the receptor apparatus of the vascular system and causes a reflex contraction of the bleeding vessels, which is of decisive importance in haemostasis. It has been found of great use in surgery.

The latest experiments carried out at the institute have helped in elaborating a technology for the production of haemostatic sponge from the blood of beef and dairy cattle. In use, these sponges are saturated with antiseptics, and are devoid of any antigenic properties (Klement, 1955).

Dry thrombin of the Leningrad Institute of Blood Transfusion is another haemostatic preparation (Andrianova, 1952). It arrests the bleeding of injured organs and is of particular importance in closed cavities. Thrombin, in combination with fibrinogen, is used in cases of special plastic operations when a physiologically adhesive material is required. This method is particularly convenient in skin-grafting. In such cases the strip of skin is impregnated with a thrombin solution, while the site on which the skin is to be grafted is anointed with a fibrinogen (or plasma) solution. The strip is applied to the previously prepared site, on which a clot of fibrin is formed that acts as a glue.

"Cotton-wool" made of blood fibrin belongs to the same class of haemostatic preparations (Filatov, 1955; Filatov and Teodorowitch, 1954); it also dissolves. Experimental investigations have proved that "homo-cotton-wool"—that is, cotton-wool obtained from homogenous blood—may be applied for haemostatic purposes in cases of injury of the internal organs. In such cases it is recommended that the cotton-wool should be dipped in a thrombin solution.

All the above biological haemostatic drugs can be widely applied. When left in the tissues of the body they completely dissolve, without bringing about any reactions. This has been confirmed by numerous clinical observations made by various investigators.

Biological antiseptic tampons containing antibiotics, such as penicillin and streptomycin, as well as antiseptics, are recommended to stop bleeding from infected wounds. Research carried out by a number of authors has shown that when a tampon saturated with penicillin or streptomycin is introduced into an infected cavity the antibiotic slowly penetrates into the blood, as from a depot. Investigation has revealed that a medium therapeutic dose of antibiotic appears in the blood within four days (Melnikova, 1954).

One of these preparations, the antiseptic biological tampon, composed of blood plasma with gelatin, is a porous, dry elastic mass of a light yellow colour (Bogomolova and Alexandrova, 1954). It can be made in any size or shape, and is packed so that it can be used for first aid to wounded on the spot.

Stimulating Preparations

The next group, the so-called stimulating preparations, includes sterilized serum made from the blood of donors. The preparation is obtained by appropriate treatment of human blood serum, which is then subjected to repeated

sterilization in an autoclave at a temperature of 125° C. As a result of the high temperature and pressure, the serum albumin disintegrates, and a gently acting protein preparation is thus created. It is a transparent brown fluid and is supplied in 10-ml. doses (Filatov, 1953).

Clinical experience has shown that the best results are obtained with sterilized serum when it becomes necessary to improve the processes of regeneration—that is, chiefly in cases of non-healing ulcers. The sterilized serum is used when treating gastric and duodenal ulceration and other diseases. It is introduced intramuscularly in increasing doses, ranging from 1 to 10 ml. daily, the course of treatment comprising 10 to 20 injections. Up to the present the Leningrad Institute of Blood Transfusion has treated more than 1,000 cases of peptic ulcer with sterilized serum. A favourable result was recorded in 90% of these, and complete healing in 40%. No aggravation or exacerbation of the disease process was observed, and there were no reactions or complications (Filatov, 1950).

Highly interesting data were obtained when sterilized serum was used as a solvent for penicillin. It appeared that when penicillin dissolved in sterilized serum is introduced intramuscularly it becomes possible to preserve a high concentration of the preparation in the body for a much longer time, and, what is of particular importance, to increase markedly the medicinal effect of the antibiotic (Filatov, 1955).

Yet another preparation, named haemohormonostimulin (Bakscht *et al.*, 1955), has been suggested for stimulant therapy. It is made of retroplacental blood and contains valuable hormones, the introduction of which jointly with the serum is particularly effective. Haemohormonostimulin is injected intramuscularly in single doses of 40–80 ml.—or, occasionally, in repeated doses—in cases of climacteric neuroses, ovarian insufficiency, climacteric dermatoses, and other instances of hormonal disorders in women. According to our data, the results obtained from haemohormonostimulin are undoubtedly superior to those produced by the use of conventional hormonal preparations, including synthetic ones. We believe that such a positive effect of haemohormonostimulin can be explained by the fact that on its introduction there takes place a combined action of the hormones and serum of pregnant women, so rich in active substances.

Treatment of Anaemia

Treatment of Anaemia

Various preparations made from animal blood have long been used to stimulate blood formation in cases of anaemia. These include haematogen, haemol, and other blood constituents. Since blood preparations do not by themselves produce a rapid and lasting restoration of blood in cases of anaemia, the task was to combine them with medicinal drugs. The preparations so far suggested do not, however, meet the physicians' requirements, since they produce only

A new haemoglobin-containing preparation, called haemostimulin (Kouralava 1954), has been tried at the Leningrad Institute. It is made of animal blood with trace elements added to it. As is well known, in addition to iron, necessary for the building up of haemoglobin molecules, a number of other metals, evidently acting as catalysts, participate in the process of blood regeneration. Such metals include copper and cobalt. Owing to the happy combination of its components, haemostimulin exercises a strong stimulating influence on blood formation and is successfully employed in treating hypochromic anaemia of various aetiology. When this preparation is administered to anaemic patients the haemoglobin content rises by a daily average of 1 to 1.5%.

In a number of cases haemostimulin has rapidly cured anaemia when the usual methods of treatment have proved unsuccessful.

Preparations for Plastic Surgery

This group of new preparations consists of those designed for plastic surgery. The first in importance are fibrin films, made of human blood as well as of the blood of beef and dairy cattle.

Films made of human blood can be used for plastic operations in cases of defects in the dura mater and peritoneum, and to cover wounds of the internal organs. Cheaper and more easily available fibrin films made of animal blood may be used externally (Filotov and Goschkina, 1950).

The question naturally arises: are not such films harmful to human tissues, since they are made of heterogenous blood and possess anaphylactogenic properties? It is well known that foreign protein, particularly when repeatedly applied, always brings about phenomena of general and local anaphylaxis. By properly treating animal blood we succeeded in eliminating the anaphylactogenic properties of heterogenous films.

Fibrin films are elastic. This property helps one to cover evenly the injured portions of the skin, thereby protecting the bared nerve-endings from external stimulation; the flow of nerve impulses from the injured area is also eliminated—a highly important point, according to Pavlov's teaching.

Fibrin films are also transparent. This makes it possible to observe the condition of the wound without risk of secondary infection during dressing and without further trauma to the wound. They also have a great capacity for adsorption, which is highly important clinically, both with regard to the extraction of toxin from the wound and rapid drying, and with regard to the creation of bactericidal depots—impregnation with bactericides having previously been done.

The fibrin film is capable of dissolving when acted upon by micro-organisms. This property is of some importance in the treatment of burns and other skin injuries, since dissolution of the film on the infected site makes it possible to recognize infection quickly, and thus prevent its spread over the whole of the wound (Goschkina, 1954).

Impregnation of the fibrin film with bactericidal substances prevents infection from spreading on the surface of the burn. The bactericidal action manifests itself the whole of the time the film is on the wound—that is, up to the moment when the film dries.

Clinical observations in over 2,000 cases of burns have proved that the films speed up the healing of burn wounds by four to five days as compared with other methods. They have been widely used in treating not only burns but abrasions, bedsores, and other skin injuries, but also for the repair of defects in serous membranes and the integuments of the organs. Considerable clinical experience has proved the unquestionable effectiveness of the fibrin film.

Of other preparations produced at the Institute of Blood Transfusion mention should be made of bioplastics. Two types of these have been made: (1) Rapidly resolving plastics for the construction of splints for use in gastro-intestinal anastomosis. Bioplastic splints are not only designed to facilitate gastro-intestinal anastomosis, but when left in the intestines they are a source of valuable nourishing substances (Filatov and Andrianova, 1952). (2) Slowly resolving bioplastics for use as intra-osseous splints in cases of fracture.

All the suggested plastics have been tested as resolving materials in plastic surgery, and the results have been good.

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JOINT MEETING OF BRITISH AND
AMERICAN PAEDIATRIC SURGEONS

[FROM A SPECIAL CORRESPONDENT]

The British Association of Paediatric Surgeons held its third annual meeting, in conjunction with the surgical section of the American Academy of Paediatrics, in London on July 17, 18, and 19. Throughout was shown evidence of the close attention now being given to many previously neglected problems in this field and the high standard of results being achieved by the specialist children's surgeon.

The president was Mr. DENIS BROWNE (London).

Cardiac Surgery in Infancy

An expert panel consisting of Dr. W. T. MUSTARD (Toronto), Mr. D. J. WATERSTON and Dr. B. G. B. LUCAS (London), and Mr. F. R. EDWARDS and Dr. JOHN HAY (Liverpool) held a discussion on recent developments in cardiac surgery in infancy. Dr. MUSTARD started the ball rolling by stating his views on coarctation of the aorta in young infants. He stressed the diagnostic difficulties at this age, but said that if all babies with tachycardia had their femoral pulses palpated the condition would be recognized more often. At present he believed many babies with coarctation died before they were seen by a cardiologist, their deaths being ascribed to such causes as malnutrition. Dr. Mustard said the real problem was whether or not to operate in infancy. In his opinion the child with cardiac failure who did not respond to medical treatment should have an operation. This might be needed urgently, and he operated in the middle of the night if necessary. Mr. WATERSTON agreed about the urgency of treatment in young babies with coarctation who developed heart failure early. A number of them had fibroelastosis, and this was responsible for some deaths after operation. It was his practice to make a biopsy of the wall of the auricular appendage in an endeavour to diagnose fibro-elastosis. The panel agreed there was no way of doing so clinically, but Dr. MUSTARD felt that biopsy might not always be reliable. Dr. HAY said that he thought it important to study the natural history of the condition. This showed that if the young child with coarctation was well he should be left alone in infancy.

Turning to cyanotic heart disease in infancy, Mr. EDWARDS said the essential problem was to know how many of these cases were worth operating on at that age. Certainly cases of Fallot's tetralogy who went into failure early could be helped by a Blalock or Potts operation. He thought it difficult to know just how large an anastomosis to make, for what would be adequate later might be too large at the time. Because of this one had to be prepared to repeat the Blalock procedure on the other side at about 4 years of age. It was best, Mr. EDWARDS continued, if these children could be treated conservatively until they reached 5 or 6 years. Dr. HAY considered the indications for operation on young infants with cyanotic heart disease. He had found that what mattered most were cyanotic attacks and a failure to gain weight normally. Mr. WATERSTON agreed, and suggested a third indication—anginal attacks, which were not uncommon in these babies. He emphasized that cyanotic attacks tended to stop in hospital, and in this regard the mother's history should always be accepted.

Dr. LUCAS said the greatest anaesthetic problems were in the infants aged from a few weeks to several months. A relaxant and as little anaesthetic as possible should be given. Whilst hypothermia was necessary if the cerebral circulation was to be shut off, it was also useful in babies who had a defective ventilating system. For such cases he favoured operating at a temperature of 28–29°C. Dr. MUSTARD agreed that in all these cyanosed babies some degree of hypothermia was necessary, and he favoured 31°C.

Meconium Plugs

Dr. J. L. EMERY (Sheffield) reported the results of pathological studies on a number of babies who had intestinal

obstruction as a result of impacted meconium, yet were not cases of Hirschsprung's disease or meconium ileus. It seemed that the abnormality must be in the meconium itself, which was still, Dr. Emery pointed out, somewhat of a mystery substance. A plug of white meconium was often found in these cases at the tip of the mass. The viscosity of meconium was related to its water content, and this had been found to be lower at the distal tip of segments of meconium seen at necropsy to be obstructing the bowel. This dry meconium could lead to stercoral ulceration.

Mr. R. E. ZACHARY (Sheffield) described the clinical features of these cases. There were two groups. Firstly, those with plugs of meconium, leading to abdominal distension and vomiting, which were passed after rectal examination or following a rectal wash-out. Secondly, a group of babies admitted between 4 days and 5 weeks of age who had perforations of the colon by hard masses of faeces. In six such cases coming to necropsy it had been possible to exclude Hirschsprung's disease and meconium ileus. Mr. Zachary pointed out that, though the first group had a benign course, there was the danger of death from inhalation.

Mr. P. P. RICKHAM (Liverpool) described a case of obstruction of the small intestine by meconium which had calcified. At operation there had been no evidence of meconium peritonitis. But after its removal and enterostomy the intestinal contents recalcified and solidified in three days, and finally the baby died at 28 days. At necropsy there was no mucositis and the bowel was normally innervated. He reported the condition, without being able to explain its nature, to draw attention to this subject.

Tension Emphysema

Mr. T. Y. NELSON (Sydney) read a short paper on tension emphysema in infants—a special group in which the emphysema was limited to one lobe, usually an upper or the right middle lobe. He thought many cases were due to hypoplasia of the bronchial wall and deficient cartilage in the bronchus going to the affected lobe. In others, a persistent ductus arteriosus, an anomalous vessel, or a flap of bronchial mucosa was responsible. Clinically there were two types. Some presented as emergencies in the neonatal period with respiratory distress and gross mediastinal displacement. Others were seen later in infancy, usually following an infection, though there was often a history, dating from birth, of wheezing or panting. These lobes could be distinguished from tension cysts by the fine lung markings which were seen radiologically. Though resection of the affected lobe was necessary, Mr. Nelson thought it might be an advantage if some form of more conservative treatment could be found which would enable lobectomy to be delayed until later. However, he did not think we yet had a suitable method.

Metabolic Response to Operation

Mr. A. W. WILKINSON (Aberdeen) read a paper in which he drew attention to some of the peculiarities and differences in renal function after injury in adults, children, and infants. Regardless of the nature of injury, older children showed the same kind of alteration in urinary function after injury as did adults, and seemed equally capable of the close conservation of sodium during, and after, potassium diuresis, even in the presence of intense oliguria. The dangers of overloading children, especially after burns, with water and sodium were as great therefore as in adults. In the first two months of life, however, the changes in urinary composition after operations such as pylorotomy were somewhat different, though there might be a similar but less marked transient potassium diuresis and sodium conservation. Whilst there was some individual variation, Mr. Wilkinson said there was nevertheless a fairly clear pattern of behaviour which was different. If it were true that the potassium diuresis in older subjects was a means of making endogenous water available for continuing such essential purposes as insensible water loss and urine formation, and the simultaneous sodium conservation allowed the maintenance of an

adequate volume of extracellular fluid, some explanation must be sought for the different urinary composition in the young child. He thought the apparent immaturity of renal function in the newborn might be adapted to the greater total, and particularly extracellular, fluid volume at and soon after birth. If this were so, it might be that the newborn child provided more of its continuing water requirements from extracellular fluid than did the adult or older child. It did seem, however, as if the newborn child, like other young animals, arriving as it did with 15% more body water than the adult, was well prepared for the restriction of its fluid intake which was one of the features of the first day or two of life. This different water content and distribution in the young baby, in combination with kidneys which did not conserve sodium after injury as closely as the kidneys of older children and adults, suggested that the apparent immaturity of the infant kidney was a useful biological device.

Other papers read during the meeting dealt with cystic hygroma, portal hypertension in children, septic umbilical arteritis, funnel-chest deformities, eventration of the diaphragm, and the use of colon for reconstruction of the oesophagus.

INSTITUTE OF PATHOLOGY AT
NEWCASTLE

OPENING BY SIR HAROLD HIMSWORTH

The new Institute of Pathology (illustrated below) at Newcastle General Hospital was opened by Sir HAROLD HIMSWORTH, F.R.S., Secretary of the Medical Research Council, on July 28. The Institute provides accommodation under one roof for three laboratory services until now largely separated: the pathology department of the hospital, which also serves many hospitals outside the Newcastle Group; the Public Health Laboratory Service's laboratory which deals with Northumberland, most of Tyneside, and part of North Durham; and the Blood Transfusion Service's regional laboratory and headquarters. The directors of the three departments are Dr. B. E. TOMLINSON, Dr. A. I. MESSER, and Dr. SHEILA MURRAY, respectively.

Unity of Medicine

After the chairman of the Newcastle Regional Hospital Board, Mr. E. F. COLLINGWOOD, had welcomed the guests, Sir HAROLD HIMSWORTH spoke. The new Institute had a twofold significance, he said. It brought to the region laboratory facilities in keeping with the needs of modern medicine; it remedied deficiencies under which they had long laboured. But over and above this it embodied an imaginative appreciation of future trends. In every branch of natural knowledge technical advances opened up new possibilities of progress in contingent fields. At this ceremony, said Sir Harold, many of his audience would be remembering James Spence, whose ideas pervaded so much forward thinking in medicine. It was Spence's virtue always to see beyond institutions to their purposes; as he had never failed to maintain, human endeavour was not



independent of its instruments, and its whole course could be diverted by inappropriate arrangement.

Medical knowledge was indivisible, continued Sir Harold, yet the demands of practice had created specialties, and nowhere was this more true than in pathology. Hospital pathology was tending to become divorced from public health work, and services like blood transfusion from both. That those engaged in these different activities should be separate specialists was probably inevitable, but that they should become isolated from each other was not. If they were to make their essential contribution to the advancement of medicine and their activities were not to degenerate into mere elaboration of technical expertise, then they must be brought into one community, living, working, and thinking together. This was the outstanding contribution of the new Institute. It united in one home the specialists of three separate but related services.

After Sir Harold's address the building was blessed and dedicated by the Archdeacon of Northumberland, the Ven. I. H. WHITE-THOMSON.

The Building

The Institute is sited between the gynaecological ward and the old hospital. Its construction involved the demolition of the former hospital department of pathology and a chapel. The Institute is a four-storeyed building, with a reinforced-concrete frame and floor. The ground floor, partly below ground level, is largely the preserve of the Blood Transfusion Service. Here there are rooms for bleeding and for the use of blood donors; laboratories, staff rooms, and offices; and a large blood bank, sterile room, and crystalloid laboratory. On the ground floor also is some of the hospital pathology department—the mortuary, viewing-chapel, and undertaker's room; the post-mortem rooms and students' gallery; and various staff rooms. However, most of this department is accommodated on the first floor, where are the histological, haematological, and biochemical laboratories; examination- and waiting-rooms for out-patients; and space for a combined museum and lecture room, and a photographic section. The Public Health Laboratory occupies the second floor, and besides its working-rooms there are laboratories for research, virology, and epidemiology, and the Service's regional administrative offices. On this floor also is a library for the use of all three departments. The top floor of the Institute is designed as an animal house.

The Institute, which covers some 68,000 sq. ft. (6,300 sq. m.), cost £240,000. Construction began in January, 1954, and was virtually complete in June this year. The architects were Messrs. Scherrer and Hicks, of London.

MEDICAL INSURANCE AGENCY

The annual meeting of the Medical Insurance Agency was held on July 26. Professor R. B. Green and Dr. Dougal Callander were elected members of the committee of management for three years, and the following were re-elected for the same period: Dr. Janet Bottomley, Sir John McNee, Mr. R. L. Newell, Dr. Henry Robinson, Sir Arnold Stott, and Dr. E. R. C. Walker. The report of the committee disclosed a new high level of service to the medical and dental professions, reflected in an ever-growing total of rebates on premiums. The audited statement of accounts for the year 1955 was adopted, and allocations to medical and dental charities were approved which, by the use of the covenant system, will result in their benefiting by an amount of about £22,000. The constantly expanding business handled by the agency on behalf of its clients has entailed the acquisition of additional premises, which have been secured in Flaxman Terrace, closely adjacent to the back of B.M.A. House. The staff has also been much augmented for a similar reason; and the new premises enable the accommodation required for them to be adequately provided. The total premium income collected by the agency is now almost two million pounds a year. Dr. James Fenton was re-elected chairman and Dr. Henry Robinson was re-elected hon. secretary.

SIR,—In discussing my report of a case of massive tumour embolism from Sully Hospital (*Journal*, February 25, p. 435), Dr. R. C. Jennings (*Journal*, March 17, p. 630) has raised the important point of bronchial involvement by metastatic pulmonary tumours. I agree that the presentation of an adrenal cortical carcinoma as an intrabronchial neoplasm is rare, but in our case the pathologist thought that this pleomorphic tumour was far more like an adrenal carcinoma than a primary bronchial tumour. It had an unusual and distinctive appearance which, in our pathologist's experience,

has not been encountered in the lung in the absence of an accompanying adrenal tumour. Nevertheless, we concede that the question is debatable.

On the wider subject of bronchial invasion by metastatic tumours in general, it was formerly thought that this phenomenon was rare. Seiler, Claggett, and McDonald¹ reviewed 52 cases from the literature, and reported 10 cases from the Mayo Clinic of metastatic malignant tumours suitable for resection. Gross bronchial involvement was demonstrated in 7 of their cases, in 4 of which bronchoscopic biopsy was positive. Though information was only given in 27 of the combined series of cases, bronchial involvement was noted in 17 and bronchoscopic biopsy was positive in 10 (16% of entire series).

Liebow,² who states that "an isolated metastasis may centre about, and even invade, a bronchus so as to suggest a primary lesion," illustrates this with examples from the kidney and colon. Judged by thoracic surgical reports, these are the commonest primary sites concerned, and the following cases, all of colonic origin, from the relatively recent practice of Sully Hospital are illustrative.

Case 1.—A woman aged 60 years first complained of left-sided chest pain in December, 1954. Seven months later radiography showed a collapsed left lower lobe; at bronchoscopy the left lower lobe bronchus was seen to be obstructed by growth, and biopsy showed necrotic tumour cells. In July, 1955, left lower lobectomy was done, the lobar bronchus being occluded by growth which microscopically was an adenocarcinoma of intestinal origin. Five months later she complained of colicky lower abdominal pain of six weeks' duration, and admitted having had bouts of diarrhoea over the previous seven months. Anterior resection involving hysterectomy was performed in January, 1956, for a papillary adenocarcinoma of the recto-sigmoid junction. She remains well at present.

Case 2.—A man aged 53 years complained in March, 1950, of bouts of constipation extending back over a year. Barium enema demonstrated a stricture in the ascending colon; right hemicolectomy was done, but no pathological report is now available. Nine months later he first noted cough and dyspnoea, which became gradually worse till he came for treatment two years later. Radiography showed collapse of the left lung; at bronchoscopy growth was seen occluding the lower end of the left main bronchus, and biopsy showed necrotic tumour cells. In February, 1953, left pneumonectomy was done, the main bronchus being occluded by growth which microscopically was adenocarcinoma of intestinal origin. A year later small metastases were suspected in the right lung. In April, 1956, six years after colonic resection and three years after pneumonectomy, he complains of some cough, but is still at work. Radiographically several circumscribed shadows in the right lung are slowly increasing in size.

Case 3.—In April, 1949, a woman then aged 56 years complained of six months' mucous diarrhoea and rectal bleeding. Abdomino-perineal resection of the rectum was done for an ulcerated adenocarcinoma invading the rectal wall but not involving lymph nodes. She remained well till May, 1956, when she had several haemoptyses. Radiology showed a large tumour in the right upper lobe; at bronchoscopy a tumour was seen growing from the lateral aspect of the right main bronchus so that the right upper lobe orifice could not be identified; biopsy showed well-differentiated mucus-secreting adenocarcinoma of intestinal origin. Further operation has been declined.

—I am, etc.,

Penarth, Glam.

W. R. PROBERT.

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Chloroquine and Bleaching of Hair

SIR,—In the course of trials with chloroquine in the management of hypersensitivity states and of certain forms of rheumatoid arthritis, I came across two instances of universal bleaching of hair within six months after starting the drug in daily doses of 400 mg.

The first lady, aged 30, was taking chloroquine, 200 mg., since January, 1956, and attended my out-patient clinic in June of this year. I was immediately struck by her cheerfulness and optimism, so different from the previous occasions when she had bitterly resented the limitation in her

activities caused by the disabling rheumatoid arthritis. Her change of outlook was not brought on by any recovery of her arthritis but by universal bleaching of her hair, including the eyebrows, which she considered a great improvement. She was quite sure that the bleaching was due to chloroquine. I was doubtful until I came across Dr. Sharvill's letter in the *British Medical Journal*.¹ Dr. Sharvill also referred to previous publications on this subject.^{2,3}

A week later another lady, aged 46, was seen to have been converted from a dark blonde into a very fair one within five months of commencing chloroquine. Fortunately, she too seemed pleased with her apparent rejuvenation and was disappointed when the drug was cut down to one tablet daily, as her symptoms of hypersensitivity following infection earlier this year had subsided. In both instances the patients were more than satisfied with their new appearance as a result of chloroquine medication. Not all patients, however, prefer the albino type of depigmented hair. It might therefore be wise to mention this remote but possible action of chloroquine to patients about to undergo prolonged treatment with the drug.—I am, etc.,

Liverpool, 1.

H. FULD.

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Steroid Anaesthesia

SIR,—Dr. L. H. Lerman is to be congratulated upon the excellent manner in which he presented his preliminary communication (*Journal*, July 21, p. 129) on the clinical use of "viadril"—a new steroid anaesthetic. Just over a month ago Dr. Margaret Rooms and I published our findings from the use of this drug in a series of one hundred cases¹ and can confirm the conclusions arrived at by Dr. Lerman. Since then we have had an opportunity to use viadril as the basic anaesthetic for a number of intra-thoracic operations and can reaffirm the opinion that this drug enables "controlled respiration" to be obtained with greater facility than when thiopentone is so used²—that is, smaller doses of pethidine and muscle-relaxants being necessary. The necessity of an intravenous drip obviously rules out the use of steroid anaesthesia—in its present form—as a routine for short operations. For long and exacting operations, however, its use is to be recommended, as patients have such a remarkable sense of well-being during the early days of the recovery period instead of varying degrees of misery. This sense of well-being appears to be similar to that experienced by patients undergoing cortisone therapy.

An excellent review of the whole subject of steroid anaesthesia appeared recently in a contemporary journal.³—I am, etc.,

London, S.E.5.

A. H. GALLEY.

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Maternal Death from Aspiration Asphyxia

SIR,—Once again Dr. R. B. Parker has rendered a signal service to the art and practice of obstetrics (*Journal*, July 7, p. 16), and if I may venture again to intervene it is chiefly to emphasize some of the points he makes, and to try to indicate the conclusions to which his article appears inevitably to lead.

In the first place it is right to insist that no patient undergoing forceps delivery should ever die from aspiration of vomit; for, as Dr. Parker says, such deaths are entirely preventable. The prevention of these tragedies is attainable if certain quite simple rules are observed.

(1) The lithotomy position should not be used in forceps delivery unless regional analgesia, in some form, is employed. It is difficult to ensure that the stomach is empty, for it empties slowly and intragastric pressure is high in labour, especially with

the patient in the lithotomy position.¹ Most people agree that it is an abomination to inflict a wide-bore stomach tube on a patient at the close of a long and tiresome labour, and it is doubtful whether even this procedure ensures an empty stomach. The adoption of the lithotomy position for forceps delivery arose because of the failure to differentiate between gynaecological patients who are properly prepared for anaesthesia and obstetric patients who hardly ever are so prepared.

(2) The lateral position effectually abolishes the risk of aspiration of vomit. It is the position into which all patients are put when recovering from an anaesthetic to obviate any risk from obstruction to the airway from vomiting. The use of the Sims position, in fact, results almost inevitably in the head and shoulders of the patient assuming a semi-prone position during anaesthesia. All this is elementary, but it is failure to grasp the simple facts which is chiefly responsible for the fatalities. I have repeatedly invited anyone to produce records of even a single case of death from aspiration of vomit when the patient has been delivered in the lateral position, and as nobody has responded it must be an extremely rare event, if, indeed, it ever occurs. From the obstetric angle I venture to assert that there is no procedure necessary during forceps delivery which cannot be satisfactorily carried out with the patient in that position, provided one is familiar with it. It is merely a question of orientation.

(3) The method of anaesthesia is clearly a matter of importance. Many of us who have used open ether for forceps delivery for many years are convinced of its supreme safety.² Although vomiting frequently occurs, the coughing reflex is nearly always retained, and in any case if the lateral position is used all the conditions are present for safe delivery. It would seem from the evidence available that elaborate anaesthetic machines may in certain circumstances be a contributory factor in a fatal result, and I seriously suggest that the rigid lithotomy supports in hospital are particularly dangerous in forceps delivery. In regard to the question of the passage of an endotracheal tube, it must be remembered that this presupposes that the patient is already fairly deeply anaesthetized. Now, as vomiting and aspiration of vomit tend to occur during the induction of the anaesthetic,³ of vomit tend to occur during the induction of the anaesthetic, it is in itself a procedure by no means devoid of risk. Presumably it would be performed with the patient in the dorsal position, which would diminish but not eliminate the danger.

Bleak as the prospect is, there are certain hopeful indications. One is, of course, Dr. Parker's impressive analysis of the situation, which should at least make those responsible for hospital obstetrics think very seriously. Secondly, meetings have taken place between obstetricians and anaesthetists in regard to this important matter, though any agreement on a solution appears, so far, to have eluded them, imperative though this is. Perhaps the most encouraging feature is that in at least two large teaching hospitals some (if not all) of the obstetric staff are teaching the lateral position for forceps delivery.—I am, etc.,

A. H. MORLEY.

London, N.W.7.

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Debt to the Middle Ages

SIR,—Sir Francis Walshe's stimulating address at Sheffield University (*Journal*, June 23, p. 1441) displays the debt, long overdue, which we owe to the Middle Ages in Europe. If I may say so, it is to America also that we owe a debt for a good deal of the research work done on the Middle Ages by another famous neurologist, but also clearly a distinguished classical scholar, Dr. James J. Walsh.¹ It is interesting to note that Alfred North Whitehead² says on our debt to the Middle Ages: "The Middle Ages formed one long training of the intellect of western Europe in the sense of order. There may have been some deficiency in respect of practice."

Now this contrasts rather with what was actually effected. James J. Walsh,³ writing on the reform of the Prussian hospitals, whose state had fallen so low in the nineteenth century, due to the poor standard of nursing, etc., that the century, due to the poor standard of nursing, etc., that the surgeons threw in their hand, said: "It was the Aegean task of cleaning up these stables as far as Prussia was concerned that was put on Virchow's (1821-1902) shoulders, and with his usual thoroughness he proceeded to learn

all he could about hospitals, so as to use his information to the best advantage. Above all he studied the history of German hospitals and gathered details that proved very interesting. He found that in the late Middle Ages—i.e., thirteenth and fourteenth centuries—there had been a marvellous development of hospitals throughout Germany. It is probable that practically every town of more than 5,000 inhabitants had a hospital. Virchow actually found that during the thirteenth century alone close on 100 hospitals had been founded in various parts of Germany. When he unearthed the efficient cause of the hospital organization he found it was to be traced to the movement set on foot and the initiative awakened by a single Pope, Innocent III (1198-1216). As Virchow said, it may be recognized and admitted that it was reserved for the Roman Catholic Church and for Pope Innocent III not only to open the course of Christian charity and mercy in all its fullness but also to guide the life-giving stream into every branch of human life in an ordered manner." He added for this reason alone, if for no other, the interest in this man and in his time will never die out.

Virchow found that these early German hospitals had been very well conducted. Indeed, when Pope Innocent III brought about their foundation through his encouragement and practically positive command (for every bishop on his visit *ad limina* was told that the Pope expected him to build a hospital in his diocese), the pontiff provided not only the model of a hospital in Rome but also the religious order, that of the Holy Ghost, to care for it. (Virchow was buried with Lutheran rites, but was known to be a professed agnostic.) In conclusion one would like to mention the very powerful letter of J. B. Oldham to *The Times* some weeks ago, which constrains one to hope for a British Virchow to bring our own hospitals up to date.—I am, etc.,

G. L. GATELY.

Rugby.

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Unconscious Mental Activity?

SIR,—The letters of Dr. S. Sament and Dr. E. R. Banner (*Journal*, July 14, p. 103) seem to bring our understanding of general mental processes up to date. Dr. Sament is right when he claims that the advantage of the Pavlovian system of conditioned reflex psychology is that it is open to experimental check under controlled conditions, but he does not make it clear that this will inevitably lead to progression in a circle, inasmuch as the method itself is based on reflex activity of a specialized nature, and investigating reflexes by means of reflexes, while providing plenty of opportunities for permutations and combinations, is not going to advance independent knowledge of mental processes. Dr. Banner wants to hold on to his Freud, but under new names. A rose by any other name, gentlemen, will smell the same. I do sympathize with him, however, while feeling that he is not really offering us a solution so much as an elegant complication.

Can we now take one step forward into the untried? Both your correspondents concentrate entirely on the brain. But the source of the dynamic unconscious (I am proud to use this fine term myself) is the whole body. The brain is a specialized organ where the activity of the body is translated into conceptual thought. The origin of this conceptual thought is physical—the body, neither more nor less. Schopenhauer called the body "the immediate object of experience." We do not know anything that we do not experience, and we do not experience anything beyond the activity of our bodies. Freud drew attention to certain barriers to the full understanding of the body, and attempted to overcome them. In order to do this he gave names to certain fairly well defined states of dynamic equilibrium, best observed in the form of their development in the child. But once he had named these states they lost their dynamic (naming things is the curse of science) and became concepts

when the public are advised to report their slightest ill-health and to avoid serious consequences.

Recently I encountered several instances where the mother was rightly alarmed, and at the time I was worried and puzzled by the "illnesses," although they may be classed officially as "minor" or "unrelated" in retrospect. One was a case of nephritis, which dated from a positive Mantoux test and took three weeks to settle. In another, fifteen days after a successful B.C.G. vaccination, a boy developed giddiness, drowsiness, and vomiting, with a pyrexia of 102° F. (38.9° C.) with no clinical signs—it lasted for three days. In a third, twelve days after his first B.C.G. vaccination, he developed epigastric pain, a temperature of 99° F. (37.2° C.), a tachycardia of 120 and multiple itchy papules. Four weeks later the temperature was still 98.6° F. (37° C.), and a few papules were still present ten weeks later. A diagnosis of B.C.G. bacteraemia was provisionally made. The fourth case was of a baby of 19 months old who vomited 24 hours after her first poliomyelitis vaccination, with a temperature of 101° F. (38.3° C.)—subsequently she was drowsy, with heavy breathing and a streaming head-cold, which cleared up suddenly after 36 hours.

Such cases further confuse the difficult problems of recognizing the new virus and collagen diseases, the toxic effects of certain new drugs, and even a surgical emergency during cortisone therapy, with which the general practitioners are already faced. Unless a much closer follow-up of all cases is made, how can the organizers of the B.C.G. and polio vaccination campaigns conscientiously advise that the vaccines are "safe"? How can they be sure that a further vaccination will not produce a "serious complication," if a minor reaction occurred previously? Surely the medical profession, and the parents, are entitled to more than "presumptive" evidence before embarking on widespread vaccinations.—I am, etc.,

London, N.7.

CHARLES O. KENNEDY.

Early Management of Poliomyelitis

SIR,—Having read the article "Early Management of Poliomyelitis," by Dr. E. G. Brewis (*Journal*, June 30, p. 1539), I was surprised at his remarks regarding the admission of patients to hospital, in which he advocates that, despite the diagnosis becoming more certain, in the event of the family doctor considering that the patient be admitted to hospital this course should be firmly resisted. The essential aim of treatment of anterior poliomyelitis is the prevention, if possible, of paralysis. In my opinion, anterior poliomyelitis of itself is not a disease to be dreaded, but the possible complication of involvement of the nervous system and subsequent paralysis is the reason why this disease must be treated with caution once it has been diagnosed.

To ensure that adequate measures are taken to prevent or minimize the complication of paralysis, admission to hospital, in my opinion, is strongly indicated except for very unusual circumstances, and this view is advocated by the Ministry of Health in their circular on poliomyelitis, dated July, 1954, in which, on page 7, it is stated that, "upon being informed of a case, the medical officer of health, or his representative, should visit the patient's home and help to get him into a suitably equipped hospital if this has not already been done."

In addition to my duties as medical officer of health, I am also fortunate to be in charge of a number of isolation beds at South Petherton Hospital, Somerset, and from January, 1947, to March, 1956, inclusive, 162 cases of anterior poliomyelitis, ranging from mild cases to cases of bulbar and respiratory paralysis and extensive limb paralysis, have been treated. The case fatality of these cases was one. I attribute in great part any success which might be claimed to the fact that practitioners in my area recognize the prophylactic value of adequate rest, and arrange with me for the patient's admission to hospital as soon as the case is diagnosed. I am convinced that the average parent is

not capable of ensuring that the patient receives the same degree of rest as can be given in hospital. The disease, rightly or wrongly, occasions considerable distress and worry to parents, and this sense of worry is communicated to the patient. Frequently I have examined patients in their home when often they are restless and anxious, but on removal to hospital, where there is a calm air of reassurance, the patient's general condition is much improved.

Dr. Brewis, in his indications for admission, refers to extensive paralysis of limbs or back, weakness of the shoulder girdles, which may precede involvement of the diaphragm, difficulty in swallowing or breathing, and I maintain that if the admission of patients is delayed until such indications are present then the risk of grave paralysis or of death is very considerable. Further, to ask a family practitioner to retain such cases at home until the indications for admission, as put forward in the article, are present places an intolerable responsibility on the practitioner. In certain cases of this disease the time between onset of the disease and of paralysis or severe complications can be relatively very short, and, unless trained nurses are available who have the knowledge and experience to appreciate any deterioration of the patient's condition, nursing of cases at home could easily result in the patient's admission being so delayed that death is almost inevitable. The policy of refusing admission could be a factor in the fatality rate which Dr. Brewis gives in his article, and to which he refers as making "lamentable reading."

Case histories of five patients, illustrating the necessity of cases being nursed in hospital, are available, but space does not permit them to be printed.

In conclusion, might I observe that two blood samples in cases, or suspected cases, of anterior poliomyelitis in children aged 2–10 years are now requested for diagnostic purposes? The use of a surface anaesthetic such as "xylotox-extra" (lignocaine with methocaine hydrochloride) renders the operation almost painless and greatly facilitates the taking of blood, particularly of the second sample.—I am, etc.,

Yeovil.

P. P. FOX.

Living on a Pension To-day

SIR,—In working on a book on the above, I feel that one or two typical budgets from retired doctors would be helpful and illuminating. Any figures given me would, of course, be used under complete anonymity, only the definition of "a doctor" or "medical specialist" being used.

The heads under which I am listing annual expenditure are rent or capital on loan, rates, household repairs and maintenance, food, clothes, domestic help of any type, tobacco, drinks, entertainment, car (if any), holidays, insurance, medical incidentals. I am particularly anxious for budgets on the £250, £350, £450, £550 a year level, but one or two about £1,000–£1,250 would be equally welcome.

To senders of budgets used I shall post a proof of the chapter on budgets, so that they may profit by the exchange.—I am, etc.,

Windrush Cottage,
Fairlight,
Near Hastings, Sussex.

CECIL CHISHOLM.

Unusual Injury

SIR,—An unusual injury came to my notice which I thought might be of some general interest.

My patient was making some adjustment which involved groping with his left hand behind the dashboard of his car, during which the metal strap of his wrist watch shorted one of the ammeter connexions to earth. The heat generated was apparently sufficient to melt one of the links and he sustained a second-degree burn some ½ in. (1.27 cm.) by 1 in. (2.5 cm.) on his wrist.

This danger in low-voltage circuits may not be generally appreciated.—I am, etc.,

Fleet, Hants.

C. R. TILLY.

Obituary

W. POINTON DICK, M.R.C.S., L.R.C.P.

Dr. W. Pointon Dick, adviser to the Government of the Gold Coast on the prevention, control, and treatment of tuberculosis, died suddenly in Accra on July 8, after a few days' illness, at the age of 51. Born on May 28, 1905, at Ealing, where his father, Dr. W. B. Dick, was in practice, William Pointon Dick was educated at Brighton College and entered the medical school of St. Thomas's Hospital in 1927. His student career was calamitously interrupted by five years of ill-health, culminating in a major chest operation, which left him with some degree of permanent disability; yet with characteristic courage and determination he went on to qualify M.R.C.S., L.R.C.P. in 1941.

After a resident post at Hereford General Hospital, Pointon Dick joined the medical staff at Harefield Sanatorium. He went from there to the Ealing Chest Clinic, and in 1943 took charge of one of the first mass miniature radiography units to operate in this country. His work in this field soon bore the mark of an original and inquiring mind. He was able to show how repeated surveys of a given population group can be used to reduce the local incidence of pulmonary tuberculosis to a very low level. His critical studies on the tuberculin patch test did much to establish a standard technique at a time when this test was in general use. In 1951 he was seconded to the Medical Research Council and as an attached member of its Tuberculosis Research Unit took part in the earlier stages of the B.C.G. vaccination trial, results of which have only recently been published. A year later he was appointed to the Government of the Gold Coast as a specialist under the Colonial Office, to investigate and advise on tuberculosis control in that country.

It was in Africa that Pointon Dick can be said to have found his true vocation. The climate suited him and his health improved, so that he was able to bring the full resources of his clinical and epidemiological experience to bear on the formidable problems that confronted him. What measure of success he achieved, in the short space of time that was afforded him, vital statistics will certainly reflect and work to be published may yet illuminate. It is already obvious that a sound basis has been laid under his imaginative guidance for his successors to build on. His loss will be mourned, not less by those in West Africa who owe him perhaps more than they know, than by his many friends in this country, whose deep sympathy will go to the wife and young daughter that he leaves.—B. C. T.

Mr. J. B. DAVID, honorary secretary of the Gold Coast Branch of the British Medical Association, writes: On any of the roads linking the scattered towns in this widespread tropical country one might come across Pointon driving his magnificent car at breakneck speed but with superb skill. He would be on one of his innumerable journeys to supervise the treatment of tuberculosis. In his younger days a well-known racing driver, he still retained unimpaired the ability to manage fast cars at speed. Also in his younger days he had conquered the scourge of tuberculosis in himself, and had come out to the Gold Coast to organize a service to limit the ravages of the disease among the inhabitants. During his time here he had endeared himself to all, both British and Africans, and had come to love the country where he worked. With very little fuss, he had

succeeded in building the foundations of a service which, if he had been allowed to live, had all the promise of unique success in the future. His experience and advice were available freely and, by reason of his prodigious journeys, to a very wide area, and it was somewhere on the last of these tours that he picked up the virus which ended his life. His work here had only just started, but its scope is shown by the concourse of all sorts of people who attended his funeral, Africans, high and low, British, friends, and patients. In stature he was a small man, but great in spirit, and his passing will leave a void here which will not easily be filled.

R. M. DOWDESWELL, M.D.

The sudden and untimely death on May 31 of Dr. Roland Dowdeswell, occurring as it did on the eve of his taking up a new laboratory appointment in Rhodesia, has been a great grief to his many friends. He was 54 years of age.

Roland Melville Dowdeswell was born in Bengal on October 23, 1901, and was educated at St. Paul's School and Emmanuel College, Cambridge. He went on to St. Thomas's Hospital for his clinical training, qualifying M.R.C.S., L.R.C.P. in 1928. He took the Cambridge degree of B.Chir. in 1932 and proceeded to M.D. six years later. In 1930 he obtained the certificate of the London School of Hygiene and Tropical Medicine and entered the Colonial Medical Service (now Her Majesty's Overseas Civil Service), and worked for several years as a medical officer in the Northern Frontier and Kavirondo provinces of Kenya. His particular interest was in bacteriology, and, in recognition of his ability in this field of medicine, he was in due course posted as bacteriologist at the Medical Research Laboratory, Nairobi. In 1948 he was appointed deputy director of laboratory services in Kenya, from which post he retired in 1950. He was honorary secretary of the Kenya Branch of the British Medical Association in 1939–40. After leaving the Colonial Medical Service he held appointments successively as visiting professor of bacteriology in the University of Beirut, and, since April of last year, as director of laboratories at the El Caloub Public Health Demonstration Project in Egypt under the World Health Organization. His contributions to medical literature included articles on typhoid agglutinins in the native population (1937) and schistosomiasis in the Kavirondo district of Kenya Colony (1938) in the *Transactions of the Royal Society of Tropical Medicine*, and a description of an outbreak of dysentery in a school in the *Lebanese Medical Journal* in 1953. He is survived by his widow, formerly Miss Sheila Patterson, whom he married in 1941, and three sons.

J. C. C. writes: Roland Dowdeswell's talents were varied and his interests were by no means confined to his professional work. He was an enthusiastic tennis and squash-rackets player, a distinguished chess player, and, perhaps most surprisingly, an intrepid big-game hunter. But above all there remains to refer, even though it be inadequately, to his unique personality, his critical and questing spirit. It is perhaps this which will be of the most enduring value, at least for those who knew him well and who cannot fail to have been affected by its influence. The keynote of his character was an all-pervading integrity, a sustained endeavour not only to think out basic principles of living but to live according to those principles. Such courageous sincerity is rare, but, if Bernard Shaw's dictum that "hardly any of us have ethical energy enough for more than one really inflexible point of honour" is true, then Roland Dowdeswell was one of those exceptional folk who had that sort of energy, and he lived to prove that living on those lines is not impossible.

R. SCOT SKIRVING, M.B., F.R.A.C.P., F.R.A.C.S.

Dr. R. Scot Skirving died peacefully at his home at Sydney, New South Wales, on July 15. He was in his 97th year, and, although the news of his death naturally caused no surprise, it came as a wrench to some of his friends in whose minds Scot Skirving was implanted as an age-long tradition. They had invested him with a cloak of permanence, and could hardly believe that he was no longer with them. On his 90th birthday he wrote of "the many kind references to my antiquity and persistence in living," and continued, "I am absurdly old, and I think with shame how little I've done with my long life." Therein lay his modesty: he might well have been proud of his achievement.

A member of a well-known Haddington family, Robert Scot Skirving graduated M.B., C.M., with honours, from Edinburgh University in 1881. He was elected a Fellow of the Royal Australasian College of Surgeons in 1936 and a founder Fellow of the Royal Australasian College of Physicians two years later. After graduation he was house-physician to Sir Douglas MacLagan, and then house-surgeon to Professor James Spence at Edinburgh Royal Infirmary. Scot Skirving's younger brother, "Archie," who died in 1930, became a well-known Edinburgh surgeon, but Robert, though he would have succeeded anywhere, chose to go to Australia, then known as "the distant colony," in 1883. "Though I love it still," he wrote recently, "Sydney is no longer the jolly little friendly town of Victorian days." But, like Robert Louis Stevenson in distant Samoa, his thoughts ever returned to the scene of his student life. Always a lively correspondent, he maintained a close touch with Edinburgh University, of which he was the oldest living graduate, and in recent years he was especially pleased to be visited by the Principal, Sir Edward Appleton, Professor D. M. Dunlop, and Dr. Douglas Guthrie. Many will remember how he recalled the past and told stories in his own delightful and witty fashion, illuminated by apt quotations from the poets, and especially from the Scriptures. He knew his Bible well, having lived in an age when the Bible was regarded as a textbook for every discipline.

It cannot be said that Scot Skirving ever retired from practice: even in his later years his services were in demand. His was a general practice in every sense of the term, and earlier in his career he had actually officiated, at the same time, as physician to one large Sydney hospital and as surgeon to another. He welcomed many British colleagues to Australia when the British Medical Association met at Melbourne in 1935. I had the pleasure of hearing him give a remarkable address at the postgraduate medical school at Sydney in 1953. It was entitled "Pneumonia, Then and Now." In a clear and audible voice the nonagenarian lecturer recalled the changes which he had seen since the time when lobar pneumonia was a common and devastating disease. Few of his hearers could recall such an age. The cheering which followed the lecture continued for several minutes. His younger friends—and to him anyone under 80 years was a "mere adolescent"—will not soon forget this grand old man whose charm of manner and whose gift for friendship endeared him to so many. —D. G.

We are indebted to Sir ROBERT HUTCHISON for the following appreciation: Robert Scot Skirving, I believe, was the

oldest Edinburgh medical graduate, as well as the doyen of the profession in Australia. I met him only once in the flesh, when the British Medical Association held its Annual Meeting at Melbourne in 1935, although I had known other members of his family since my early life: but we struck up a friendship which led to our exchanging letters every few months since that time, and his last letter to me is dated June 28. In his early years Scot Skirving went to sea in sailing ships, but left the sea for medicine and graduated at Edinburgh in 1881. He settled in Sydney, which he had visited on one of his voyages, and soon acquired a high reputation as a physician both in hospital and in private practice. He was very highly esteemed in his own city, and doctors visiting Sydney from the United Kingdom never failed to look him up. He told me in his last letter that not long ago he had met Russell Brain and Lionel Whitby in this way. Since the death of his wife a few years ago he had been rather lonely, and suffered also from much impairment of sight, which was a great grief to him, as he was fond of reading and a man of considerable culture. Altogether, Scot Skirving was a rather remarkable man.

HERMON WHITTAKER, M.R.C.P.

Dr. Hermon Whittaker died suddenly on July 18 at the age of 45. Hermon Whittaker was born on October 18, 1910, and developed severe diabetes in 1926 at the age of 15. On leaving his school in Yorkshire he became an assistant to a pharmacist, who thought so poorly of diabetics that he advised him to change from this career. Later he was guided into medicine and qualified M.R.C.S., L.R.C.P. from King's College Hospital in 1941, becoming an M.R.C.P. in 1944. His life as a doctor was devoted to the treatment of diabetics. He was first assistant in the diabetic department at King's College Hospital for many years and was in charge of the children's clinic there. Later, as a consultant, he developed an ever-growing diabetic clinic at Queen Mary's Hospital for the East End. He was the chief adviser and stimulator in the work of the Diabetic Association for diabetic children. Among other things he pressed for the provision of residential homes and schools for neglected diabetic children and for holiday camps for diabetic children. He never spared himself, nor did he allow his own insulin life ever to interfere with the task in hand. His medical work and place will be difficult to fill, as his medical colleagues know. But he will be missed even still more by the thousands of diabetics he handled as if their lives were more important than his. In his quiet competent way he engendered a personal trust and love which will be a sad loss to them and to his co-workers. He leaves a widow and two sons.

Dr. WILFRID OAKLEY writes: As Dr. Whittaker worked for so long with me in the diabetic department at King's, I would like to add a few words of appreciation of his character and work. His wide knowledge of the management of diabetes was derived from personal experience and clinical observation rather than from scientific journals, and I always felt that he was even more interested in his patients than in their diseases. This approach to the problems of his fellow-diabetics was an example both to students and to colleagues, and was the underlying cause of his popularity with his patients. Quite apart, however, from professional ability, Hermon Whittaker will be remembered by his friends for his quiet sense of humour, his fairness, and his courage; he never thought too highly of life or death, which was perhaps why he faced the latter with the same fearlessness with which he lived the former. Diabetic children owe him a debt which he would never have wished repaid.

Miss MARTHA MARQUARDT

The obituary of Miss Martha Marquardt was printed in the *Journal* of July 21 (p. 181).

Dr. HARRY SUGARÉ writes: May I very humbly follow Sir Henry Dale and write my personal tribute to the late Miss Martha Marquardt, who had been personal secretary to Paul Ehrlich from 1902 until his premature death in 1915? Although, as Sir Henry rightly points out, her book *Paul Ehrlich*, written in English and published by Heinemann in 1949, "never appeared . . . to have the spontaneity and lively charm of the shorter character-sketch which she had written in German 25 years earlier"—namely, *Paul Ehrlich als Mensch und Arbeiter*, yet it is a mine of most interesting information for a good understanding of Ehrlich's personal life, traits, and his scientific career for those readers who are not familiar with the German language. Martha Marquardt, as well as Professor Carl Browning, emeritus professor of bacteriology in the University of Glasgow, were of considerable help to me by their long correspondence when I prepared a paper on the life and work of Paul Ehrlich delivered on the very day of the centenary of the birth of Paul Ehrlich, March 14, 1954, to the Leeds Jewish Medical Society, with Professor C. L. Oakley, Brotherton professor of bacteriology in the University of Leeds, in the chair. I value such correspondence most highly. In the preparation of this paper I received much help from Martha Marquardt. I look forward with great interest to the publication of the first volume of the collected edition of the scientific writings of Ehrlich.

Mr. T. G. CROMBIE, surgical registrar at the Queen Alexandra Hospital, Cosham, Portsmouth, under the South-west Metropolitan Regional Hospital Board, died on June 29 at the age of 33. Thomas Gilmour Crombie was born on November 3, 1922, and received his medical education at Edinburgh University, graduating M.B., Ch.B. in 1944, when he was awarded the Mouat Scholarship in the practice of the physic. After graduation he held appointments at the Walsall General Hospital and the country branch of the Royal National Orthopaedic Hospital at Stanmore, and then served in the R.A.M.C. from 1945 to 1947. Admitted F.R.C.S. in 1950, two years later he was appointed surgical registrar at Portsmouth under Mr. R. T. Campbell, first at St. Mary's Hospital and latterly at the Queen Alexandra Hospital.

R. F. R. writes: The untimely death of T. G. Crombie has caused the deepest grief to those of us who were privileged to be his closest friends. Crombie was a man of sterling character and forceful personality, who concealed beneath a somewhat cynical exterior an unfailing kindness of heart and devotion to his ideals. By nature outspoken and critical, his honesty of purpose was always apparent and deeply respected even by those who found themselves in disagreement with him. He was a brilliant conversationalist who never missed a point in debate, and whose shafts of wit enlivened any company in which he happened to be present. A week-end spent at his home in Portsmouth was always a memorable for—among other things—the humour and laughter which were inevitably associated with his charm. As an undergraduate at the University of Edinburgh, Crombie achieved the uncommon distinction of playing in the University fifteen during his first term. A Scottish cap was confidently forecast for him, but characteristically, having decided that he could not afford the time from his studies, he gave up the game completely at the end of his first year. Eighteen months ago he developed the first symptoms of the illness which was eventually to prove fatal. He was well aware of the probable outcome, but his outstanding courage was more than equal to the occasion. With strength of character undimmed, he carried on to the end. To his wife, who bravely tended him during his last days, and to his young son, we extend our deepest sympathy.

Mr. R. T. CAMPBELL writes: Thomas Gilmour Crombie bore with characteristic grit and determination the discomfort and anxiety of two major operations and the culmination of a long illness which he knew full well could have only one end. His sterling qualities, however, remained with him to the last, and his passing is mourned deeply by his many medical and nursing friends, and not least by the many patients who benefited from his kindness and skill.

Dr. A. J. H. ILES, consulting radiologist to the Taunton and Somerset Hospital, died in hospital at Taunton on July 3, nine days before his 78th birthday. Born at Taunton on July 12, 1878, the son of Dr. A. R. Iles, Alfred John Hopkinson Iles was educated at Repton School and at St. Thomas's Hospital. His medical training was interrupted by service in the South African War, during which, as a sergeant, he was responsible for the x-ray equipment for the whole Army in South Africa. The entire equipment, he used to say, was kept in a cellar and hardly used. On demobilization he returned to his medical studies and qualified M.R.C.S., L.R.C.P. in 1907. After qualification he held the appointments of assistant lecturer in surgery, demonstrator in physiology, and clinical assistant in the x-ray and electrical department at St. Thomas's before joining his father in general practice at Taunton, taking with him his interest in radiology. This interest led to his appointment as the first honorary radiologist to the Taunton and Somerset Hospital, a post which he held until his retirement in 1938. In the following year he was elected a Fellow of the Faculty of Radiologists. In addition to radiology, Dr. Iles was intensely interested in the use of electricity and massage in the treatment of injuries. He had a natural gift for inventing gadgets, and this gift he applied in many ways to his work and his hobbies. The outbreak of the first world war in 1914 saw him back in service with the R.A.M.C. The war produced a rapid advance in electrical and massage treatment. His abilities were quickly recognized, and he was asked to form and control the electrotherapy and massage centre in the medical base depot at Etaples. After the war he gradually gave up general practice and concentrated on radiology and physiotherapy. A member of the British Medical Association for nearly fifty years, he was honorary secretary of the old West Somerset Branch from 1922 to 1924 and president of the Branch in 1924-5. In 1932 the Branch became the West Somerset Division of the new Bath, Bristol, and Somerset Branch, and he was chairman of the Division in 1934-5 and president of the Branch in 1937-8. When the Association held its Annual Meeting at Cardiff in 1928 he acted as one of the honorary secretaries of the Section of Radiology and Physio-Therapeutics. For many years he was assistant county controller and director of the Somerset branch of the British Red Cross Society. In 1937 he was elected mayor of Taunton, during which year King George V visited Taunton, the first visit of a reigning monarch for 400 years. He acted as deputy mayor from 1938 to 1945. A staunch freemason, Dr. Iles was granted many masonic honours, and at the time of his death was provincial grand master of the South-western counties of England in the Royal Order of Scotland. He married Miss Florence M. Pink in 1906. His wife died in 1950; there were no children of the marriage.—L. P. M.

Dr. REUBEN LIPMAN died at his home in Liverpool on July 14 after a long and distressing illness, bravely borne. The eldest of seven children, Reuben Lipman was born at Leeds on October 23, 1900. His abilities carried him to high school and subsequently to Leeds University. His preparation for medicine was thorough. After taking an honours B.Sc. in physiology in 1921, he proceeded to the M.Sc. in the following year and to his medical degree in 1925. Soon after graduation he entered general practice in Leeds, and a few years later settled in the Aintree district of Liverpool. With this practice he remained connected up to the time of his death. During his student days Lipman had become interested in psycho-analysis, and it was in this

specialty that he later built up a private consulting practice. In 1934 Dr. Lipman was appointed to the staff of the Liverpool Psychiatric Clinic, then a voluntary institution, and continued his work there when, in 1948, the clinic was transferred under the National Health Service. His therapeutic skill was in constant demand. Though he remained a firm adherent and a clear exponent of psycho-analytic principles, he spurned no form of psychotherapy which he considered would be of help to the individual patient. This tolerance and breadth of outlook much increased the range of his powers and rendered him virtually irreplaceable on Merseyside. For several years he was a valued member of the South Liverpool Hospital Management Committee. It could be said that Reuben Lipman entered into life at many points, often with distinction, always with infectious enthusiasm: military training, athletics, games, swimming, boxing, painting, photography, and the pleasures of the countryside—all enriched his experience; and up to the time of his illness he took every opportunity he could for study abroad. He was an active member of the British Medical Association, the Royal Medico-Psychological Association, and the Liverpool Medical Institution. Among the qualities we shall miss most were the warm-hearted kindness of his nature and his staunch and loyal friendship. Many owe much to his generosity of spirit and to his unobtrusive practical help, and throughout his professional life one could rely on his unflinching presence in response to a difficult situation. At those times his insight and self-command enabled him to intervene without trace of self-assertion, yet powerfully and constructively, disarming factious opposition. The setbacks of his last illness found his courage unquenchable. He passes from our sight, untimely as it seems, and at the height of his powers: he is mourned by numberless patients, friends, and colleagues.

In 1928 Dr. Lipman married Miss Lili Raphael, of Darlington, who survives him, together with their two sons and two daughters—dental surgeon, research physicist, doctor, and student of dentistry, respectively; and it is to them that our thoughts and sympathies turn.—S. B. H.

Dr. J. O. W. DICK died from poliomyelitis at Oxford on July 14 at the age of 39. James Orford Wallace Dick was born on November 6, 1916, the son of the late Mr. J. R. Dick, F.R.C.S.Ed., of Scarborough. Educated at Wellington College and Trinity Hall, Cambridge, where he took his B.A. in 1937, he completed his medical training at the London Hospital, obtaining the degrees of M.B., B.Chir. in 1941. After graduation he held appointments at the London Hospital and Haymeads Hospital, Bishop's Stortford, before entering the R.A.M.C. in 1942. He volunteered for the Airborne Division and was with a glider battalion in France and Germany. For a time he held the appointment of deputy assistant director of medical services, and later was in command of a field ambulance in Norway and Greece, with the rank of lieutenant-colonel. After the war he spent another year at the London Hospital, and in 1948 settled in practice at Abingdon, Berkshire. He is survived by his widow, formerly Miss Mary Sykes, whom he married in 1943, and four children. His first daughter died in 1953.

J. R. E. writes: Orford Dick was a man of many interests who, throughout his all too short life, refrained from following a few to the exclusion of others. A natural athlete, he played games for enjoyment and recreation, not as an end in themselves. It was fitting that he should elect to enter general practice, in which he at once gained the confidence and affection of his patients. He set himself a high standard in everything he did. An integrity of purpose which in a lesser man might have had unhappy results only enhanced Orford Dick's popularity, and his love of life and his ready laugh made him a delightful companion. Much of his happiness was derived from his home life, for his marriage was a blessed one. His patients have lost a highly respected doctor and his fellow-practitioners a charming and loyal colleague. All who knew him have suffered keenly by his premature death.

Medical Notes in Parliament

Fluoridation of Water Supplies

Dr. DONALD JOHNSON (Carlisle, Con.) asked the Minister of Health on July 20 how he assessed the required dose of fluoride to be added to water in experimental fluoridation areas; and to what extent he had followed the recommendation of the Report of the United Kingdom Mission to North America on the best way of determining the present level of ingestion of fluoride in human beings. Mr. R. TURTON said that the right level for the fluoridation of water in the studies in this country was determined as a result of investigations into the effects of water which naturally contained fluoride, and in the light of over 10 years of experience in other countries. It had been found that at one part per million a very high degree of protection against caries was given, but the mottling caused by higher concentrations was avoided. As regards the mission's suggestion for a survey of fluoride excretion, a pilot investigation confirmed the results obtained in other countries.

Strontium on Welsh Mountains

Mr. TUDOR WATKINS (Brecon and Radnor, Lab.) asked the Lord Privy Seal what effects strontium had had on Welsh mountain sheep. Major G. LLOYD-GEORGE, the Home Secretary, who replied on July 25, said that, in studying the distribution of radioactivity arising from fall-out, measurements had been made of the strontium-90 associated with the calcium in various biological materials. Among the representative samples of sheep bones examined, a few from very localized mountain areas in Wales had shown higher values than those from other areas. Even so, the levels were too low to have any detectable effects on the sheep.

French Ban on Pharmaceutical Goods

Dr. REGINALD BENNETT (Gosport and Fareham, Con.) questioned the President of the Board of Trade about recent limitations placed on the importation into France of finished pharmaceutical products from England, and what reciprocal action he would take. Mr. PETER THORNEYCROFT stated on July 26 that a ban was imposed last January on imports into France of certain made-up pharmaceutical goods. After consultation with the French authorities he was satisfied that the ban was imposed for reasons of public health and safety, and not as a deliberately protective or discriminatory measure. The question of reciprocal action did not therefore arise. He was, however, considering an approach to the French authorities to find out by what means imports from the United Kingdom could be brought within their health requirements.

Chiropody Associations

Mr. SOMERVILLE HASTINGS (Barking, Lab.) asked the Minister of Labour on July 26 whether his attention had been called to a statement in *Careers Guide*, April, 1956, an official publication of his department, that the only training accepted as leading to a suitable qualification for inclusion in the British Register of Medical Auxiliaries was that approved by the Society of Chiropodists; whether he was also aware that the Institute of Chiropodists, formerly the Joint Council, and the Society of Chiropodists were mentioned as appropriate bodies in the Health Service Medical Auxiliaries Regulation, 1954, and that the qualifications awarded by both bodies were generally regarded as of equal value; and what action he proposed to correct this misstatement. Mr. ROBERT CARR, the Parliamentary Secretary, replied that the statement in the *Guide* was strictly correct. The complicated position in this profession might, however, have been more fully explained, and he would consider how best this information could be conveyed to the schools interested. Mr. HASTINGS: The

Minister of Labour, when Minister of Health, decided after careful study that these two bodies were of equal esteem. How comes it that as Minister of Labour he takes a different view? Mr. CARR replied that the Minister did not take any different view. The information in the booklet was strictly correct, but he would see what he could do to have it amplified. Mr. HASTINGS said it was stated in the booklet that only the Society of Chiropodists was an approved body, whereas, as was made clear in the statement of the Ministry of Health, both these bodies were regarded as of equal esteem. How could that be? Mr. CARR thought this was one of the few cases where they could both be largely right. The British register was maintained by the B.M.A., which recognized only the Society.

East Africa Inquiry

Mr. SOMERVILLE HASTINGS asked the Secretary of State for the Colonies on July 25 what he was doing to implement the recommendation of the East African Royal Commission that a medical commission should be sent out to make recommendations on the control of endemic and epidemic disease and preventive medicine generally. Mr. LENNOX-BOYD replied that a committee, under the chairmanship of Professor A. C. Frazer, of Birmingham University, had investigated the medical and health services in Uganda and its report would shortly be debated in the Uganda Legislative Council. The Governments of Kenya and Tanganyika saw no present need for a visit by an expert body. In Tanganyika a draft plan for the development of the medical services over the period 1956-61 was before the Legislative Council. He shared the view of the East African Governments that in these circumstances the recommendation referred to need not be followed up.

The Pay Claim

Mr. C. OSBORNE (Louth, Con.) asked the Minister of Health on July 30 what were the average net earnings of a general medical practitioner in the Health Service; what they were in 1939; and by what percentage they had risen. Mr. R. TURTON replied that the present average net earnings of a general medical practitioner after meeting his practice expenses were £2,222 a year. The corresponding figure for 1939 was £938, and the percentage increase was therefore 136.9. Mr. OSBORNE asked if the Minister would agree that, as the value of money had fallen by one-third since 1939, doctors were no better off; and that those working in rural areas who were on tap seven days a week fully earned what they got. Mr. TURTON.—I agree that both those working in rural areas and in urban areas deserve well of the community. Lieut.-Col. M. LIPTON (Brixton, Lab.).—But for the difficult economic circumstances of the country the doctors would have a good case for an increase. Mr. TURTON.—My reply to the claim was on the basis that in present circumstances it would not be right to give consideration to a claim for a general increase in remuneration. Dr. EDITH SUMMERSKILL (Warrington, Lab.).—How does the Minister reconcile that with the recommendations of the Spens Committee? Mr. TURTON.—The committee did not lay down any contractual obligation. They based their recommendations on what should be the level at which doctors entered the Service.

Danger in a Theatre

Mr. J. J. ASTOR (Plymouth, Sutton, Con.) asked the Minister of Health if he would make a statement on the recent death of a patient in the South Devon and East Cornwall Hospital, Greenbank, Plymouth, which was found due to infection caused by inadequate and dangerous conditions in the operating theatre. Mr. TURTON.—I have asked the regional hospital board for a full report on this case.

Mr. ASTOR asked what representations had been received by the South-west Regional Hospital Board over the last eight years from the hospital management committee and medical staff about the inadequate and dangerous conditions in the operating theatre at the South Devon and East Cornwall Hospital. Mr. TURTON stated that the board received

five representations from the hospital management committee about the condition of this operating theatre; the earliest was in April, 1950, and the most recent in January, 1955. The committee, however, recommended higher priority for two other capital schemes in their group. Mr. ASTOR asked if, in view of these unfortunate circumstances, the Minister would consider in similar cases intervening when medical opinion was in conflict with the hospital management committee. Had the management committee published the reason why it did not give priority to the rebuilding of this theatre? Mr. TURTON replied that it was clear that the committee took the view that the maternity unit was even worse than the operating theatre. He had now received a proposal for a new operating theatre. It was submitted on June 19, and he had approved the preparation of sketch plans on July 23. That work would go forward in due course.

Tranquillizer Drugs

Mr. BLENKINSOP asked the Minister whether he would give guidance in his *Notes to Prescribers* to general practitioners as to the cost of tranquillizer drugs. Miss PAT HORNSBY-SMITH, the Parliamentary Secretary, said the Minister would certainly consider whether there was any information which general practitioners might find useful if circulated to them in this way. Mr. BLENKINSOP asked that the Ministry should encourage a campaign to make clear that these drugs, which might cost up to 35s. for a bottle of 50, were of very doubtful value. Miss HORNSBY-SMITH replied that *Notes to Prescribers* were supervised by an editorial committee on which the B.M.A. was represented. She agreed that this might be something they could consider, but it was only recently that these drugs had been introduced. Dr. EDITH SUMMERSKILL (Warrington, Lab.) said it was because they had been recently introduced that they were being widely advertised among doctors.

Ophthalmic Tests.—Under the supplementary ophthalmic services about 415,200 tests were made in 1954 in the area of the London executive council, and 443,200 in 1955. Spectacles were prescribed in about 359,600 cases in 1954, and in 385,100 cases in 1955.

Research on Genetics.—During the financial year 1956-7 expenditure by the Medical Research Council on research on genetics is estimated at approximately £70,000.

Medico-Legal

LIBEL ACTION SETTLED

The libel action¹ brought by the Royal College of Obstetricians and Gynaecologists against Associated Newspapers Ltd., and others, in respect of an article which appeared in the *Daily Sketch* on January 4, 1956, was settled before Mr. Justice Pearce on July 25.

Mr. H. Milmo for the plaintiffs said that the article entitled "Must Our Babies be Born in Pain?", published under the name of Dr. Jon Collen, asserted that the Royal College had acted in a shameful manner towards a medical practitioner, who it was stated was the man primarily responsible for the new look in obstetrics, that they had prevented him from working in any hospital in the country, and had caused him to be harried and cold-shouldered by the medical profession. He said that this grave attack upon the honour and propriety of the Royal College was utterly false and without foundation. The defendants had apologized, published a note in the *Daily Sketch* of January 6 regretting the wording of the article, and agreed to pay the Royal College substantial damages, in addition to their taxed costs of these proceedings. Mr. N. Faulks for the defendants said he desired to associate himself with everything which Mr. Milmo had said. He expressed the defendants' sincere apologies. Mr. Milmo asked leave to withdraw the record of the action, which Mr. Justice Pearce granted.

The damages are understood to have amounted to £600.

¹ *British Medical Journal*, January 21, 1956, p. 176.

Universities and Colleges

UNIVERSITY OF CAMBRIDGE

The following candidates have been approved at the examinations indicated:

FINAL M.B.—Part II: ¹R. E. C. Altounyan, ¹F. K. Amarquaye, ²G. M. D. Archer, ¹W. Arthur, ¹K. D. Austin, ¹R. C. Bain, ²R. T. Barnie-Adhead, ¹P. C. Barrington, ²J. R. Batchelor, ¹D. E. R. Bateman, ¹M. F. Beard, ¹C. F. N. Bennett, ¹S. Bendif, ¹A. Bessell, ¹P. C. Bewes, ¹A. C. S. Bloomer, ¹A. T. Brain, ¹E. M. Bray, ¹G. Brocklehurst, ¹A. C. Brown, ¹S. Buchanan, ¹E. Bush, ¹H. C. I. Bywater, ¹M. Cairns, ¹D. Cameron, ¹R. Carlisle, ¹J. F. Catto, ¹D. A. Chamberlain, ¹C. Cohen, ¹G. Cohen, ¹M. R. Colwill, ¹F. G. Cooper, ¹V. Cope, ¹J. R. M. Copeland, ¹W. M. Copeman, ¹C. C. Cory, ¹J. Dauncey, ¹H. J. Davies, ¹J. E. Davies, ¹A. G. Dawrant, ¹J. K. Dewhurst, ¹St. J. Dowling, ¹D. W. Downham, ¹M. H. M. Dykes, ¹D. J. El Kabir, ¹S. G. Elkington, ¹D. M. Essenhigh, ¹T. G. Evans, ¹D. J. Fairclough, ¹S. G. W. M. Faris, ¹J. Farrer, ¹B. W. K. Fayle, ¹M. L. Fenner, ¹A. C. Fernando, ¹S. J. M. Fernando, ¹C. A. Fox, ¹T. A. Fox, ¹P. Francis, ¹R. Fraser, ¹M. A. R. Freeman, ¹M. J. P. Furniss, ¹G. B. Gasson, ¹I. Gaston, ¹J. H. Gervin, ¹M. D. Gibson, ¹W. R. Gibson, ¹D. A. Gilchrist, ¹A. D. R. Goodcliffe, ¹N. G. A. Gracey, ¹P. F. Gray, ¹F. B. Grossmark, ¹B. H. Grundy, ¹A. L. Gunn, ¹C. C. Gunn, ¹T. B. Hales, ¹D. W. Hall, ¹S. J. Harrison, ¹P. S. Heath, ¹F. R. Hilborne, ¹D. B. Hill, ¹S. O. Hill, ¹E. D. Hocking, ¹S. F. R. Hocking, ¹S. T. W. Hoskins, ¹H. J. Hoyland, ¹D. H. Hull, ¹C. J. B. Hundley, ¹S. C. Hunnibun, ¹S. W. E. Ince, ¹J. N. Insall, ¹G. A. Irving, ¹S. D. Jackson, ¹A. M. C. Jennings, ¹Mrs. E. M. Jewell, ¹A. H. H. Johnson, ¹S. G. B. C. Jones, ¹J. K. L. Jones, ¹N. F. Jones, ¹P. M. Jones, ¹S. W. R. B. Jones, ¹N. W. Karunaratna, ¹F. J. Keegan, ¹R. C. M. Kew, ¹J. Key, ¹N. D. Kilpatrick, ¹A. B. King, ¹J. M. Kirk, ¹S. J. M. Lachellin, ¹J. P. Lachmann, ¹N. F. Leigh, ¹S. W. Lister, ¹H. K. Litherland, ¹S. B. Lomax, ¹E. W. Lord, ¹S. W. McCormack, ¹S. P. McCormack, ¹J. McGregor, ¹S. J. Mainwaring, ¹G. Maisei, ¹S. F. Mansfield, ¹S. K. Matthews, ¹H. M. Melville, ¹A. E. H. Mence, ¹D. H. Metcalfe, ¹J. B. B. Milne, ¹S. W. R. Moore, ¹K. A. A. Mourin, ¹S. P. D. Mulcahy, ¹S. P. Mullin, ¹D. H. Murphy, ¹S. P. Murphy, ¹S. W. B. Newsom, ¹S. A. G. Nicholas, ¹S. F. V. Nicolle, ¹M. A. E. Nixon, ¹N. W. M. Orr, ¹D. G. Peacock, ¹S. R. K. L. Percival Smith, ¹G. M. Petrie, ¹R. M. Pollock, ¹S. T. R. Preston, ¹P. E. Putnam, ¹S. J. L. Reed, ¹S. N. C. R. W. Reid, ¹S. N. S. C. Rice, ¹F. F. Richards, ¹S. J. D. M. Richards, ¹S. E. R. Roberts, ¹S. J. Rushton, ¹S. A. J. Salsbury, ¹S. J. R. Sandford, ¹S. R. E. Scott, ¹S. A. J. Shaw, ¹S. J. Shaw, ¹H. W. Shaw, ¹S. B. J. Sheail, ¹S. P. H. W. Sheard, ¹S. J. Sims, ¹S. M. Slapak, ¹S. M. W. Sleight, ¹S. M. G. Smedley, ¹S. D. M. Smith, ¹S. E. A. H. Smith, ¹M. J. V. Smith, ¹S. R. W. M. Smith, ¹S. J. Steele, ¹S. R. V. Stephenson, ¹S. J. D. Stirling, ¹D. A. Swales, ¹S. K. A. McL. C. O. Swinburne, ¹S. S. Taylor, ¹D. A. Thomas, ¹S. D. W. P. Thomas, ¹S. J. M. Thompson, ¹E. G. F. Tinsley, ¹J. A. D. Todd, ¹S. J. C. F. Townsend, ¹S. R. F. Tuckett, ¹S. J. E. Vallis, ¹M. A. M. von Bergen, ¹S. R. M. Wainwright, ¹S. J. D. Waller, ¹S. C. G. Waters, ¹S. A. J. Watson, ¹C. P. K. Watson, ¹S. G. A. Watson, ¹S. P. G. Watson, ¹S. R. C. Whalley, ¹S. J. L. G. Whitley, ¹S. H. J. O. White, ¹S. V. Whitehead, ¹S. G. E. G. Williams, ¹S. J. G. P. Williams, ¹M. G. Williams, ¹J. A. N. Wingate, ¹S. G. Wooster, ¹S. N. Wright, ¹S. G. Yates, ¹S. T. W. Young.

Part I (Pathology and Pharmacology): C. U. Abengowe, F. K. Amarquaye, C. F. N. Bennett, I. E. Bush, A. S. E. Crewdson, J. M. E. Dunn, G. W. M. Faris, B. W. K. Fayle, M. J. P. Furniss, A. C. Halliwell, D. B. Hill, E. D. Hocking, R. S. Hole, W. H. W. Inman, J. N. Insall, G. A. Irving, A. B. C. Jefferson, M. C. Johnson, N. D. Kilpatrick, M. I. Lander, N. F. Leigh, R. W. Lister, G. I. M. McLellan, J. T. Mainwaring, H. K. Melville, R. Murphy, A. D. G. Nicholas, F. V. Nicolle, J. D. J. Parker, R. A. N. Petrie, R. M. Pollock, J. E. Portelly, R. J. L. Potts, M. B. Rees-Jones, R. E. Scott, G. Screech, A. J. Shaw, J. Sheail, P. H. W. Sheard, R. W. M. Smith, D. A. Swales, I. R. Thornber, E. G. F. Tinsley, M. K. T. Valentine, P. G. Watson, V. Whitehead, W. M. A. Wright.

¹Passed in principles and practice of physic. ²Passed in principles and practice of surgery. ³Passed in midwifery and gynaecology.

UNIVERSITY OF LONDON

The following candidates have been approved at the examination indicated:

THIRD M.B. B.S.—¹E. W. J. Brown, ¹J. W. Carter, ¹B. G. Child, ¹D. H. Elliott, ¹Florence P. Forsythe, ¹C. J. W. Hunter, ¹R. F. Jewkes, ¹Ann E. Johnson, ¹W. G. G. L. Jones, ¹S. E. Josse, ¹Mary C. Munday (University Medal), ¹R. W. Portal, ¹K. T. Tighe, ¹A. Abraham, C. D. Addo, P. Adlington, Barbara A. Alcock, M. J. Andrews, C. Angeli, C. R. N. Ashbee, Rosemary R. Ashby, L. Ashworth, S. Bacchus, A. J. M. Bailey, G. R. Ball, Armita Bamboat, R. O. Barnard, R. M. Barnes, Elaine V. Barracough, R. D. E. Basden, J. D. C. Baxandall, M. A. Beale, J. S. Beales, M. E. J. Beard, A. W. L. Beatson, M. A. Bedford, P. J. Bekenn, J. D. L. Bell, Phyllis J. A. Bell, R. L. Belsey, R. Bendall, R. J. J. Bennett, R. V. Berry, J. Bertram, L. J. Binnie, B. P. Bliss, T. W. Bolton, J. R. Bowles, L. B. H. Boxall, K. W. Braybon, R. S. Britton, C. P. Broad, Susan M. Brocklesby, J. F. Brooks, W. B. J. Broom, Helen R. L. Brown, K. W. Browne, V. R. Bruce, D. M. Bruton, A. G. Bryer, D. W. Bullman, D. R. Burcombe, Maureen V. Burrage, A. L. Bussey, C. A. Butler, M. B. Butler, R. M. C. Butler, R. P. Callaghan, D. I. Campbell, F. P. A. Capps, R. J. Carmichael, G. B. Carter, M. Chapman, Davina C. Cherry, C. D. Chivers, T. G. C. Christopher, M. D. Churcher, J. M. Clark, A. J. Clement, E. Clissold, Dulcie V. Coleman, Delia F. Coney, D. B. Co-nell, J. Connolly, N. Conway, P. L. Cook, B. Corrin, M. H. Cox, F. Cramer, P. J. Creaven, A. H. Crisp, N. Crombie, J. G. Cruickshank, B. J. Cuddigan, J. B. St. C. Cumberland, J. M. Cundy, J. R. Curtis, D. F. Davies, R. D. Davis, B. P. Day, J. J. de Jode, P. L. G. G. Delva, Gillian R. Diamond, J. A. Easton, Helen E. Economides, I. M. Edwards, M. A. Edwards, A. Elsworth, F. E. Ely, D. M. Entwistle, I. M. Evans, Joy Evans, Rachel G. Evans, J. O. Fajemisin, P. Faridian Aragh, J. W. J. Fearn, G. McF. D. Fleming, P. G. T. Ford, P. A. French, M. J. N. Frohn, P. L. G.

Galloway, G. B. Gillett, A. B. Gilmour, Margaret A. Gordon-Watson, R. A. Gould, Fiona M. Graham, C. B. T. Grant, R. H. E. Grant, Ann B. Gray, J. M. Gray, I. D. Green, G. H. Griffith, P. D. Griffiths, P. D. J. Griffiths, A. B. L. Gulati, Teresa M. Gurrin, D. M. Harris, J. M. Harry, T. D. Haskins, G. W. Hatcher, P. R. Hawley, B. Hecht, R. S. Henderson, Diana K. Henry, R. L. Hewer, Jennifer L. B. Hicks, T. Hillier, J. R. Hobbs, A. G. Hocken, Pamela M. Hogg, J. G. Holmes-Milner, C. V. Horn, Jennifer M. Hubble, I. D. Hudson, Pauline M. Hughes, D. I. Hughes-Davies, J. W. Hunt, Ann L. Hunter, J. D. Hurley, H. E. Inness-Palmer, G. W. Jenkins, T. Jenkins, Jane G. Jenkinson, Barbara D. Jones, W. E. O. Jones, A. J. Jordan, A. J. Jouhar, J. McK. Kennedy, M. G. Kieley, Barbara C. King, Margaret King, T. J. King, R. F. Knight, Pamela F. Kordik, V. A. Kumoli, G. D. Langham, R. J. K. Law, Marian E. Le Couillard, P. F. S. Lee, D. S. Leede, J. R. Leeds, B. L. Lees, S. C. Lennox, A. W. F. Lettin, D. J. Lewis, W. G. Lewis, T. M. C. Lindsay, Patricia E. Linnell, D. B. Lloyd, Louis M. Louisy, J. N. Lunn, M. A. C. Lyon, B. C. McDermott, Bertha S. McGill, M. B. R. MacKenzie, D. M. MacLaren, R. E. MacLaurin, Angela de la C. Main, P. D. Marsden, P. B. Martin, Edna Matthews, Faith E. Maurice Williams, Ann P. Melville, G. B. Middle, J. Mikolajewski, F. J. C. Millard, M. Millett, W. F. Millner, R. E. Mills, P. H. Minc, B. A. E. Mndham, R. M. Moffitt, Ann H. Montford, D. A. Montgomery, G. Morgan, J. A. Morgan, K. H. Morgan, M. T. Morgan G. M. Morris, J. R. Morton, P. A. Mounfield, Janice H. Mount, G. G. Muir, B. Murphy, J. K. Murphy, Pamela M. Mylward, P. H. Nankivell, A. I. C. Napier, F. J. Nash, M. A. Nelson, A. I. E. Nichini, E. R. Nye, N. W. J. Oliver, C. M. O'Neill, Pamela D. Osborn, D. A. Packham, H. Pambakian, D. R. J. Parrott, D. L. Parry, Margaret R. Paton, J. Payan, R. S. Peachey, R. L. V. Pearce, W. S. Pease, D. E. Pegg, P. A. Pelham, Eifion Phillips, Hazel M. Phillips, T. T. Phillips, Ann P. Pickering, B. N. Pickering, G. E. Pickup, J. F. G. Pigott, P. W. Pitt, Iris C. Platt, I. H. Porter, C. J. Powell Smith, J. Price, Anna Pridal, G. Priddle, Valerie J. Prior, J. Quantrell, M. C. Rang, Shirley G. Ratcliffe, W. D. Rees, D. E. Rendle, Kathleen M. Rich, D. A. Richardson, F. J. Roberts, A. R. Robertson, R. H. Robinson, W. D. Roche, R. K. Rondel, P. O. Rosanwo, I. G. Ross, Charmian A. Russell, D. G. L. K. Russell, J. A. Russell, Mary G. Russell, R. D. Sandfield, Winifred Sanford, J. V. Sawdy, B. Scaife, Elizabeth A. Scharff, P. M. Schiller, M. P. Y. Scott, P. J. Scott, A. K. Seeram, H. T. Shacklock, M. Sharp, A. J. H. Shepherd, M. C. Sheppard, Margaret T. Shiels, M. Shillito, C. D. G. L. Shimmmin, G. R. Silver, P. J. G. Simons, E. C. Smart, D. G. Smith, G. L. Smith, Jean M. B. Smith, Marguerite E. Smith, P. G. Smith, R. B. F. Smith, Elizabeth A. Spence, D. M. Stainton-Ellis, R. E. Steel, A. S. V. Steele, M. D. B. Stephens, D. O. Stewart, P. J. Stiles, Susan Stonestreet, A. J. Sutton, G. R. Swift, A. R. Tanser, C. G. Taylor, D. J. Terry, P. H. J. Theobald, A. A. Li. Thomas, D. B. Thomas, G. D. Thomas, G. R. Thompson, G. J. Thorpe, A. C. Ticehurst, J. E. Tindle, Dileas M. Tingle, J. W. Turner, Jennifer M. Vann, W. H. C. Walker, Margaret M. Walshe, W. J. Walton, Judith C. R. Wardle, Edna M. Watson, R. R. Welsh, H. Westbury, C. T. Western, D. Whitty, A. C. Whitmore, P. C. Wilkinson, P. E. K. Will, D. O. Williams, E. J. Williams, I. A. Williams, D. J. Wilsher, D. W. Wilson, F. D. Wilson, P. E. H. Wilson, P. J. E. Wilson, Shirley J. Wilson, D. Winstock, Anne Winterton, A. J. Wood, C. D. Wooding, T. K. W. Woolcott, J. A. R. Worthy, B. C. Wyatt, P. R. Wykes, Grace O. Yolo, R. C. Young, Barbara K. Zamoyka.

¹With honours. ²Distinguished in pathology. ³Distinguished in medicine. ⁴Distinguished in applied pharmacology and therapeutics. ⁵Distinguished in surgery. ⁶Distinguished in obstetrics and gynaecology.

The following candidates at the Institute of Psychiatry have been approved at the examinations indicated:

ACADEMIC POSTGRADUATE DIPLOMA IN PSYCHOLOGICAL MEDICINE.—F. Grunberg, N. H. Rathod. The following have passed in Part I only: W. H. Allchin, C. P. B. Brook, M. D. Eilenberg, L. Goldie, O. A. F. Grant, J. M. Hinton, G. M. Jacobides, I. P. James, W. I. N. Kessel, N. B. Kreitman, H. McG. McBryde, Naomi I. Penfold, R. Rodriguez Arganaris, M. H. Sheard, H. J. Walton, S. Wolf.

The degree of M.D. was awarded by the Senate on May 16 to T. G. Paxon.

UNIVERSITY OF WALES

The following candidates were admitted to the degrees of M.B., B.Ch. at a Degree Congregation held at Cardiff on July 24:

A. V. Barford, Hannah M. Biddow, June M. Birch, D. H. Blacknall, B. K. Bondzi-Simpson, P. Coy, D. Daley, D. E. Davies, I. A. Davies, J. A. Dodge, J. R. Dove, J. G. Elias, A. G. Evans, D. H. Evans, Ruth E. Francis, D. J. Griffiths, M. F. Holding, D. S. B. James, Enid P. Jarvis, R. A. C. Jones, W. I. Jones, Sheila B. Kidd, G. S. Lodwig, W. S. B. Loosmore, R. G. Penn, G. A. D. Rees, G. E. Roberts, Marise E. Roch, Jean M. Summerell, W. G. Thomas, G. L. Williams, J. M. Williams, Margaret D. Wyatt.

UNIVERSITY OF BIRMINGHAM

Dr. John Hardwicke, Lecturer in Experimental Pathology, has been appointed Deputy Warden of the Manor House.

Professor W. Melville Arnott, Professor A. P. Thomson, Dr. A. G. W. Whitfield, and Mr. Hugh Donovan have been appointed representatives of the University on the Standing Joint Committee of the University, the United Birmingham Hospitals, and the Birmingham Regional Hospital Board for the period April 1, 1956, to March 31, 1957.

UNIVERSITY OF BRISTOL

The dissertations by A. G. M. Davies and Grace E. Woods for the degree of M.D. have been approved.

The following candidates have been approved at the examinations indicated:

FINAL M.B. Ch B.—¹Pauline F. Haswell, ¹D. H. Wright, Miriam M. Alderwick, B. O. Amure, Elizabeth M. F. Andrews, J. H. Andrews, J. C. Bailey, E. P. Beck, ²W. E. Benney, B. T. A. Clarke, Ruth E. A. Coles, H. E. Cramp, J. D. Davison, K. M. Evans, Irene E. Gibbs, P. M. Gill, C. L. G. Hale, A. F. Hickson, A. L. Horton, Rachel M. Hulbert, A. T. Lloyd, Sheila M. McClements, June M. McLeod, T. McMorley, R. W. Morris, A. N. Okoro, K. M. Parry, W. F. Perera, C. K. Protheroe, M. J. Rose, W. J. Stephen, S. J. Strong, J. P. Telling, M. J. Watson, A. H. E.

Williams, Mary B. Wilson, C. H. Wood. In Group 1 only: W. B. Whisker. In Group 11 only: J. S. A. Ashley, B. H. Bee, Edna M. Dumbell, M. J. Lewis, H. E. Millen, R. D. Neale, Hilary S. Prowse.

¹With second-class honours. ²With distinction in public health.

ROYAL COLLEGE OF SURGEONS OF ENGLAND

At a meeting of the Council of the College held on May 10, with Sir Harry Platt, President, in the chair, the death of Mr. R. P. Scott Mason (Vice-president and member of the Court of Examiners) was reported and the Council unanimously adopted a resolution of condolence.

The President was asked by the Council to convey to Mr. Gerald S. Hughes, of York, its hearty congratulations on having completed fifty years as a Fellow of the College.

Dr. Bernard Johnson (Middlesex Hospital) and Professor Mary Lucas Keene (Royal Free Hospital) were admitted to the Fellowship, having been elected as medical practitioners of twenty years' standing.

The Begley Prize was awarded to C. R. N. Ashbee, of St. Bartholomew's Hospital Medical School.

Diplomas were granted, jointly with the Royal College of Physicians of London, as follows: In Child Health, to Mary K. M. Lindsay; in Tropical Medicine and Hygiene, to D. Buchanan and A. M. Rankin; in Industrial Health, to Doreen P. Allan; in Anaesthetics, to R. P. Holmes.

At a meeting of the Council of the College held on June 14, with Sir Harry Platt, President, in the chair, the Mitchiner Medal was presented to Colonel R. E. Waterston and the Lady Cade Medal to Air Commodore C. A. Rumball.

Professor F. A. R. Stammers was appointed as representative of the College on the Court of Governors of Birmingham University, and Sir William Kelsey Fry on the General Dental Council.

The Begley Prize was presented to C. R. N. Ashbee, of St. Bartholomew's Hospital Medical School.

Diplomas of Fellowship were granted to the following successful candidates:

H. M. Parsons, P. D. G. Pugh, I. K. R. McMillan, P. N. Porritt, G. N. Lumb, P. I. Busfield, S. S. Grové, P. E. B. Holmes, Ruth M. Robinson, J. C. Gazet, A. R. Butterfield, A. M. Morkos, E. P. Abson, I. Coll, A. W. Eklund, D. Guha, J. N. Ormrod, M. N. Dutta, N. G. I. Mehta, V. A. T. Robb, D. St. C. Roberts, A. R. Dalton, Hussain, L. I. McGuire, W. W. Woodward, R. P. Chandler, G. A. Dalton, M. A. Hossain, I. D. Thompson, A. C. Bowring, R. R. Collmann, K. C. D. M. A. Lam, N. C. Little, J. A. MacDougall, G. F. Murnaghan, Gordon K. L. Lam, N. C. Little, J. A. MacDougall, G. F. Murnaghan, S. P. Parkash, J. N. Rohatgi, J. N. Tennant, M. M. Whiteley, S. Bhattacharyya, K. McD. Ewen, L. B. Fleming, J. D. Russell, R. G. D. M. McLaren, T. J. McNair, J. D. Marsh, E. A. D. Cox, W. F. P. White, J. C. Wilson, R. G. Beard, N. A. Blumberg, K. R. Ross, N. G. Gammie, A. B. Holmes, D. Howell, A. M. Jatoi, J. K. Ross, N. G. Rothnie, R. Shannon, J. P. Williams, G. Wynne-Jones, R. P. Yaxley, G. E. Allin, J. B. Borman, M. D. Cameron, M. Clardige, P. B. Clark, G. T. Costello, C. L. Greaves, J. P. Halliday, G. W. Hankins, W. Lane, Mitchell, H. Perkin, P. B. Prasad, A. Singer, J. B. Walker, G. A. Cutler, B. J. Dooley, R. F. C. Jones, W. J. Lyons, N. S. Painter, I. Penn, J. M. Saunders, R. D. Smith, J. D. Crowley, H. T. John.

A Diploma of Membership was granted to E. O. O. Arbenser (Liverpool).

ROYAL COLLEGE OF SURGEONS OF EDINBURGH

At a meeting of the College held on May 9, with Sir Walter Mercer, President, in the chair, the following candidates, having passed the requisite examinations, were admitted Fellows:

P. L. Berger, J. Bingham, A. C. Bowring, M. E. J. Brightman, I. Coll, H. Collinson, G. I. B. da Costa, G. A. Dalton, P. C. Dubey, D. B. Eaton, A. W. Eklund, C. A. Ezike, C. L. Greaves, M. B. Johnson, E. P. J. King, R. P. Leake, J. I. de B. Leembruggen, D. O. Maisels, N. K. G. Mendis, J. H. Miller, A. H. Mizrahy, H. Mohan, J. Morgan, N. R. A. Narayan, K. G. Orr, J. R. Page, H. Perkin, K. P. Prabhu, M. A. Qayyum, L. A. Sarembock, F. W. Shea, C. A. Shearer, D. M. Sinclair, D. P. Singh, R. D. Smith, B. D. Stringer, J. N. Tennant, I. C. K. Tough, R. Yule.

ROYAL COLLEGE OF PHYSICIANS OF IRELAND

At a meeting of the College held on June 1, with the President, Dr. F. J. O'Donnell, in the chair, Dr. John G. Kirker was admitted to the Fellowship, and Dr. R. A. L. Agnew, Dr. R. W. Barter, Dr. M. D. Joyce, Dr. W. H. Moffatt, and Dr. W. A. Ryan were admitted to the Membership of the College.

ROYAL AUSTRALASIAN COLLEGE OF PHYSICIANS

At a meeting of the Council of the College held in Sydney on June 15, the following candidates, who were successful at an examination by the Australian Board of Censors, were admitted to Membership of the College: Dr. W. J. Hickey and Dr. I. J. McGelvie, of Queensland; Dr. P. N. Francis, Dr. J. E. Hassall, Dr. W. B. Hennessy, Dr. J. W. Lance, Dr. P. J. Maloney, and Dr. B. J. Smith, of New South Wales; Dr. J. M. Bradley and Dr. R. E. Seal, of Victoria; Dr. M. D. Begley and Dr. H. Lander, of South Australia; and Dr. J. B. Stokes, of Western Australia.

INFECTIOUS DISEASES AND VITAL STATISTICS

Summary for British Isles for week ending July 14 (No. 28) and corresponding week 1955.

Figures of cases are for the countries shown and London administrative county. Figures of deaths and births are for the 160 great towns in England and Wales (London included). London administrative county, the 17 principal towns in Scotland, the 10 principal towns in Northern Ireland, and the 14 principal towns in Eire.

A blank space denotes disease not notifiable or no return available. The table is based on information supplied by the Registrars-General of England and Wales, Scotland, N. Ireland, and Eire, the Ministry of Health and Local Government of N. Ireland, and the Department of Health of Eire.

CASES in Countries and London	1956					1955				
	Eng. & Wales	Land.	Scot.	N. Ire.	Eire	Eng. & Wales	Land.	Scot.	N. Ire.	Eire
Diphtheria ..	5	3	3	0	2	10	0	3	0	
Dysentery ..	1,149	164	109	3		1,816	195	321	16	1
Encephalitis, acute ..	2	1		0		0	0		0	
Enteric fever: Typhoid ..	2	0	0	0		2	0	0	0	1
Paratyphoid ..	16	3	8 (B)	0		7	0	0	0	0
Food-poisoning ..	396	38		7		117	10		1	
Infective enteritis or diarrhoea under 2 years ..				12	28				12	7
Measles* ..	3,276	329	90	41	222	29,018	3685	374	583	93
Meningococcal infection ..	42	3	8	1	1	48	4	22	1	2
Ophthalmia neonatorum ..	45	2	3	0		33	4	4	0	
Pneumonia† ..	210	11	115	1		980	58	257	42	18
Poliomyelitis, acute: Paralytic ..	48	5	3	4	1	10	3	2	0	1
Non-paralytic ..	59					3				
Puerperal fever‡ ..	220	29	4	0		252	43	9	0	
Scarlet fever ..	514	35	48	12	15	839	42	88	61	19
Tuberculosis: Respiratory ..	609	56	124	17		688	71	139	25	
Non-respiratory ..	74	4	11	1		90	13	28	5	
Whooping-cough ..	2,404	132	162	40	80	1,924	154	155	51	53

DEATHS in Great Towns	1956					1955				
	Eng. & Wales	Land.	Scot.	N. Ire.	Eire	Eng. & Wales	Land.	Scot.	N. Ire.	Eire
Diphtheria	0	0	0	0	0	0	0	0	0	0
Dysentery	0	0		0		1	0		0	
Encephalitis, acute ..		1			0		0	1		0
Enteric fever	0	0	0	0		0	0	0	0	
Infective enteritis or diarrhoea under 2 years	3	1	1	0	0	3	0	2	0	1
Influenza	3	0	1	0	0	82	10	4	2	15
Measles		0	0	0	0		2	1	0	0
Meningococcal infection		1	0				1	1		
Pneumonia	137	12	16	6	8	458	78	42	24	18
Poliomyelitis, acute	0	0			0	0	1			0
Scarlet fever		0	0	0	0		0	0	0	0
Tuberculosis: Respiratory	} 38	{ 4 0	7	0	4	} 92	{ 15 2	15	0	9
Non-respiratory ..			1	1	1			1	0	0
Whooping-cough ..	1	0	1	0	1	2	0	0	0	0
Deaths 0-1 year ..	177	24	27	4	9	240	30	42	6	14
Deaths (excluding live births) ..	4,390	610	458	66	131	7,525	1122	717	156	277
LIVE BIRTHS ...	8,001	1219	864	179	421	8,167	1234	928	215	258
STILLBIRTHS ...	196	17	20			197	18	27		

Vital Statistics

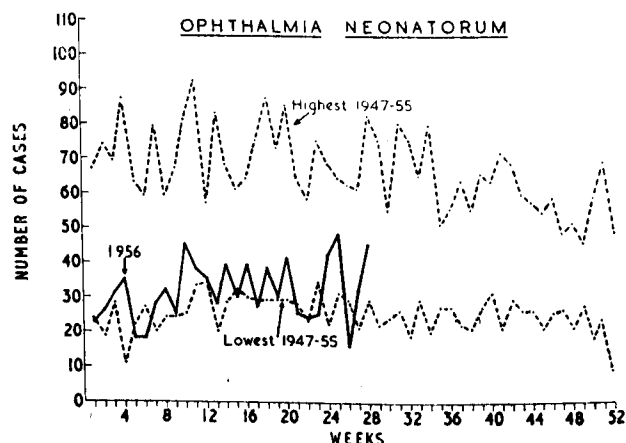
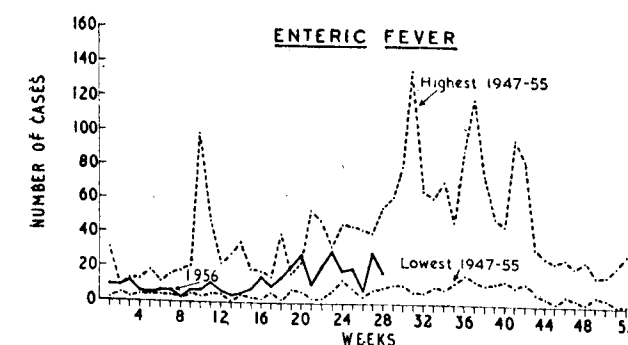
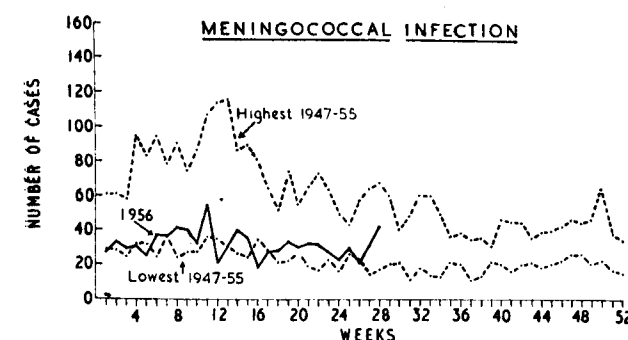
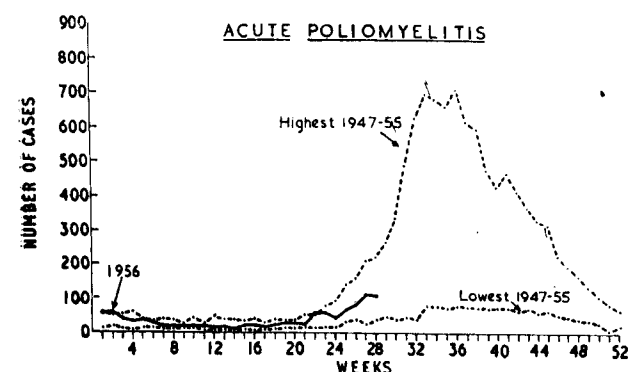
Poliomyelitis

Poliomyelitis notifications in the week ending July 21 (29th week of the year) were as follows: paralytic 70 (49), non-paralytic 72 (58), total 142 (107). This is an increase of 35 compared with the previous week, the figures for which are in parentheses.

Cases notified from the beginning of the year (with rate per 100,000 population in parentheses) are as follows for districts of relatively high incidence: Macclesfield M.B. 24 (66), Whitehaven M.B. 22 (87), Ennerdale R.D. 18 (63), Darlington C.B. 19 (23), Middleton M.B. 12 (28), Yeovil M.B. 18 (75), Yeovil R.D. 6 (25), Guildford M.B. 30 (60), Carlton U.D. 7 (19), Manchester C.B. 148 (21), Woking U.D. 12 (21), Tottenham M.B. 21 (17), Reigate M.B. 9 (19), Guildford R.D. 11 (23), Hambledon R.D. 7 (21), Hoyland Nether U.D. 3 (19).

Graphs of Infectious Diseases

The graphs below show the uncorrected numbers of cases of certain diseases notified weekly in England and Wales. Highest and lowest figures reported in each week during the nine years 1947-55 are shown thus ----, the figures for 1956 thus —. Except for the curves showing notifications in 1956, the graphs were prepared at the Department of Medical Statistics and Epidemiology, London School of Hygiene and Tropical Medicine.



Infectious Diseases

Infectious diseases were less prevalent in England and Wales during the week ending July 14. The largest declines in the numbers of notifications were 168 for scarlet fever, from 682 to 514, 153 for measles, from 3,429 to 3,276, 86 for dysentery, from 1,235 to 1,149, 84 for food-poisoning, from 480 to 396, and 49 for acute pneumonia, from 259 to 210.

The largest falls in the incidence of measles were 66 in Southampton County, from 139 to 73, and 54 in Sussex, from 172 to 118; the largest rises were 93 in Yorkshire East Riding, from 32 to 125, and 57 in Cornwall, from 67 to 124. A small decline in the incidence of scarlet fever was recorded in most regions, and there were no large local variations in trend. 2,404 cases of whooping-cough, 1 fewer than in the preceding week, were notified. The only large fluctuation in the local returns was a rise of 106 in Yorkshire East Riding, from 11 to 117. This was mainly due to an outbreak in Hull C.B., where 91 cases were notified. 5 cases of diphtheria, 2 fewer than in the preceding week, were notified.

The largest centres of dysentery were Yorkshire West Riding 259 (Leeds C.B. 53, Rotherham C.B. 37, Sheffield C.B. 32, Huddersfield C.B. 18, Dewbury C.B. 17, Adwick le Street U.D. 16, Wakefield C.B. 14), London 164 (Wandsworth 43, Lewisham 23, Woolwich 17, Greenwich 14, Hackney 10), Lancashire 137 (Liverpool C.B. 31, Blackpool C.B. 25, Lancaster M.B. 17), Warwickshire 77 (Coventry C.B. 62), Staffordshire 40 (Smethwick C.B. 26), Kent 36 (Dartford M.B. 11, Eassey R.D. 10), Middlesex 35 (Twickenham M.B. 18), Essex 34, Leicestershire 33 (Leicester C.B. 28), Lincolnshire 30 (Grimsby C.B. 22), Sussex 26, Southampton 25 (Farnborough U.D. 12), Nottinghamshire 24 (Nottingham C.B. 13), and Suffolk 22 (Ipswich C.B. 22).

Industrial Accidents and Diseases

The number of workpeople (other than seamen) in the United Kingdom whose deaths from accidents in the course of their employment were reported in June was 97, compared with 116 (revised figure) in the previous month and 104 (revised figure) in June, 1955.

The number of cases in the United Kingdom reported during June, 1956, were as follows: lead poisoning 5, anthrax 3, epitheliomatous ulceration 20, chrome ulceration 14; total 42. There were no deaths.—*Ministry of Labour Gazette*, July, 1956.

Week Ending July 21

The notifications of infectious diseases in England and Wales during the week included: scarlet fever 530, whooping-cough 2,558, diphtheria 2, measles 3,251, acute pneumonia 221, acute poliomyelitis 142, dysentery 970, paratyphoid fever 16, and typhoid fever 4.

Medical News

Polio Vaccines in the Commonwealth.—Mr. J. R. HANAN, the New Zealand Minister of Health, stated in Wellington on July 23 that they were expecting to receive enough polio vaccine from Britain early this month to vaccinate 25,000 children. Children aged 9 years are to be inoculated, according to an official bulletin. In Australia the Director-General of Health, Dr. J. A. METCALFE, inaugurated a mass immunization campaign with vaccine from the Commonwealth Serum Laboratories, Melbourne, at the end of June. The campaign started with a million doses of vaccine, said Dr. Metcalfe, and the output from the Serum Laboratories was 220,000 doses a fortnight. He predicted that in two years' time Australia would produce enough vaccine to protect everyone in Australia. The June 23 issue of the *South African Medical Journal* includes a report from Dr. J. GEAR, director of research at the Poliomyelitis Research Foundation, Johannesburg, on the inoculation of 15,000 children in South Africa with a Salk-type vaccine made at the Foundation's laboratories. Vaccination was voluntary and was restricted to children under 5 years of age, except in the case of children of doctors and nurses, where 16 was the upper age limit. No cases of paralytic poliomyelitis attributable to the vaccine were notified, and no serious untoward reactions are stated to have occurred. Dr. Gear draws no definite conclusions about the protective value of the vaccine, in view of the relatively small number of children inoculated.

British Report on Narcotics.—In 1955, according to the British Government's report to the United Nations on narcotic drugs, exports of heroin were authorized to Barbados, British Honduras, Gold Coast, Irish Republic, Kuwait, Mauritius, St. Kitts-Nevis, and Uruguay. No heroin was imported, but the drug continued to be manufactured for domestic use and for export. Discussing drug addiction, the report states that this is not a serious problem in Britain. There is very little illicit traffic in manufactured drugs of addiction, and the addict who is also a "pusher" is unknown. Of the 335 known addicts, 179 took morphine, 64 pethidine, and 54 heroin. Among the addicts were 70 doctors, 14 nurses, and 2 dentists. Only four seizures of drugs are reported, all of Indian hemp (*Cannabis sativa*): 147 g. from a Liverpool club; 120 g. from a room in the East End of London; 1,105 g. from a car returning from Liverpool; and 390 g. from a car in Liverpool.

Royal College of Physicians of London.—At the quarterly comitia on July 26, at which the president, Sir RUSSELL BRAIN, presided, Professor W. G. BARNARD and Sir HAROLD BOLDERO were re-elected, respectively, treasurer and registrar. The following were elected censors for the ensuing year: Dr. T. C. HUNT, Sir HORACE EVANS, Dr. A. M. COOKE, and Professor A. KEKWICK. Dr. DONALD HUNTER was appointed Harveian Orator for 1957, and Professor AUBREY LEWIS Bradshaw lecturer for 1957. The award of the Conway Evans Prize to Lord ADRIAN, F.R.S., for his work in the field of physiology was announced. It was also announced that the Bisset Hawkins Medal had been awarded to Dr. G. S. WILSON for his "able development and direction of the Public Health Laboratory Service," and the Gilbert Blane Medal for 1956 to Surgeon Commander J. M. HOLFORD.

Royal College of Obstetricians and Gynaecologists.—At the council meeting on July 28, at which the president, Mr. C. H. READ, presided, all the College officers were re-elected. The vice-presidents are Professor A. M. CLAYE and Mr. V. J. F. LACK; the hon. treasurer Mr. A. C. H. BELL; and the hon. secretary Mr. I. M. JACKSON. Dr. J. T. LOUW was elected hon. treasurer of the South African regional council; the other regional treasurers were re-elected.

Royal College of Physicians of Edinburgh.—A presentation was made to Mr. W. J. PILCHER at the last quarterly meeting to mark his retirement after 34 years' service as College officer. Mr. PILCHER was given an inscribed wrist-watch and a cheque from the Fellows of the College in appreciation of his long and faithful service.

London University.—Professor W. G. BARNARD, treasurer of the Royal College of Physicians of London, has been elected Dean of the Faculty of Medicine in the University of London. He replaces Dr. C. F. HARRIS, and will hold office for two years commencing on October 1. The following have been granted full recognition as teachers: Dr. C. H. LACK (bacteriology, Institute of Orthopaedics), Dr. S. A. MASON (anaesthetics, King's College Hospital), Dr. S. NEVIN (medicine, King's College Hospital), Professor G. PERKINS (orthopaedics, St. Thomas's Hospital), Dr. J. P. QUILLIAM (pharmacology, St. Bartholomew's Hospital), and Dr. G. SIMON (diagnostic radiology, St. Bartholomew's Hospital). Dr. R. G. BIRD (London Hospital Medical College) has been awarded the first Williams Fellowship for medical and scientific research. He is working on *Entamoeba histolytica* at the London School of Hygiene and Tropical Medicine.

Gerontology at Leeds.—The department of medicine at Leeds University has been granted £6,000 a year for two years by the Nuffield Foundation to support the gerontological research unit under Professor R. E. TUNBRIDGE.

Royal Masonic Hospital.—The EARL OF SCARBROUGH, Grand Master of the United Grand Lodge of Masons of England, laid the foundation stone, on July 24, of an 80-bed extension to the Royal Masonic Hospital at Ravenscourt Park, London. The extension will also provide accommodation for a pathology department, consulting-rooms for out-patients, and the nurse-training school. The funds for the new building, estimated to cost more than £700,000, are being raised by an appeal among English Freemasons. The new beds are hoped to be in use in two years' time. At present the hospital has 200 beds.

Ciba Foundation Awards for Research on Ageing.—Seventy-five papers from 17 countries were submitted for the 1956 awards. The following awards were made by the adjudicating panel (Professors C. H. Best, E. Braun-Menendez, A. Hadow, R. Nicolaysen, F. Verzar, F. G. Young, E. J. Conway, and V. R. Khanolkar, and Drs. G. W. Corner and A. S. Parkes): Dr. MADELINE KEECH and Dr. R. REED (Leeds University), jointly, £400; Dr. B. BRONTE-STEWART (Capetown University), £300; Mr. R. L. GREGORY (Cambridge University), £300; and Dr. J. CONWAY (Charing Cross Hospital, London), £200. Five other competitors received awards of £100 each. There will be a similar competition next year, for which the closing date is January 31, 1957. Full details from the Ciba Foundation, 41, Portland Place, London, W.1.

Department of Health for Scotland.—Changes, dating from August 1, are announced in the under-secretaries responsible, respectively, for health services and for town and country planning in Scotland. Mr. N. W. GRAHAM has been appointed under-secretary with responsibility for health services. Mr. T. D. HADDOW, who formerly held this position, transfers to town and country planning on the retirement of Mr. G. H. KIMPTON after 43 years' service with the Department and its predecessors.

"Doctor in the House."—The Victoria Palace Theatre (twice nightly), itself the scene of many an unrehearsed incident in the lighter side of medical student life, was the venue on July 30 of the stage version (by Mr. Ted Willis) of RICHARD GORDON's novel *Doctor in the House*. A hardworking cast, excellently led by Alan White as Tony Grimsdyke, served up the mixture as before with a flavour that has already proved very much to the public taste and will doubtless continue so to be. Mr. Douglas Ives's Bromley, the hospital porter, was straight from any London teaching hospital one could think of—quite perfect.

NEW ISSUES

American Physicians to Visit U.S.S.R.—A party of American physicians, which will include Dr. P. D. WHITE (Boston), Professor H. RUSK (New York), Professor ANCEL KEYS (Minnesota), Dr. J. WATT (National Heart Institute), and Dr. M. FIELD (Boston), are going to Moscow for a short visit in September, according to *The Times*, to discuss medical rehabilitation and epidemiological research in cardiovascular disease. It is understood that the visit has been arranged at the invitation of the Soviet Ministry of Health.

"International Abstracts of Biological Sciences."—The council of Biological and Medical Abstracts Ltd. has decided to change the title of their journal *British Abstracts of Medical Sciences* to *International Abstracts of Biological Sciences*. This is because the range of biological research subjects covered by the journal is being increased. The wider coverage will include translations of Russian papers abstracted in the *Referativny Zhurnal Biologii* and *Referativny Zhurnal Biologicheskoi Khimii*, an arrangement made possible by the help of the Institute of Scientific Information of the U.S.S.R. Academy of Sciences and beginning next January. Among the societies represented on the council of Biological and Medical Abstracts Ltd. are the Biochemical Society, Association of Clinical Pathologists, Society for Endocrinology, Society for Experimental Biology, Nutrition Society, Pharmacological Society, and Physiological Society. The publishers are the Pergamon Press, of 4 and 5, Fitzroy Square, London, W.1, and 122, East 55th Street, New York, 22.

B.O.A.C. Medical Services.—Sir HAROLD WHITTINGHAM has retired from the post of director of medical services, and two appointments are being made in his place: Dr. K. G. BERGIN becomes medical superintendent, air services, and Dr. A. S. R. PEFFERS, superintendent, U.K. medical services. Sir Harold Whittingham will continue to serve B.O.A.C. on a part-time basis as consultant medical adviser. Dr. Bergin was recently elected vice-president of the Aero Medical Association for 1956-7. This is an organization of about 2,000 doctors, with headquarters in America, for the study of medical and research problems associated with flying.

Sir John Stopford, F.R.S. is to be invited to become an honorary freeman of Manchester by the City Council.

Professor A. M. Claye, professor of obstetrics and gynaecology at Leeds and vice-president of the Royal College of Obstetricians and Gynaecologists, left England last month as a Sims-Black travelling professor to Australia and New Zealand. On his return journey he will lecture, on behalf of the British Council, at Singapore, Colombo, and Karachi. He will be away for about five months.

COMING EVENTS

Sixth International Congress of Otolaryngology.—Washington, D.C., May 5-10, 1957. Details from the general secretary, 700, North Michigan Avenue, Chicago, 11, Illinois. The last date for submitting titles of papers and films for presentation is October 1, 1956.

Glasgow Conference on Cardiology.—Details of a post-graduate conference on medical and surgical cardiology, to be held at Glasgow, October 1-5, are given in our advertisement columns (p. 35).

Royal Institute of Public Health.—Dr. P. M. F. BISHOP has been appointed Bengué Memorial Award lecturer for 1956. He will speak on October 17 at 3 p.m. at the Institute, 28, Portland Place, London, W.1, on "The Problem of Obesity."

Italian Congress on Nuclear Medicine.—Pisa, September 30. Details from Centro di Medicina Nucleare, Clinica Medica, Pisa, Italy. The congress is sponsored by the national committee for nuclear research.

Fourteenth International Tuberculosis Conference.—New Delhi, January 5-11, 1957. Details from the conference secretariat, 22, Red Cross Road, New Delhi, India.

Annals of the Rheumatic Diseases.—The new issue (Vol. 15, No. 2) is now available. The contents include:

MEASUREMENT OF BONE DENSITY. Donald Mainland.
ANKYLOSING SPONDYLITIS. D. O'Connell.
ACQUIRED RESISTANCE TO CORTICOSTEROIDS. H. F. West.
PILOT STUDY OF INTRA-ARTICULAR PROCAINE AND HYDROCORTISONE ACETATE IN RHEUMATOID ARTHRITIS. G. R. Fearnley, Rita Lackner, R. I. Meanock, and E. G. L. Bywaters.
UVEITIS AND RHEUMATIC DISEASES. A. Stanworth and J. Sharp.
HAEMODILUTION IN RHEUMATOID DISEASE. M. R. Jeffrey.
DECLINE OF ACUTE RHEUMATISM. R. A. N. Hitchens.
COMPARISON OF CORTISONE ACETATE AND A CODEINE MIXTURE AS ADJUVANT TREATMENT IN JUDETH ARTHROPLASTY. G. P. Arden.
PERICARDITIS COMPLICATING RHEUMATOID ARTHRITIS. A. E. Thomas and W. K. C. Morgan.

Issued quarterly; annual subscription £2 2s.; single copy 12s. 6d.; obtainable from the Publishing Manager, B.M.A. House, Tavistock Square, London, W.C.1.

British Journal of Industrial Medicine.—The new issue (Vol. 13, No. 3) is now available. The contents include:

SIXTY YEARS OF INDUSTRIAL MEDICINE IN GREAT BRITAIN. Andrew Meiklejohn.
OCCUPATIONAL MEDICINE AS A VOCATION. James A. Smiley.
THE RELATIONSHIP BETWEEN VENTILATORY CAPACITY AND SIMPLE PNEUMONIOSIS IN COALWORKERS. R. G. Carpenter, A. L. Cochran, J. C. Gilson, and I. T. T. Higgins.
FACTORS INFLUENCING THE RADIOLOGICAL PROGRESSION RATE OF PROGRESSIVE MASSIVE FIBROSIS. A. L. Cochran and R. G. Carpenter, with the assistance of W. G. Clarke, G. Jonathan, and F. Moore.
PNEUMONIOSIS IN CENTRAL INDIAN COALMINES. K. B. Roy.
A STUDY OF DUST TOXICITY USING A QUANTITATIVE TISSUE CULTURE TECHNIQUE. J. Marks, M. Ann Mason, and G. Nagelschmidt.
A QUANTITATIVE TECHNIQUE FOR STUDYING THE EFFECT OF DUST ON PHAGOCYTIC CELLS IN VITRO. J. Marks and M. Ann Mason.
THE USE OF A SIZE SELECTOR FOR DUST SAMPLING WITH THE THERMAL PRECIPITATOR. J. T. Burdick and J. G. Dawes.
THE USE OF THE PULHEIMS SYSTEM OF MEDICAL CLASSIFICATION IN CIVILIAN PRACTICE. M. D. Warren.
DETERMINATION OF ATMOSPHERIC BENZENE CONCENTRATION BY DISPLACEMENT FOLLOWING ADSORPTION ON SILICA GEL. Per Ovtum.
TWO CASES OF POISONING WITH DI-ISOPROPYLFLUOROPHOSPHONATE (D.F.P.). W. K. S. Moore.
ARSINE POISONING. D. Blair Macaulay and D. Austen Stanley.
ASSOCIATION OF INDUSTRIAL MEDICAL OFFICERS: PROGRAMME OF 21ST ANNUAL MEETING.
MISCELLANEA:
THE PRESCRIPTION OF INDUSTRIAL DISEASE. Ronald E. Lane.

Issued quarterly; annual subscription £2 2s.; single copy 12s. 6d.; obtainable from the Publishing Manager, B.M.A. House, Tavistock Square, London, W.C.1.

SOCIETIES AND LECTURES

A fee is charged or a ticket is required for attending lectures marked ●. Application should be made first to the institution concerned.

Tuesday, August 7

INSTITUTE OF PSYCHIATRY.—12 noon, Dr. M. S. Guttmacher (Baltimore): Problems of Legal Psychiatry in America.

Wednesday, August 8

POSTGRADUATE MEDICAL SCHOOL, London, W.—2 p.m., Dr. Randolph K. Byers (Children's Medical Centre, Boston, Mass.): Neurological case demonstration.

Thursday, August 9

INSTITUTE OF PSYCHIATRY.—12 noon, Professor C. C. Pfeiffer (Georgia): Muscarinic Stimulation of the Brain Inhibits the Conditioned Response and Counteracts Schizophrenia.

APPOINTMENTS

EAST ANGLIAN REGIONAL HOSPITAL BOARD.—Elizabeth L. Brown, M.B., Ch.B., Senior Registrar in Chest Medicine, Norwich and East Norfolk areas; G. A. Wall, M.B., Ch.B., F.R.C.S., Registrar in Plastic Surgery, Regional Plastic Surgery and Burns Unit, West Norwich Hospital; A. W. Robertson, M.B., B.S., F.F.A.R.C.S., F.F.A.R.A.C.S., Consultant Anaesthetist, South-west General Hospitals Group; P. A. L. Horsfall, M.B., Ch.B., M.R.C.P., Medical Registrar, North Cambridgeshire and Clarkson Hospitals; P. A. Harbison, M.B., B.S., Surgical Registrar, Ipswich and East Suffolk Hospital; I. P. Crowley, M.B., Ch.B., Surgical Registrar, North Cambridgeshire Hospital; B. J. Poole, M.B., B.S., Registrar in Geriatrics, Norfolk and Norwich Group of Hospitals.

BIRTHS, MARRIAGES, AND DEATHS

DEATHS

Costello.—On July 14, 1956, at the Regional Hospital, Galway, Thomas Bodkin Costello, M.D., D.P.H., of Bishop Street, Tuam, Co. Galway.
Dick.—On July 14, 1956, at Oxford, James Orford Wallace Dick, M.B., B.Chir., of Ladygrove House, Abingdon, Berks.
Duguid.—On July 11, 1956, at 4, Hermitage Gardens, Edinburgh, Alfred Duguid, M.B., Ch.B., of 19, Styevehall Croft, Coventry.
Kennedy.—On July 8, 1956, at Dunbar Hospital, Thurso, John Robert Kennedy, M.V.O., M.B., C.M., of 6, Couper Street, Thurso, late of Dunbeath, Caithness, aged 85.
McCutcheon.—On July 6, 1956, at R.N. Hospital, Haslar, Hants, James McCutcheon, M.B., B.Ch., Surgeon Rear-Admiral, ret., aged 79.
Rushworth.—On July 5, 1956, at Wrightington Hospital, near Wigan, Lancs, Cyril Davenport Rushworth, M.R.C.S., L.R.C.P., of Finch Lane, Appley Bridge, near Wigan, aged 37.

Any Questions?

We publish below a selection of those questions and answers which seem of general interest. It is regretted that it is not possible to supply answers to all questions submitted.

Palliative Hormone Therapy in Breast Cancer

Q.—Is it worth advising palliative hormone therapy for a case of advanced cancer of the breast, with secondary deposits, which has already been treated by surgery and radiotherapy? If so, what regime is advised for use in general practice?

A.—In every case of advanced cancer of the breast where surgery and radiotherapy have been tried and have failed, or where, because of the advanced nature of the condition, neither is applicable, hormone therapy should always be given a trial. This method of treatment is effective for a short time in about half of the patients and is occasionally quite miraculous in the benefits which it confers. Patients quite well past the menopause should be given 50 mg. of stilbestrol by mouth daily, and younger patients should be given injections of testosterone propionate—100 mg. three times a week intramuscularly. For further details of the management of such cases the inquirer is referred to an article in the Refresher Course series for general practitioners.¹

REFERENCE

¹ Atkins, H. J. B., *British Medical Journal*, 1953, 1, 1099.

Learning During Sleep

Q.—Claims are made that by the use of a microphone under the pillow relaying teaching material during sleep the learning of languages or long parts from plays can be facilitated, and that attitudes to life can be influenced. To what extent are these claims true?

A.—Despite the claims of a number of experimenters and commercial concerns, there is little or no conclusive evidence that learning can take place or be helped by repetition during sleep. A recent review¹ of ten American studies states that all had weaknesses either in experimental design, statistical treatment, methodology, or criteria of sleep. One statistical attempt to teach morse code to Navy men while they slept was stopped when it was found that "ambitious Navy instructors of the control group had been giving extra day-instruction in order not to be out-taught." Not all time instruction in order not to be out-taught; but other errors the work had been so naively interrupted; but other errors generally crept in. For example, attempts were made to break nail-biting in boy campers by playing the phrase "My fingernails taste terribly bitter" through a loudspeaker 300 times a night for 54 nights. Forty per cent. of the experimental group and none of the control group (20 in each group) stopped biting their nails, which seemed a clear indication of the value of such verbal suggestion during sleep. A number of other kinds of learning material have been used, such as nonsense syllables, ordinary speech in retarded and aphasic children, and English-Chinese vocabularies. None of the studies stands up conclusively on examination. Some of them report "uncertain and improbable" learning during sleep; others, as in the case of the nail-biting, seem at first sight to point to unequivocal learning. The serious difficulty has been in establishing whether or not the subject was asleep. For instance, in the nail-biting experiment the boys were asked, before the experiment started, whether they were awake, and the input was turned off if the boys seemed restless. These are, of course, completely inadequate tests of sleep. (This experiment seems also to have been vitiated by the fact that control and experimental groups were unmatched for age, which is known to be related to nail-biting.) It is common experience that one may wake up and perform some quite

complex action, and forget about it in the morning. Obviously the best criterion at present available is given by the electroencephalogram. It has been used recently in a well-planned study,² the general conclusion of which was that learning during real sleep is impractical and probably impossible. It is conceivable that during the drowsy state between sleep and waking learning may occur, but nothing is known at present about the possible harm that may be done by keeping a subject half awake in this way, nor about the relative efficiency of such learning if it does occur. Matter learned just before sleep seems to be better remembered on waking, probably because there is relatively little to "drive out" the memory. This may have given rise to the idea that learning may take place during sleep itself. At any rate, "for the present sleep-learning is not the simple matter that some experimenters and commercial firms, which sell equipment for this purpose, would lead us to believe."

REFERENCES

¹ Simon, C. W., and Emmons, W. H., *Psychol. Bull.*, 1955, 52, 328.
² J. *exp. Psychol.*, 1956, 51, 89.

British Influenza Vaccines

Q.—What is the present position with regard to influenza vaccines in Britain? How effective are they and for how long does the immunity they confer persist? Are there any special contraindications to their use? Where may they be obtained?

A.—The present position concerning influenza virus vaccines is that field trials are being carried out in Britain under the auspices of a committee of the Medical Research Council. These trials are designed to assess both the serological effect and the protective action of various vaccine preparations against influenza. Until the results of the present trials are announced, all that can be said is that somewhat less favourable results have been obtained in Britain compared with those reported in the American literature. Nevertheless, a significant protection was found in the trial of 1952-3, but this was insufficient to warrant a recommendation for use of the vaccine on anything but an experimental basis.¹ The duration of the immunity conferred by existing vaccines is unknown, but is thought not to be better than twelve months unless vaccines containing oil adjuvants are used.

Influenza vaccine, prepared at the Wright-Fleming Institute of Microbiology, St. Mary's Hospital, Paddington, is distributed by Messrs. Parke, Davis & Co., and is obtainable through retail chemists. The only known contraindication is the presence of sensitivity to egg protein.

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¹ *British Medical Journal*, 1953, 2, 1173.
² *Ibid.*, 1955, 2, 1229, 1232.

Vaccination and Atopic Eczema

Q.—Is it safe to vaccinate infants or children who have (a) active atopic eczema, (b) a few residual lesions of atopic eczema, or (c) only a history of atopic eczema in the past? What special precautions are advised to reduce the risks of generalized spread or an allergic response?

A.—The vaccination of infants or children with active atopic eczema, or even residual lesions of this condition, is not advised because of the risk of eczema vaccinatum. Even if there is only a history of atopic eczema, in either the patient or his parents, vaccination in infancy might well be deferred because the introduction of a dermatopathic virus producing damage to the epidermis has been so often followed by acute eczema that the provocative effect of vaccination can scarcely be doubted.

If a child is travelling to a country where smallpox is common it would probably be the lesser evil to take the risk of vaccination. If vaccination is performed on atopic infants or children, the skin should be cleansed with great care and the site of vaccination should be kept totally protected by a porous-plaster dressing, and at night a loose cardboard cylinder might be placed on the other arm to

prevent scratching. An antihistamine, such as elixir of diphenhydramine, 60 min. (3.5 ml.), given three times a day after food, would diminish the chance of an allergic reaction, and with eczematous infants it might be wise to give at the same time an injection of gamma globulin, 500 mg., at 3 months of age, increasing to 1 g. in older children.

Delayed Microscopy in Breast Tumours

Q.—Where immediate histological examination is impracticable, as in certain tropical areas, is local diathermy excision of a possibly malignant lump in the breast, for later microscopy, unjustifiably risky? Radical treatment, in the cases proved to be malignant, would be undertaken within a week or two of the local excision. The only alternative would be to send all doubtful cases to a well-equipped hospital a long distance off for investigation and treatment.

A.—There is no objection whatsoever to excision of a possibly malignant lump in the breast for histological examination, with a view to radical treatment a week or two later. In actual practice, however, the occasions when the surgeon would be in doubt about the diagnosis after macroscopic examination of the excised lump would be very rare, so the only cases in which radical treatment would be delayed for a week or two would be the very early growths which were unrecognizable macroscopically.

Toxicity of Ingested Detergents

Q.—Does the common practice of not rinsing glasses and cups after washing with detergents constitute any danger?

A.—Over the past ten years the experimental results of feeding some of these detergents to animals have been published. Even at levels as high as 1% in the whole diet, toxic effects have not been observed. Other experiments have shown that when added to feeding-stuffs detergents, like antibiotics, may actually improve the growth of certain domestic animals. There is thus no evidence to support a belief that the small quantities of detergents that may be consumed in food or drink put into unrinsed vessels would be harmful. The results of an investigation by a committee of the Medical Research Council into any possible carcinogenic action of detergents are not yet available.

Life Expectancy in Britain

Q.—What is the present life expectancy in Britain at birth, at one month, and at one year of age?

A.—The latest official figures of expectation of life are those published in the Registrar-General's *Quarterly Return* No. 427 (Appendix B) and relate to England and Wales only. They are based on deaths registered in 1954. For males, the expectation of life at birth is given as 67.58 years, and at age 1 year 68.58 years. For females the expectation of life at birth is given as 73.05 years, and at age 1 year 73.69 years. No official estimates are given of expectation of life at one month. For the purpose of answering this question, however, a calculation based on published mortality data for England and Wales in 1954 suggests that the expectation of life at 4 weeks would be about 68.9 years for males and about 74.1 years for females.

Significance of Epimenorrhagia

Q.—What is the likely significance of a reduction in the usual length of the menstrual cycle coupled with some increase in the duration of the flow in a woman of 37?

A.—Epimenorrhagia is more often due to a local cause in the genital tract than to a general condition. Yet the patient may present complaining not of the menstrual disturbance but of the symptoms of resultant anaemia, such as weakness, breathlessness, and insomnia. After excluding a psychogenic factor, for which diligent inquiry must be made, the most likely extragenital cause is probably hypothyroidism. Among the local lesions, pelvic infections (including tuberculosis) and endometriosis are the most likely, especially if there is associated dysmenorrhoea. In pelvic infection the latter is typically premenstrual and more of

a heaviness and dragging feeling, whereas the more acute pain of endometriosis is usually intramenstrual, although it may persist from a few days before to a few days after the period. In both of these conditions one would expect positive physical signs on bimanual examination, notably a restricted mobility of the genital organs and palpable enlargement of the appendages. Fibroids may affect the amount and duration of flow, but if there is also increased frequency of menstruation in the presence of palpable fibroids there is probably some coexistent disease of the appendages.

In the absence of pain and physical signs of local disease, functional epimenorrhagia may be presumed. It most commonly occurs when menstruation is resumed after the end of a pregnancy. In this, as in all functional menstrual disorders, there is a tendency to spontaneous cure in 6 to 12 months.

Obstruction of the Nasolacrimal Duct

Q.—What are the likely causes of obstruction of one nasolacrimal duct in a middle-aged patient who has never had an inflammatory affection of the eye? Dilatation and syringing through the punctum have not relieved the epiphora. What is the best treatment?

A.—The calibre of the nasolacrimal duct varies among different patients, and there is a tendency for the channel to become narrower in middle and later life. In the absence of ocular inflammation the most likely aggravating factor is chronic infection of the nose, because the nasal mucous membrane is continuous with that which lines the nasolacrimal duct. Dilatation and syringing through either lacrimal punctum hardly ever relieves this form of epiphora. Dacryocystorhinostomy offers the best chance of relief, but it should be reserved for cases which suffer from fairly severe epiphora.

Corrections.—In our report of the Section of Orthopaedics at the annual meeting (July 21, p. 167), Mr. W. H. Gervis was wrongly quoted as stating, in his contribution on foot form, function, and footwear in the young, "the arch of the foot in the condition known as flat foot did not collapse but merely rocked over to the medial side." What he said was: "the foot rocked over." In normal standing the lateral border of the foot is weight-bearing, therefore the foot does not resemble an arch. Mr. Gervis demonstrated that the footprint in the first stage of flat foot is that of heel and metatarsal heads only. Therefore only in the first stage of flat foot does the foot resemble an arch-like structure, supported at each end of its span and not in the middle.

In our issue of July 21 (p. 156) the name of a proprietary tablet containing aluminium glycinate was wrongly spelt. The name of the product is "prodexin," not "rodexin" as was stated.

In the report on "Carotid Sinus Syncope" (*Journal*, July 28, p. 228) in the ninth line of the paragraph "waking up" should have read "warning."

In reporting the proceedings of the International Congress of Gastroenterology (*Journal*, July 28, p. 236), it was stated that: "Dr. Trounce and his colleagues were unable to demonstrate, by pharmacological or histological means, any notable loss of ganglion cells such as might explain the abnormal movements in achalasia of the cardia..." Dr. J. R. Trounce and his colleagues write: "Such was not the case. Our paper referred particularly to the lowest segment of the oesophagus, and it was in longitudinal muscle strips from this area alone that we did not observe any outstanding loss of ganglion cells or activity in the majority."

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BRITISH MEDICAL JOURNAL

LONDON SATURDAY AUGUST 11 1956

PROBLEMS OF SALMONELLA FOOD-POISONING

BY

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Tables I, II, and III are compiled from the annual reports on food-poisoning contained in the *Monthly Bulletin of the Ministry of Health and the Public Health Laboratory Service*. Large as are the figures, they undoubtedly are not a complete record of all cases of food-poisoning. Three important facts stand out from these tables: (1) the steady increase in the number of recorded cases of food-poisoning; (2) the overwhelming proportion of cases which are ascertained to be due to salmonellae; and (3) the very high proportion of "sporadic" cases. It is obvious that the most important problem in food-poisoning is salmonella outbreaks, and their elimination, or at least material reduction, would reduce food-poisoning to manageable limits. For this reason this paper is limited to this group.

TABLE I.—Food-poisoning Outbreaks

Type	1949	1950	1951	1952	1953	1954
Outbreaks	410	539	343	372	492	506
Family outbreaks	265	453	287	340	422	630
Sporadic cases	1,753	2,987	2,717	2,807	4,363	4,880
Total incidents	2,428	3,979	3,347	3,519	5,277	6,016

Note.—All cases, single or multiple, are called incidents, and these are classified into three groups: "Outbreak," two or more related cases in persons in different families; "Family outbreak," two or more related cases in members of the same family; and "Sporadic case," a case which was not, so far as could be ascertained, related to other cases.

TABLE II.—Total Incidents

Causation	1949	1950	1951	1952	1953	1954
Salmonellae	1,369	2,021	1,668	2,098	3,114	3,508
Staphylococci	97	82	65	82	132	127
Cl. welchii	—	24	20	20	25	48
Other organisms	88	43	5	17	6	9
Chemical	3	2	2	1	0	2
Not discovered	874	1,807	1,587	1,301	2,000	2,322

TABLE III.—Incidents with Causation Determined

	1949	1950	1951	1952	1953	1954
Outbreaks and family outbreaks:						
No. of salmonella origin	307	467	301	242	532	647
Percentage of "	64.5	77.1	73.4	69.8	81.9	81.5
Sporadic cases:						
No. of salmonella origin	1,062	1,554	1,367	1,766	2,582	2,861
Percentage of "	98.5	98.5	99.5	99.2	98.2	98.3

Figures for earlier years are given in the *Monthly Bulletin* for June, 1950. The number of incidents reported from 1941 to 1948 are: 1941, 119; 1942, 73; 1943, 244; 1944, 291; 1945, 433; 1946, 685; 1947, 846; and 1948, 804. For these eight years the total was 3,495 incidents, and 3,193 of these were due to salmonellae (91.4%). The total for the whole eight years is conspicuously less than for a single year to-day.

Still further back, during the period 1921–4, by arrangement with the Ministry of Health and the Medical Research Council, local health authorities throughout the country were offered free examination and investigation in my laboratory for all food-poisoning outbreaks. Although the number so investigated was large, it was quite small compared with the number of present-day outbreaks. The enormous increase is striking. On the other hand, three factors have influenced the recognition of outbreaks which in earlier years might not have come to light. One is the compulsory notification of food-poisoning which undoubtedly has supplied information of more outbreaks. Secondly, the extensive laboratory facilities now available all over the country have greatly increased the utility of notification and of scientific investigation. Thirdly, these laboratory facilities have also encouraged medical officers of health to take more interest in food-poisoning. These factors have played an important part, but I do not think they have been responsible for any large share in closing the enormous gap between, say, 20 years ago and to-day.

The most striking features of Table I are the enormous number of "sporadic" cases and their regular increase year by year. The laboratory returns give very little information on these incidents. Steps have been initiated asking for samples of faeces from the home contacts, but I am informed that the results are not very encouraging. It is unrealistic to suggest that these are isolated cases without any connexion with other cases, and this is borne out by the only serious effort I have come across to investigate them.

Dr. G. T. Cook, formerly of the Public Health Laboratory Service, at Oxford, now at Guildford, carried out some investigations on sporadic salmonella cases and is kind enough to allow me to quote his findings.

He visited 27 sporadic cases, 22 due to *Salmonella typhi-murium*, and made detailed inquiries into possible sources of infection. Faecal specimens from contacts and, when indicated, samples of food were examined bacteriologically. In two of the seven men affected the attacks were associated with the consumption of duck eggs the day before onset. Another was linked with previously unsuspected gastro-enteritis in his daughter two days before, who was found to be excreting *Salm. typhi-murium*. Two further cases, apparently unrelated, were probably infected from sandwiches shared at work and prepared by the mother-in-law of one of the patients, a symptomless excretor of *Salm. typhi-murium*. The six women included three infected with *Salm. typhi-murium* who shortly before the attack had tasted, while

cooking, a "mix" containing raw duck eggs, which may have been the source of infection. Nine out of 19 family contacts of these six women were found to be excreting *Salm. typhi-murium*, though none had had symptoms. Among eight cases of children under 5, no evidence of source was obtainable, though two households had positive family contacts. In another group of six older children, one had been associated with duck eggs and another had probably been infected by his mother, a symptomless excreter of salmonellae who had recently returned home from nursing a relative with gastro-enteritis.

In all, the households of 40 sporadic cases were investigated, and in 23 of these one or more positive salmonella contacts were found. Of the 105 home contacts examined, 36 were positive for salmonellae, though only 6 of these had symptoms of food-poisoning.

In view of the fact that these were one-man investigations by a bacteriologist without the full resources of a health department, and that it was usually possible to collect only a single sample from each person, the findings suggest how well worth while really detailed investigations would be, both in the homes and into possible outside sources of infection.

A feature brought out in Table II is the large proportion of incidents for which the cause was not ascertained. Remedies for this unsatisfactory feature are discussed below.

The Salmonella Group

When I started working on this group around 1905 only three distinct serotypes (excluding *Salm. typhi*) were recognized. More were separated over the next few years, and slowly at first and then more rapidly the number has increased to just over 300 different serotypes. The group is united by cultural and chemical characteristics with some variations with special selected agents, but the main distinctions are founded upon antigenic differences. Still further improvements of classification are being obtained by bacteriophage typing. The types most commonly met with in food-poisoning cases in this country are shown in Table IV. The two striking features are the outstanding prevalence

TABLE IV.—Main Salmonella Types Isolated from Food-poisoning Incidents

Salmonella Strains	1949	1950	1951	1952	1953	1954	6-year Total
Endogenous:							
<i>Typhi-murium</i>	1,053	1,593	1,236	1,604	2,438	3,038	10,962
<i>Enteritidis</i> (including subtypes)	51	91	99	145	126	70	582
<i>Thompson</i>	82	67	97	90	84	83	503
<i>Newport</i>	53	77	71	40	50	35	324
<i>Dublin</i>	24	40	23	17	20	15	139
<i>Cholerae-suis</i>	2	2	3	6	12	11	36
<i>Bovis-morbificans</i>	13	23	14	6	81	26	163
<i>Derby</i>	1	7	5	6	11	10	40
<i>Stanley</i>	0	1	4	19	4	3	31
Exogenous:							
<i>Anatum</i>	8	20	11	10	30	20	99
<i>Montevideo</i>	9	18	23	12	18	13	93
<i>Oranienburg</i>	9	11	6	10	29	6	71
<i>Boreilly</i>	1	14	5	15	25	3	63
<i>Minnesota</i>	4	5	5	13	17	11	50
<i>Give</i>	0	2	10	17	8	2	40
<i>Tennessee</i>	2	13	16	5	15	8	59

Endogenous types—those always common in England and Wales.
Exogenous types—mainly isolated only after 1940.

of *Salm. typhi-murium*, constituting 83% of all the strains isolated, and the complete absence of *Salm. paratyphi B* as a cause of acute food-poisoning. Both features are also shown by the reports for earlier years.

None of the group is a natural saprophytic inhabitant of the intestines of men or animals. I wrote in 1920 (Savage,

1920): "These bacilli are not natural inhabitants of the animals used for food and not found more frequently than can be accounted for on the supposition that their presence is due to an actual case of disease or the carrier state after infection." (This was by no means accepted by all in 1920.) They are found causing disease in a very wide variety of animals and with some evidence of host selection. The literature on their distribution is so extensive that only a broad sketch of their animal distribution can be attempted.

Animal Sources

Birds.—Poultry seem to be the commonest reservoir of salmonellae. Ducks are especially significant in relation to food-poisoning because salmonella infections may be widespread on duck farms and the organisms can invade the blood stream and oviduct, with infection of the individual egg, while from dirty infected egg-shells the organism may penetrate the interior of the egg. Smith and Buxton (1951) examined faeces from 500 ducks and found 1.2% positive. Salmonella infections in fowls are even more common, but are much less a source of human food-poisoning, because the two commonest strains *Salm. pullorum* (cause of chick diarrhoea) and *Salm. gallinarum* (cause of fowl typhoid) are practically non-pathogenic to man. A whole range of other salmonellae have also been isolated from eggs, particularly in the U.S.A. *Salm. typhi-murium*, *Salm. thompson*, and *Salm. enteritidis* are important strains isolated from hens or their eggs. Turkeys also suffer from salmonella infections and have been a cause of food-poisoning. Many other birds, such as pigeons, geese, and pheasants, may be infected.

Pigs.—Pigs seem to have a considerable liability to salmonella infections. Scott (1940), in Great Britain, examined batches of mesenteric glands and spleens from apparently normal pigs, and in one factory found salmonellae in 23 of 500 pigs and in 18 out of 500 pigs of another factory. While nine different strains were isolated, the commonest were *Salm. cholerae-suis* (10), *Salm. typhi-murium* (9), and *Salm. thompson* (7). In a more recent investigation in Great Britain (M.R.C., 1947) salmonellae were present in 133 of 1,058 batches of lymph nodes representing 5,285 pigs (2.5%). Smith and Buxton (1951) isolated salmonellae from faeces from 4 out of 600 apparently healthy pigs.

Cattle.—Although probably less common as a reservoir than pigs and birds, cattle are important and illustrate some interesting points. *Salm. dublin* is the main type found, but *Salm. typhi-murium* also occurs, especially in older cattle. Full surveys have not been made, but our present information suggests large pockets of infection in areas geographically far apart. One pocket is in Mid- and West Wales, where Field (1948) has carried out extensive studies. Salmonellosis was diagnosed on 70 farms during 1946–7, in every instance due to *Salm. dublin*, except on one farm with *Salm. typhi-murium*. The cattle mortality rate was about 70%. Another pocket seems to extend over parts of Ireland. Ritchie and Clayton (1951), investigating in 1949–50 presumed healthy cattle slaughtered at Birkenhead abattoirs, found *Salm. dublin* in 10% of faeces and in 3.4% of bile samples from Irish cattle. The corresponding figures for non-Irish cattle were 3.7 and 0.5%. Liver swabs from 25 out of 202 Irish cattle yielded *Salm. dublin*, but swabs from 171 non-Irish cattle yielded none. Smith and Buxton (1951), found only three salmonella-positives among 750 samples of faeces from cattle in Great Britain; all were *Salm. dublin*. In 1950–2 Murdock and Gordon (1953) isolated *Salm. dublin* from 86 (8.6%) North Ireland cattle. In Somerset there were 14 outbreaks of *Salm. dublin* infection in 1947–53, and McCall (1953) reported on three human *Salm. dublin* outbreaks in that county, the largest involving 598 children infected from school milk.

Rats and Mice.—Salmonella infections are common in both species and many survivors continue as excretors of salmonellae. In rats the prevalence varies with the sources of these animals. In places where animals are killed, such as slaughterhouses, the prevalence may be over 6%, and in

Liverpool docks with much food storage Khalil (1938) found 7.3% harbouring salmonellae, all but four strains being *Salm. enteritidis* or *Salm. typhi-murium*.

Cats and Dogs.—Cruickshank and Smith (1949) examined 500 samples of faeces from apparently healthy dogs and found 5 positives, and from 500 apparently healthy cats 7 were salmonella-positive—3 *Salm. typhi-murium*, 2 *Salm. anatum*, and one each of *Salm. montevideo* and *Salm. paratyphi B*. They give particulars of many other investigations on cats and dogs with positive findings. Both animals not only can carry salmonellae but can suffer from definite infections. (This is in accord with findings in a few food-poisoning outbreaks.) The authors make the interesting calculation, based on dog licences issued, that their findings, if a fair sample, represent 20,000 to 30,000 dogs in Great Britain excreting salmonellae at any one time.

Commercially Prepared Egg Mixtures

Egg mixtures raise problems quite distinct from findings from flocks or from single eggs, so are discussed separately. The bacteriology of imported U.S.A. spray-dried egg has been described in detail (M.R.C., 1947). The powder is either prepared from shell eggs or from frozen egg pulp. Two facts stand out. One is that the examination of 7,584 samples revealed salmonella strains in 9.9%. The other is that the use of these mixtures in Great Britain resulted in the introduction of a large number of salmonella types new to this country but present in the U.S.A. and later found to be responsible for food-poisoning outbreaks in this country. In that M.R.C. report four such outbreaks are described, due to the introduced strains *Salm. oranienburg*, *Salm. montevideo*, *Salm. tennessee*, and *Salm. sunsvall*.

Murdock (1954) during 1951–3 examined liquid egg mixtures made up of North Ireland eggs sampled at the stage from homogenizer to the receptacle cans. Salmonellae were isolated 21 times from batches representing 1,610 hen's eggs (2.1%) and 120 times from 249 batches of duck eggs (48.2%). The majority of strains were *Salm. typhi-murium*.

A more comprehensive survey (Report, 1955) undertaken by members of the Public Health Laboratory Service dealt with English egg mixture collected at egg factory stations, classified into three groups—fresh untreated mixtures, chilled mixtures, and frozen mixtures in cans. When hen eggs were used, the first two groups gave 0.3% positive for salmonellae; the frozen egg mixtures gave 2.0% positive. With duck egg mixtures the percentages were respectively 6.1, 0, and 1.7.

Chinese frozen egg mixtures have been examined by Smith and Hobbs (1955). Salmonella strains were isolated from 27% of 128 cans examined. The findings varied according to types of can: tall 22-lb. (10-kg.) cans, 5.9%; 22-lb. (10-kg.) flat cans, 23%; and 44-lb. (20-kg.), 3% positive. The strains isolated were *Salm. pullorum*, *Salm. thompson*, *Salm. aberdeen*, and *Salm. typhi-murium*, but the last was found only twice.

Newell (1955) describes a number of outbreaks and single cases associated with Chinese egg mixtures used in bakeries for cream cakes. Newell *et al.* (1955) reported two outbreaks, in Worthing and Weymouth areas, of paratyphoid fever due to *Salm. paratyphi B* type 3a in cakes filled with imitation cream prepared in two bakeries in which there were unopened cases of Chinese frozen whole egg confectionery. The imitation cream was contaminated in the bakeries from the frozen egg.

This brief summary of the distribution of salmonellae in the animal world of Great Britain shows how widespread are these reservoirs of salmonellae, and suggests that it is here we must look for the origins of the salmonellae in most food-poisoning outbreaks.

In other countries the distribution of salmonellae types shows considerable differences, as indeed we find from the many foreign types introduced by packaged eggs from the U.S.A. Edwards and Bruner (1943) made an analysis of 3,090 salmonella strains from outbreaks in man and animals

up to 1943 in the U.S.A. and distinguished 59 types. Pigs, for example, yielded 27 different types with *Salm. cholerae-suis* (kunjendorf) from 305 outbreaks, 329 cultures, and 28 human outbreaks. *Salm. dublin* was only twice isolated from cattle, but foxes had a high incidence. *Salm. newport* was often found in fowls and human outbreaks, but rarely in swine, while *Salm. thompson* was almost confined to human outbreaks. *Salm. bovis-morbificans* is rare in the U.S.A. and until recently was uncommon in Great Britain, but it seems to be fairly widely distributed in Australia.

Evolution of Salmonella Strains

The enormous number of distinguishable salmonella types, the wide range of animals invaded, and the varying types of infections caused form a complex picture. In my opinion the problems raised can best be linked, and in part explained, by considering them from an evolutionary standpoint. As long ago as 1932 I expressed the view that the salmonella group is in an evolutionary stage as regards the separation of types, selection of animal hosts, and varieties of parasitic functions, and later I elaborated this conception (Savage, 1940). *Salm. typhi-murium* is probably nearest to the common ancestor, catholic in its distribution and undifferentiated in its host selections. Specialism has enabled some strains to attain a high measure of host specificity. *Salm. paratyphi B* has become for all practical purposes a human invasive parasite causing long-continued infection and rarely gastro-intestinal symptoms. It is no longer invasive to the lower animal by natural infection. Other strains with a high degree of host specialization are *Salm. abortus-ovis* for sheep, *Salm. gallinarum* and *Salm. pullorum* for fowls, and *Salm. abortus-equi* for horses. *Salm. dublin* is particularly interesting, for it tends to limit itself to calves and cattle but so far very incompletely, and this characteristic is accompanied by varied patterns of pathological changes which emphasize its instability.

These statements are probably in no single instance absolute, which is exactly what we should anticipate in evolutionary strains. For example, *Salm. paratyphi B* in a very few instances does cause gastro-intestinal symptoms, while there is reliable evidence that dogs and possibly pigs may occasionally be invaded by this otherwise purely human parasite. The general picture of paratyphoid fever is, however, very definite, and not a single outbreak of food-poisoning in the long records of the Public Health Laboratory Service has been ascribed to *Salm. paratyphi B*.

Given suitable conditions for growth, bacteria produce in less than a week as many generations as man takes from the Bronze Age to the present time, so evolutionary changes are to be anticipated with the production of new antigenic types better adapted to extend their distribution in animals. This extension may very well be taking place, but so far the evidence is not conclusive. Evidence concerning the evolutionary character of the salmonella group is reinforced by comparatively recent work demonstrating that type-transformation is possible. Three methods have been successful. One is by growing the organism in antiserum: Bruner, for instance, in 1949, succeeded in transforming *Salm. oranienburg* into *Salm. montevideo*, but was unable to reverse the process.

Factors Necessary for Full Elucidation of Each Outbreak of Food-poisoning

No outbreak can be said to be fully explained unless four factors are solved. These are the bacterial or other cause of the symptoms, the vehicle responsible for conveying the causal agent to man, the reservoir from which the infecting organism originated, and the path from the reservoir to the infected vehicles.

Salmonella Infections

Only salmonellae are under consideration, and their distribution has been discussed. It is of interest to study the relative presence of the different salmonella types in actual

cases of food-poisoning. Those for the last six years available are shown in Table IV. The most striking feature is the overwhelming prevalence of *Salm. typhi-murium*, and we may associate this with its ubiquity of distribution in the animal kingdom. Another interesting point is the fairly regular way *Salm. enteritidis* and *Salm. thompson* take the second and third place, with *Salm. newport* usually fourth. This, I think, is evidence of an association of food-poisoning with animal reservoirs. *Salm. typhi-murium* is of wide animal distribution largely impartial in respect of animal hosts. *Salm. enteritidis* is persistently found connected with diseased cattle, and is perhaps the most frequently isolated strain from emergency-slaughtered cattle in Germany causing food-poisoning. It is especially associated with meat as a food-poisoning vehicle.

The primary and prevalent sources of *Salm. thompson* and *Salm. newport* are still somewhat of a puzzle. Both have been found in lymph nodes of pigs; *Salm. thompson* is a common cause of chicken disease in Great Britain (Buxton and Gordon, 1947) and is not uncommon in imported eggs. It is possible that birds are the primary sources of both strains. The origins of the exogenous strains have been considered under imported eggs. Naturally some strains may be more prominent in particular years owing to special outbreaks due to a particular type—such as the rise in frequency of *Salm. bovis-morbificans* in 1953 associated with a large outbreak in Lancashire due to meat pies.

Vehicles

The main groups were fairly comprehensively worked out many years ago, but it is of value to discover if there have been material changes over the last 20 years or so. This is done in Table V, but it includes outbreaks due to causes

TABLE V.—Vehicles in Food-poisoning Outbreaks

Vehicle	Outbreaks 1919-31*	Outbreaks 1951-3†
Meat, fresh ..	8	4
" somewhat manipulated ..	10	47
" heavily processed ..	37	92
Canned foods ..	8	14
Milk and milk products ..	12	11
Eggs, duck ..	6	45
" other ..	1	12
Shellfish ..	2	1
Sweetmeats (trifle, ice-cream, custard, etc.)	Not separately recorded	36

* From Savage (1932).

† From *Monthly Bull. Minist. Hlth*, 1954, 13, 12; and 1955, 14, 34.

other than salmonellae, as the bacterial groups are not separated. While only a rough guide, the figures show that the vehicles to-day are essentially the same and in very much the same proportion as 30 years or so ago, with one striking exception—that is, the great increase in eggs as a vehicle (partly because of failure to recognize their importance). This is particularly so for duck eggs. The overwhelming importance of manipulated meat food is about the same for both periods. There are, however, other differences between the two age periods not brought out in the table. One is the much greater safety of canned food to-day; many of the outbreaks now recorded as associated with canned foods are due to the infection of such products after removal from the can. The present ice-cream regulations have greatly increased the safety of this food. Changing food habits and commercial practices have resulted in a far more extensive consumption of meat foods prepared in quantity in works outside the places of consumption, and, if specific infection occurs in places where such food is prepared, resultant outbreaks are usually much more extensive than those from the old-time home or shop-made brawn, pressed beef, and the like. A good example, described by Miller *et al.* (1955) is the very extensive outbreak of salmonella food-poisoning (*Salm. bovis-morbificans*) in 1953, extending over a large part of West Lancashire and involving over 1,149 persons, with 5 deaths. The vehicle was meat pies, all made in one bakery but using meat supplied by a number of butchers.

Another example of widespread salmonella infection from meat is the very extensive outbreak in 1953, extending over many parts of Sweden (Lundbeck *et al.*, 1955) due to *Salm. typhi-murium* and involving 8,845 known cases with at least 90 deaths. The meat was all distributed from one large abattoir, the infection probably being introduced by infected animals and spreading widely through the abattoir by direct transfer, infected faeces playing a large part. Examination of carcasses showed *Salm. typhi-murium* of the same phage type in 11.2% of glands and 9.6% of muscles, while the pork carcasses yielded even higher percentages. Of 360 personnel examined 53 (15%) showed the same strain of salmonella.

An important factor to be considered in relation to the vehicle is its suitability for bacterial multiplication. Large numbers of salmonellae appear to be necessary to cause food-poisoning, and this usually involves multiplication outside the human body. Hormaeche and Salsamendi (1936, 1939) found that human volunteers might ingest as many as 2,000-4,000 million salmonellae (*Salm. typhi-murium*) without any ill effects.

McCullough and Eisele (1951) carried out a very large number of feeding tests with human volunteers, and the following findings illustrate the influence both of dosage and of strain variations within the same type.

Salm. meleagridis.—Of the three strains used strain III was the most virulent, and illness was caused in a minority of cases with about 750,000 bacteria; with a 20-million dose of strain I, only one out of five was ill, but with a 30-million dose four out of six were ill.

Salm. anatum.—With the two most toxic strains doses of 3,500,000 and 1,250,000 were the lowest to cause symptoms, but with the third strain 45,500,000 bacilli merely caused mild ill effects and then only in one out of six fed.

Salm. newport.—More toxic, but of 16 fed with doses of 152,000 to 385,000 bacteria only two became ill; with 1,350,000 three out of six were ill.

Salm. derby.—No illness until 15,000,000 fed, and then only three out of six affected.

Salm. bareilly.—Dosage 125,000: out of six fed, one ill. Dosage 695,000: out of six fed, two ill. Dosage 1,170,000: out of six fed, four ill.

Salm. pullorum.—A large number of strains used, but only when the dose ranged from 1.3 billion to 10 billion did any illness result, and that was slight and brief.

These findings emphasize the significance of the nutrient vehicle and explain a common experience that articles such as trifle, part consumed at time of preparation, are usually harmless, while next day, if kept under conditions favouring multiplication of bacteria, they cause widespread illness.

This numerical factor explains how frequently salmonella carriers can work on food premises for long periods without causing outbreaks if the conditions deny opportunities of inoculation of nutritive foods. Thomson (1954) has shown that salmonella carriers of typhoid and paratyphoid bacilli may excrete enormous numbers of these bacilli in their faeces, but I have not found any information on whether this applies to carriers of food-poisoning salmonella.

Paths of Infection

Frequently the most unrewarding part of an investigation is tracing the path from the reservoir to the vehicle. The following points have to be considered.

The consumption of meat from a salmonella-infected animal, either obviously ill or without noticeable changes even to a trained meat inspector. Outbreaks from emergency-slaughtered animals used to be fairly common in Germany. Food-poisoning bacilli may be transferred by animal products, usually milk, the bacilli being either derived from cows suffering from a salmonella infection (usually *Salm. dublin*) or gaining access from infected dung. Infection of the food by salmonella-carrying intermediaries such as rats, mice, cats, and dogs. The risk is materially increased when rats are prevalent in places where

food is prepared. Savage and White (1922-3) isolated *Salm. enteritidis* from 6 out of 96 rats from slaughterhouses, and Ludlam (1954) found salmonellae in only 4.4% of rats from mixed types of premises, but in 6.4% from 94 rats from a butcher's by-products factory.

Originally sound food in catering premises, shops, or homes may be specifically contaminated either directly by the incorporation of infected egg mixtures or indirectly by such egg mixtures contaminating various food-preparing machines or utensils difficult to clean and when unsterilized allowing bacterial multiplication.

Infection from Human Carriers of Salmonella

This path requires special consideration in view of the undue prominence accorded to it by many doctors and particularly medical officers of health. An ascertained human salmonella carrier amongst the food preparation staff is often accepted as the proved source of infection without any real evidence. Salmonellae are excreted by man under three conditions: (1) during an actual attack of food-poisoning, (2) persistence of the bacilli after recovery either for a limited time (temporary carriers) or for a prolonged period (chronic carriers), or (3) from a symptomless but infected person.

After an attack of salmonella food-poisoning the bacilli can readily be isolated from the faeces, but they diminish in a fairly orderly sequence for some weeks, after which they usually cannot be isolated apart from a minority which may persist longer or even become chronic carriers. A few examples illustrate this sequence.

Kwantes (1952), reporting on a *Salm. typhi-murium* outbreak in Llanely in 1949, was able to follow up 112 cases. Those faeces-positive in each week were 112 (end of one week), 60, 34, 16, 9, 9, 3 (end of nine weeks). The 61 symptomless excretors were also followed up, and their rate of elimination was roughly comparable to that of actual cases, with two cases (5.5%) still excreting at the end of seven weeks. Lennox *et al.* (1954), investigating a milk-spread *Salm. typhi-murium* outbreak, found a slow rate of clearance from the faeces for three weeks and then a rapid and fairly uniform decline each week, leaving only 2 positives out of 60 cases at the end of seven weeks, with persistence of 1 or 2 positives until 18 weeks.

Miller *et al.* (1955) investigated the clearance rate of 563 cases infected with *Salm. bovis-morbificans*. Only 14 were still excreting after four to five weeks; these were reduced to four after 13 to 14 weeks, and several were still positive after 15 weeks.

A few infected persons undoubtedly become chronic carriers, for scattered through the literature are records of individuals found positive after one or two years. A percentage figure cannot be given for such chronic carriers, but probably it is low and below that for paratyphoid fever carriers. Investigations carried out by the Public Health Laboratory Service (personal communication) yielded the following figures:

Of 3,303 children under 15 years admitted to hospitals	7 positive
" 2,968 mothers at antenatal clinics	11 "
" 2,467 persons waiting admission to mental hospitals	5 "
" 1,091 adults waiting admission to general hospitals (none gastro-intestinal cases)	1 "

In all, out of 9,829 persons examined 24 (0.24%) were positive for salmonellae, 14 strains being *Salm. typhi-murium* and 6 other strains being represented. Bearing on this point, Armstrong and Allison (1955) examined 200 gall-bladders removed after death and 50 cholecystectomy specimens, and only one was positive (*Salm. typhi-murium*). Some weeks without systemic invasion, but more permanent continuance must be associated with lodgement in internal organs such as the spleen or gall-bladder. In this connexion the experiments of Ørskov *et al.* (1928), and Ørskov and Moltke (1928) on oral feeding of mice with salmonellae are of great interest and support this view.

Consumption of left-over foods, etc., by staff is common in places where food is prepared, and may result in staff members being victims in many food-poisoning outbreaks. Distinction between a salmonella carrier and an infected victim is usually difficult, but it should always be attempted. Lines of investigation are the following: (1) Is there any history of a previous gastro-intestinal attack? (2) If the person is a real chronic carrier there is a possibility of a history of food-poisoning outbreaks at previous places of employment. (3) Critical consideration of the connexions of the alleged food-handlers with the infected food and with opportunities of infecting it. (4) Detailed studies on agglutination titres, both H and O, and particularly their fluctuations.

The fourth line of investigation is of considerable value for typhoid and paratyphoid infections, but seems to be of limited utility for the food-poisoning salmonella cases. Not much recent work appears to have been done on this point, but available facts suggest irregular findings for both H and O agglutinins. Miller *et al.* (1955) studied this factor, but owing to shortage of time no agglutination observations were made until after two months, and then rather less than 70% of actual cases showed evidence of antibody production.

In their studies of experimental salmonellosis produced by feeding different salmonellae to human persons McCullough and Eisele (1951) also studied agglutination development reached by those who developed illness of food-poisoning type; their findings are shown in Table VI. Of their 47

TABLE VI

Strain	No. of Cases	No. Titre Change	Non-significant Rise	Moderate Increase	Considerable Increase
<i>Salm. meleagridis</i> ..	16	6	5	2	3
" <i>anatum</i> ..	16	8	2	3	3
" <i>newport</i> ..	5	3	1	—	1
" <i>derby</i> ..	3	1	—	2	—
" <i>bareilly</i> ..	7	4	1	2	—
	47	22	9	9	7

cases, only 16 (34.5%) showed any significant rise in titre. Apparently separate O and H reactions were not used. Also a number of the infections were quite mild. These estimations are important enough for them to be regularly made, and more detailed study may show that they are more helpful than the above figures suggest.

Measures to Reduce the Incidence of Food-poisoning

We appear to be amassing a great deal of highly useful information which pin-points the increase of food-poisoning, throws much light upon the organisms responsible, the reservoirs of infection, and the vehicles infected, but is unaccompanied by adequate measures of prevention. A good deal is being done by health education, by inspection of food-producing and catering premises under inadequate powers of control, and from technical improvements in appliances used in food kitchens and eating-places. All this is valuable, but the plain fact is that food-poisoning continues to increase, and there is evidence of an expanding distribution of salmonella infection in both man and animals.

(1) Detailed Investigation of all Outbreaks to Ascertain More Accurately the Extent of the Problem

Table II shows that for 1953 and 1954 the outbreaks for which no cause was found were respectively 2,000 and 2,322—that is, about 39% of the total reported. This unsatisfactory position is commented upon in the *Monthly Bulletin* of December, 1955, and the authors are probably correct in their supposition that "most of the outbreaks for which no cause was found were small outbreaks reported so late to the medical officer of health that no investigation was worth carrying out."

Another feature, brought out in Table I, is the enormous number of sporadic cases which remain unconnected with other cases, in large part probably from faulty co-operation on their detailed investigation. For these two failures medical practitioners and medical officers of health must both share part of the responsibility. Food-poisoning is at present notifiable by medical practitioners under the Food and Drugs Act, 1938, due to be repealed when the Food and Drugs Act, 1955, comes into operation. Food-poisoning is difficult to define in legal enactments, but the change-over will give the Minister of Health an opportunity of revision in the new memorandum which will be necessary. One suggestion is the introduction of "acute" before food-poisoning (the enteric infections are notifiable under another section) and with an implication on promptitude. Stress should be laid upon the urgency to communicate at once with the medical officer of health, which is hardly sufficiently expressed by the "forthwith" in the Act.

The investigation of a food-poisoning outbreak requires experience, and, although inquiries by the practitioner concerned can be most helpful, wider exploration is indicated, not only within the family, but into such matters as possible infection from food eaten in a catering establishment or intimate association with animals. The medical officer of health should regard these isolated sporadic cases as probably linked to a more extensive outbreak only to be discovered by personal inquiries on his part, linked with the full co-operation of the Public Health Laboratory Service. From wide experience I do not consider that routine inquiries by a sanitary inspector alone are adequate, and direct medical oversight is needed.

(2) More Complete Ascertainment of the Animal Reservoir of Salmonellae

We know much about salmonellosis in animals, but are still very incompletely informed about their quantitative distribution. To extend our knowledge of reservoirs of salmonella strains we need more extensive surveys of animals that may possibly be associated with food-poisoning. A good illustration is *Salm. dublin* infections in cattle. As set out above, we know of a number of scattered pockets of infection, but we do not know its extent in cattle generally or if these infections are on the increase. Recent evidence that salmonella-infected animal foods may spread the disease to healthy animals is a new light on a possible method of spread. Combined veterinary and bacteriological studies could contribute much to our knowledge of salmonella reservoirs.

(3) Reduction of the Risk of Food Infection from Human Carriers of Salmonella

Chronic human carriers are rare, but with the present large number of outbreaks annually there must be at any one time a considerable number of people in the community who are for limited periods temporary salmonella carriers. There is little risk of direct infection to other persons, but a real risk that they may infect foods which foster rapid bacterial multiplication and so become vehicles to spread food-poisoning. These risks occur in places where food is manipulated and where food is prepared for consumption, such as in catering kitchens.

The use of administrative means to ascertain carriers of food infections in catering or food-preparation places is admittedly a difficult problem. It is tackled in Section II (1) of the Food Hygiene Regulations, 1955; but this takes us only a little way towards ascertainment and is far inferior in potential effectiveness to the corresponding recommendations in the standard code of the Catering Trade Working Party.

(4) Improvement of Standards of Hygiene in Commercial Feeding-places

The Food Hygiene Regulations, 1955, go a long way towards this aim and are a decided improvement on previous enactments. At the same time they have a number of

serious defects which limit their effectiveness in controlling food-poisoning. The whole regulations cannot be discussed, but three adverse features may be mentioned. They are charged with indefinite phrases such as "reasonably practical," "sufficient," "suitable and sufficient," "adequate," etc., which cannot fail to be interpreted differently by individual local authorities, so that anything like uniformity of administration is most unlikely. Many local authorities will fear to press for necessary requirements lest, if tested in the courts, these vague phrases may be interpreted by the court against them. The risks of specific infection from inadequately cleaned utensils cannot be ignored, but this seems to have been done in the Regulations. These do not enforce either effective cleaning or sterilization, for "suitable and sufficient sinks" is not enough, and sterilization is not ensured by "an adequate supply either of hot and cold water or hot water at a suitably controlled temperature." The definite risks of carrying infection from day to day from objects so difficult to clean as sausage machines or egg mixers are not covered. Particularly unsatisfactory is the absence of any requirement for the registration of catering establishments of all kinds with the local authority, as recommended by the Catering Trade Working Party. Experience in connexion with another business (ice-cream making) has shown registration to be a most valuable instrument for the hygienic control of such establishments. There is not even a suggestion that every medical officer of health should keep a complete register of all catering premises in his district, and deal in his annual report with the actions taken and results achieved.

Within the last few years many practical surveys of catering establishments have been published, and invariably they disclose numerous hygienic defects, many of which facilitate the transference of food-poisoning organisms to food on the premises. Many of these defects cannot be put right under the new regulations except voluntarily.

(5) Hygienic Control of Bulk Food Preparation

It is essential to ensure hygienic control in premises used for the bulk preparation of meat foods and those distributed in package form. Risks of infection from such foods and appropriate measures of control have been considered in detail by the Manufacturers Meat Products Working Party. They made a number of valuable recommendations, some of which are incorporated in the new Food Hygiene Regulations. Among the Working Party recommendations was the registration of such premises. This is incorporated in the new Food and Drugs Act, 1955, Section 16, requiring the registration with the local authority of premises for "the preparation or manufacture of potted, pressed, pickled, or preserved food intended for sale." Registration will be very useful, but time is necessary to see to what extent the regulations will be tightened to ensure adequate hygienic premises and practices. It would be helpful to work out better bacteriological standards for these premises to assist in this control.

(6) Steps to Reduce Risk of Salmonella Infections from Imported Egg Products

The danger does not arise from unopened shell eggs (except from duck eggs from infected farms) but from pooled mixtures of shell eggs involving the distribution through the mass of any salmonellae present and usually also some multiplication of the bacilli. An important feature is the unknown (to health authorities) and insidious way these infected egg mixtures are distributed all over the country and used by bakers and confectioners in cakes and confectionery products which subsequently do not receive effective heat treatment. A considerable list of salmonella outbreaks so caused could be compiled. This risk is apt to be extended in duration because of the considerable difficulty in effectively cleansing egg-mixing machines in the absence of any regulations requiring their sterilization. The spread of salmonella infection may also occur indirectly,

for dried-egg mixtures that are unfit are sometimes distributed to manufacturers of animal foods. The M.R.C. (1947) report on spray-dried egg includes an examination in 1944-5 of the mesenteric lymph nodes of 5,285 pigs from a number of abattoirs. As stated earlier, from 133 of these nodes salmonella strains were isolated—an incidence of 2.5%. At least 10 of the different types isolated were exogenous types not previously found in this country, and comprised more than half of all the salmonellae isolated. These mixed-egg products are a valuable addition to our food supply, but this is inadequate to justify their use when infected with large numbers of living salmonella organisms. The destruction of pathogenic organisms in egg mixtures is difficult but by no means insuperable. Presumably these products require import licences, which would give power to impose reasonable conditions of safety sufficient to remove or at least largely reduce these risks.

Conclusions

1. After making full allowance for the effects of notification of food-poisoning by medical practitioners and the greater facilities for bacteriological investigation there is clear evidence of a marked increase in food-poisoning in Great Britain over the last decade or so, an increase which shows no signs of diminution but rather of still further increase. Undoubtedly, also, a material number of outbreaks remain unreported and therefore not investigated.

2. Owing to the increased laboratory facilities and the improved technical procedures now available for investigation it is difficult to compare present and past experience, but the evidence points to an extension of salmonella infections in animals. It is not merely that we know more about them; they appear to be more extensive.

3. The increases mentioned in the above two paragraphs have in recent years led to a rise in the number of persons who, either as symptomless cases or transitory carriers, are excreting salmonella strains in faeces.

4. It is suggested that the above three conclusions may be associated with evolutionary changes in the make-up of the salmonella group.

5. Five factors seem to be operating in the increase in food-poisoning. (a) Changing food habits, taking the form of a considerable increase in the number of meals eaten outside the home in professional catering-places, where defects in hygienic control may affect large numbers of customers. (b) The extension of bulk preparation of packaged or other foods under factory conditions which inherently increase the risk of contamination with salmonellae. (c) The extensive and extending use of bulked eggs (consigned to this country frozen or in other forms) in confectionery, etc. A large number of hitherto unknown salmonella types have been introduced in this way into this country. The association of liquid egg foods with food-poisoning in Great Britain is clear-cut. (d) The extension of the reservoirs of salmonella in animals indicated in paragraph 2. (e) The increase in human carriers of salmonella organisms (mentioned under paragraph 3) supplies opportunities for specific infection of foods, particularly under the conditions set out in a and b.

6. The number of single-case salmonella incidents yearly is very large and in a material proportion is likely to be associated with other cases at present unrecognized. It would be helpful if official steps were made to define more precisely the cases to be notified as food-poisoning and to point out that prompt notification is essential as an aid for investigation. These should

be supplemented by efforts by medical officers of health to enlist the help of family doctors in giving prompt notification and co-operating in their elucidation.

7. The problem of the greatly increased and yearly increasing toll of food-poisoning may be summed up by pointing out that public health action has not kept step with the modern revolution in food habits. More and more food preparation is escaping from the domestic kitchen into the hands of the bulk commercial manufacturer, whose practices often fall below essential hygienic standards. Prepared foods such as meat pies are passing from production by the few to production on an extensive scale, with an absolute need of much higher sanitary standards of safety, which investigation of food-poisoning outbreaks shows are often not reached. The very machinery necessary in large-scale production carries and spreads the risks because of the difficulty of effective cleaning and sterilization. Methods comparatively harmless in the domestic kitchen are fraught with risk when practised in the communal kitchen. All bulk-feeding habits add to the risk, since the few infected persons may contaminate inefficiently cleaned food utensils and so spread infection.

We smile at Mrs. Beeton's direction to "take 12 eggs," but the point to us should be that they are single eggs and (except for some duck eggs) free from risk, but the mixed dry or frozen egg mixtures of to-day are far more liable not only to bacterial infection in the mixing stages but to distribution of the bacteria through the mass, probably with multiplication before usage.

These revolutionary changes in habits, with their resultant changes, are not adequately guarded against even in the latest control orders. A pathetic faith in the value of voluntary education is no adequate substitute for control based on education and exhortation with adequate reserve powers of enforcement should the will be lacking to attain to proper hygienic standards.

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INHALED FOREIGN BODIES

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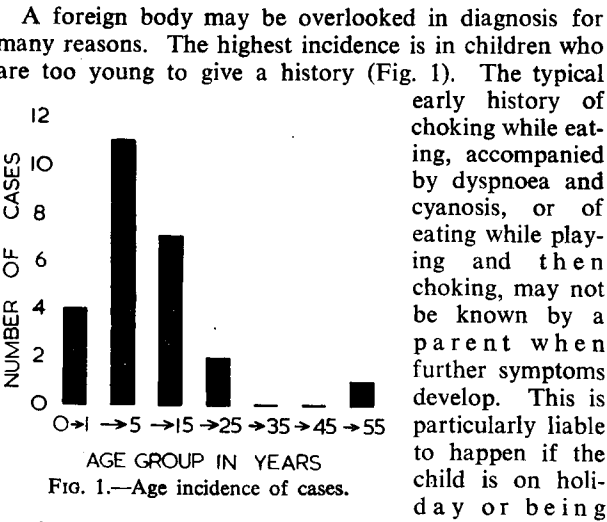
The problems associated with inhaled foreign bodies usually receive little attention in the medical curriculum and in textbooks. This is in contradistinction to the ingested foreign body, which is well documented at every stage of its journey. The importance of the inhaled foreign body is demonstrated by the Registrar-General's (1954) statistics for deaths in England and Wales from this cause. There were 11 due to inhalation, as compared with 29 due to ingestion (Tables I and II).

TABLE I.—Total Deaths from Foreign Bodies in England and Wales, 1954

Trachea, bronchus, and lung	11
Digestive tract	29
Pharynx and larynx	443
Genito-urinary tract	5
Ear	1
Nose	1

TABLE II.—Ages of 11 Subjects who Died From Inhaled Foreign Bodies in Trachea, Bronchi, and Lungs in England and Wales in 1954

Age:	-1	-5	-15	-25	-35	-45	-55	-65	-75	-85
No.	4	1	0	0	0	1	1	1	1	2



A foreign body may be overlooked in diagnosis for many reasons. The highest incidence is in children who are too young to give a history (Fig. 1). The typical early history of choking while eating, accompanied by dyspnoea and cyanosis, or of eating while playing and then choking, may not be known by a parent when further symptoms develop. This is particularly liable to happen if the child is on holiday or being tended by a baby-sitter when the foreign matter is inhaled (Table III, Cases 5 and 12). Again, a patient may choke and cough, and think that the object has been expelled, whereas in fact it has been inhaled from a larger sensitive tube to a smaller insensitive one (Case 8). Further, a small metallic foreign body may not cause any immediate disturbances, and only come to light years later from its pressure effects (Case 2). An object may also be inhaled when a patient is asleep, under the influence of alcohol, during an epileptic seizure, or during anaesthesia (Case 15). The foreign body is often thought to have been swallowed and that it will be passed by the bowel. Sometimes the early history is not known, and the presenting symptoms may simulate those of bronchitis, pneumonia, tumour, lung abscess, bronchiectasis (Case 6), tuberculosis, or empyema (Coope, 1948).

Protective Reflexes

The inhaled object may stimulate the laryngeal mucosa and cause adduction of the cords. The patient chokes and coughs, and may expel the object. A large object which is not dislodged will cause complete obstruction of the larynx and death from asphyxia in a few minutes.

The cough reflex is normally protective for the trachea and bronchi, but each cough is preceded by a deep inspiration, and at this time, before the burst of explosive coughing, the object may be inhaled into the trachea. From here the further passage depends on the size and sharpness of the object. The tendency is for it to be inhaled as far as its size and shape will allow it to go.

If it is large, it will remain in the trachea, causing paroxysms of coughing; as it moves up and down and strikes the glottis from below it makes an "audible slap." If the movements are forcible in the trachea they may be easily perceptible as a "thud" or, if less forcible, as a "flutter" (Jackson and Jackson, 1950).

A smaller foreign body will pass into the right bronchus more commonly than the left, because of the larger diameter and the less acute angle at which this bronchus leaves the trachea. The posterior segmental bronchi are more commonly affected than the anterior.

Pathology

The nature of the foreign body determines the degree of further reaction. Metallic foreign bodies cause very little immediate inflammation, but in the course of time they become oxidized and the edge roughens, with consequent penetration and pressure. Organic substances such as nuts and beans cause an intense inflammation with oedema, granulations, and pus due to the contained fatty acids. As the material absorbs moisture and swells it progressively blocks the lumen of the passage in which it lodges. The younger the patient the more dangerous it is.

A foreign body lodging in a bronchus may occlude it either completely or partially. Complete obstruction is followed by atelectasis of the portion of the lung supplied by that bronchus (Asherson, 1953). Subsequently the inflammatory changes may take the form of pneumonia, bronchiectasis, lung abscess, and empyema. Partial obstruction may either allow relatively easy passage of air in both directions, in which case the later effects are due to local inflammation only, or it may take the form of a ball-valve obstruction. Air enters the lungs during inspiration when the bronchus dilates, but cannot pass out in the reverse direction during expiration because the bronchial mucosa becomes approximated to the sides of the foreign body. This results in obstructive emphysema.

Occasionally, combinations of these features occur. When a foreign body causes atelectasis of a lobe the remainder of that lung may become "emphysematous" even though it is not directly affected by the object. This is a process of "compensatory emphysema."

Diagnosis

The original accident is often dramatic, accompanied by choking, prolonged coughing, cyanosis, and dyspnoea. It cannot be overemphasized that such a history should be sought repeatedly from parents, guardians, and baby-sitters. Occasionally, however, a foreign body is inhaled into a distal bronchus without setting up any reflex during its passage. The diagnosis of metallic foreign body is easy, for, although it may cause few signs apart from those of bronchitis, it is clearly seen in either a postero-anterior or lateral radiograph. The diagnosis of a non-opaque foreign body can be made from physical examination. The presence of atelectasis will be shown by diminished movement, dullness to percussion, decreased air entry, with the trachea and apex

beat perhaps displaced to the same side and the diaphragm high (Fig. 2). Obstructive emphysema is characterized by decreased movement, overexpansion of the affected part of the chest, a hyperresonant or tympanitic percussion note, and poor breath sounds, except in the early case when air is still entering in the inspiratory phase. Clinically this may be mistaken for pneumothorax, but radiographs taken in inspiration and expiration are diagnostic. A comparison of these two pictures shows the shift of the mediastinum away from the affected side on expiration, and the flattened diaphragm, with of course some lung markings in the emphysematous area (Fig. 3). The contrast in transparency of the two sides is not so evident on inspiration, for the compensatory increased movement of the sound lung fills it so well with air that there may be little difference between the translucencies of the two sides.

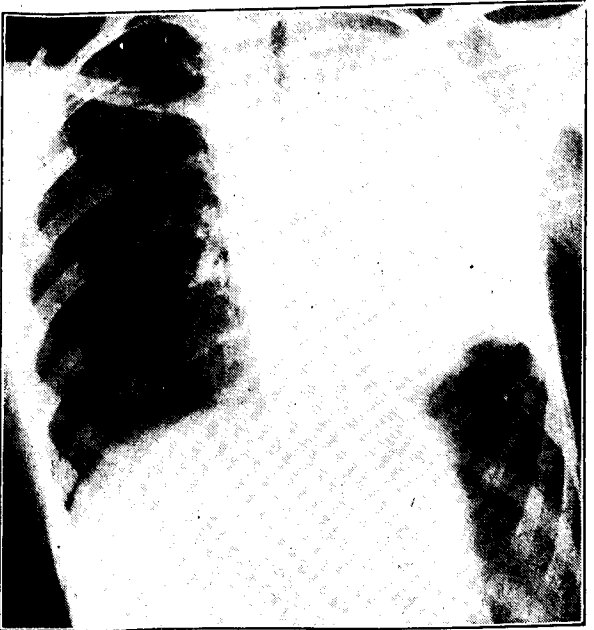


FIG. 2.—Case 4. Postero-anterior chest radiograph: atelectasis of left lung, with mediastinum drawn to the same side, high diaphragm, crowding of ribs, and ground-glass appearance of lung field.

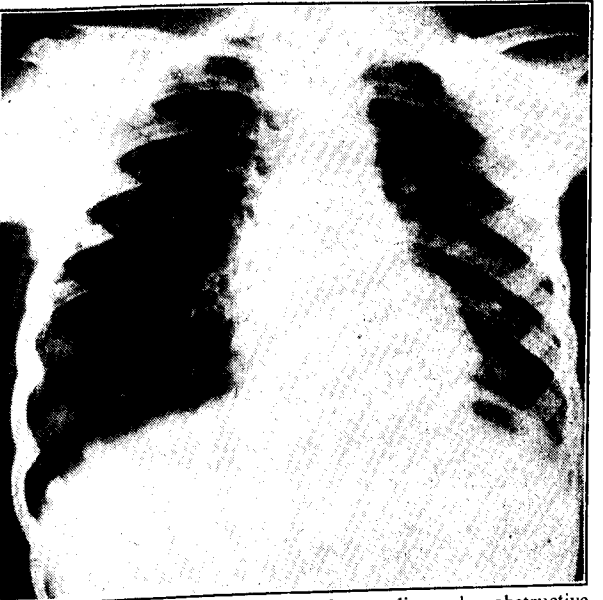


FIG. 3.—Case 8. Postero-anterior chest radiograph: obstructive emphysema right lung, with mediastinum to opposite side, diaphragm depressed, and greater translucency of lung.

Differential Diagnosis

The differential diagnosis may be difficult if the history of inhalation is not obtained. Or if it is obtained and a foreign body is suspected the signs of laryngo-tracheitis *per se* will simulate those of a foreign body. This happened in a case not reported in this series:

A child went to bed sucking a boiled sweet, and was heard to cough and choke later. Although it had signs of laryngeal stridor and bronchospasm, there were none of localized obstruction radiologically. The child was prepared for bronchoscopy, but before the scope was introduced the cords were seen to be oedematous. This was thought (and proved) to be sufficient to cause the symptoms. The symptoms subsided with nursing in a steam tent and the administration of antibiotics.

Pressure on the bronchi from without, due, for example, to enlarged lymph nodes or mediastinal abscess, may give a clinical picture similar to that of inhaled foreign body. A good example is a foreign body lodged in the oesophagus, which may press on the trachea and cause partial obstruction.

If there is a reasonable likelihood of a non-opaque foreign body being in the air passages in a patient suffering from bronchiectasis, unresolved pneumonia, lung abscess, or obstructive emphysema he should have the benefit of a direct inspection of the air passages by an experienced bronchoscopist.

Treatment

The hope that a foreign body may be coughed up is unjustifiable, for this course of events occurs in only 3% of cases (Jackson and Jackson, 1950). The practice of inverting the patient and shaking him to displace the object is dangerous, for the object may move, become impacted in the glottis, and cause suffocation. It is imperative that a skilled bronchoscopist should remove the foreign body as soon as possible, under anaesthesia administered by a competent anaesthetist. There is one caution to this rule: if a child has had unsuccessful attempts at bronchoscopic removal when first seen, and is suffering from laryngeal oedema, this should be treated first and time allowed for the oedema to subside before another attempt is made (Case 3).

Anaesthesia

The importance of expertly administered anaesthesia for the successful removal of foreign bodies from the respiratory tract cannot be overemphasized. As Fig. 1 shows, the majority of our patients were infants and children, in whom it is notoriously difficult to administer safely an efficient anaesthetic for bronchoscopy. Several of our patients (Cases 1, 3, 8, 9, 11, and 15) had had previous unsuccessful attempts at removal of the object by bronchoscopy, probably necessitated by inefficient anaesthesia. Many of them suffered from anoxia of varying degree, sometimes with gross respiratory obstruction. Anaesthesia must provide the bronchoscopist with a tranquil oxygenated patient in whom all the tracheal and bronchial reflexes have been eliminated so that as much time as is needed can be spent in finding, seeing, and removing the foreign body.

We condemn as unsafe the use of relaxants to obtund respiratory tract reflexes in these circumstances. Suppression of these reflexes by this means occurs coincidentally with respiratory arrest. Unless the surgeon is interrupted continually by the need to ventilate the patient, serious and possibly fatal oxygen lack follows. We know of deaths that have occurred in this way. Surface analgesia with cocaine or, if desired, a similar but longer-lasting drug, forms the essential basis of the method of anaesthesia which we recommend. In adults unconsciousness is rarely indicated. Sedation with papaveretum and hyoscine followed by careful surface analgesia of the pharynx, larynx, and trachea is generally adequate.

Children below the age of 10 years are anaesthetized in a manner similar to that which we use for bronchography (Mushin and Lake, 1951). They are put to sleep in bed with a suitable dose of basal narcotic such as rectal bromethol.

In the theatre, anaesthesia is slowly and carefully induced with trichlorethylene and oxygen. When laryngoscopy is possible the cords and pharynx are sprayed with local analgesic, and a further 1 ml. of solution is injected through a fine catheter into the trachea.

Overdose with local analgesics is a possible danger, and is avoided by carefully limiting the dose used (Mushin and Lake, 1951). Anaesthesia is maintained with a stream of nitrous oxide, oxygen, and trichlorethylene into the side tube of the bronchoscope.

At the end of the operation, and when the bronchoscope has been removed, the child is carefully watched in case laryngeal spasm occurs. This is liable to happen when the operation has lasted longer than expected and the effect of the local analgesic is wearing off. Children are not allowed to leave the operating theatre until free respiration is present.

Bronchoscopy

Bronchoscopic removal of foreign bodies in children is specially hazardous. The patient usually has a degree of laryngospasm and bronchospasm, and if these become extreme during the procedure the bronchoscope must be immediately withdrawn as the first step in overcoming it. Needless to say, manipulations must be gentle. Because a small instrument is necessary, the grasping of the foreign body in children is always "blind"—not an easy accomplishment with an elusive object. The risk of dropping an object on which a tenuous hold is maintained is considerable: the seriousness of this accident might be imagined if an object is being removed from an atelectatic lung and it drops into the opposite main bronchus. For this reason the table should be kept tilted in a slight Trendelenburg position, and a portable x-ray machine should be available in the theatre. The instruments which have been used routinely are shown in Fig. 4.

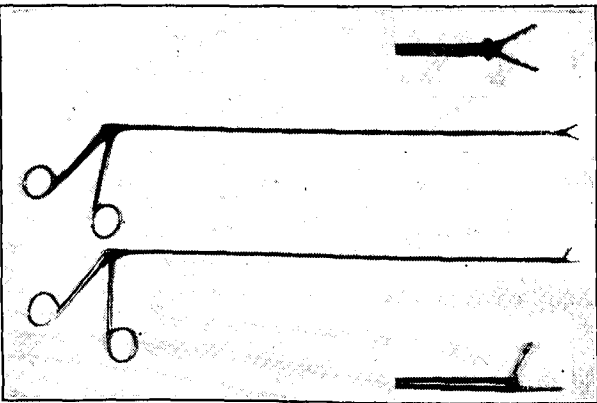


Fig. 4.—Photograph of two instruments used for removing foreign bodies from bronchus. (Made by Thackrays from German model by H. Pfau.)

When the object has been grasped the forceps and the bronchoscope are removed simultaneously in a smooth motion, so that the object will not be dropped at the point where it may catch—the cords, the epiglottis, and the back of the tongue. Repeated attempts at removal of fragile objects—for example, nuts—may be necessary, and occasionally smaller pieces may be removed with a sucker. Sharp objects whose points are uppermost should be manipulated so that the sharp end is protected in the beak of the bronchoscope; with safety-pins the point is drawn into the scope and the "keeper" may safely trail (Fig. 5).

After removal, an x-ray film is taken on the table, and if all the material has come away the film will show a dramatic improvement in any previous obstructive emphysema or atelectasis. If there is still some slight evidence of retention of fragments the patient is encouraged to cough before

TABLE III.—Summary of Cases

Case No.	Age in Years	Sex	Duration of Symptoms	History and Examination	X-ray Findings	Findings at Bronchoscopy	Comment
1	12	M	8 days	Inhaled dressmaker's pin which he had in mouth while watching an aeroplane	Pin deeply placed in basal segment R.L.L. (Fig. 6)	Attempt to remove it bronchoscopically elsewhere failed, in spite of using magnet and obtaining "radiological" contact with pin	Right thoracotomy, attempt to remove pin by bronchotomy at basal stem bronchus failed; pin then pushed out through visceral pleura
2	25	F	12 months	Frequent chest colds with mucoid sputum. Consequently recalled swallowing or inhaling safety-pin at a party 17 years previously	Open safety-pin R.M.B. (Fig. 5)	Pin in R.L.M.B., surrounded by granulation tissue. Removed easily, keeper trailing	Cough subsided in one week
3	14	M	9 days	Definite history of inhaling foreign body. Previous bronchoscopy at another hospital unsuccessful. Considerable laryngeal stridor. T. 101° F. (38.3° C.); P. 130; R. 36	Atelectasis of basal segments R.L.L.	Two attempts at bronchoscopic removal, the second successful in extracting granite chip from R.M.B.	First bronchoscopy delayed 2 days after admission and second one for 5 days. Nursed in steam tent
4	8	F	2 "	"Swallowed" nut while running. Coughed and spluttered. Pain in upper abdomen on coughing and spontaneously. O.E., cyanosis. Atelectasis left lung; T. 100° F. (37.8° C.); P. 140; R. 30	Atelectasis and consolidation left lung (Fig. 2)	Part of nut and shell removed from L.M.B. Mucopus distal to this aspirated	Slow expansion apical segment L.L.L.; but complete in 7 days
5	9	F	24 hours	While eating raw carrot, choked, became dyspnoeic and wheezy (history obtained from "sitter" one day later). O.E., cyanosed and very dyspnoeic. Obstructive emphysema. Left lung. T. 99° F. (37.2° C.); P. 140; R. 30	Slight obstructive emphysema left lung. Cervico-dorsal scoliosis convexity to right	Piece of carrot removed from L.L.L.B.	The diaphragm regained normal position, but the mediastinum did not (owing to scoliosis). Asymptomatic 6 days
6	11	F	7 years	Pneumonia; no complications. Recurrent haemoptyses and wheezing from age 4	Bronchiectasis R.L.L.	No evidence of foreign body. Slight narrowing middle lobe orifice	Right lower lobectomy. Privet leaves found in L.L.B. Had been seen with them in her mouth when aged 4
7	4	F	1 week	Severe bouts of coughing and vomiting. Sputum purulent. Treated for "pneumonia" with some improvement	Screw in right bronchus. Atelectasis basal segments R.L.L.	Screw removed with difficulty, owing to bronchospasm, from R.L.L.B.	Good recovery
8	3	M	6 weeks	While eating peanuts, choked, went blue, and was gasping for breath. Father "coughed" him and colour improved but wheeze persisted. Bronchoscopy 9 days later at another hospital—fragments of nut removed from R.L.L.B. Initial improvement, then relapse with wheeze and stridor, pyrexia, and purulent sputum	Obstructive emphysema right lung (Fig. 3)	Several pieces of nut removed from R.L.L. and pus aspirated	Complete recovery in 12 days

TABLE III.—Summary of Cases—Contd.

Case No.	Age in Years	Sex	Duration of Symptoms	History and Examination	X-ray Findings	Findings at Bronchoscopy	Comment
9	19	F	2 months	Aspirated piece of coconut. Violent cough for 10 minutes, then pain lower chest on inspiration and tightness. Three previous bronchoscopies elsewhere, when pus and inflamed mucosa only seen	Consolidation lateral basal segment, R.L.L.	Right basal stem bronchus appeared stenosed, owing to granulation tissue; some pus	Intensive physiotherapy, postural drainage, and antibiotics—progressive improvement. Bronchogram normal 1 month later
10	3	M	5 days	While eating peanuts, fell. Bout of coughing and constant wheeze. Obstructive emphysema left lung. Bilateral rhonchi	Obstructive emphysema left lung	Mucosa of L.M.B. oedematous. No foreign body seen at first, but gentle blind instrumentation recovered 2 sizable fragments of nut	Immediate x-ray film showed mediastinum central and emphysema cleared. Complete recovery
11	6/12	M	2 "	Swallowed peanut. Coughed and developed wheeze. Attempts at disposal by holding him upside down and shaking, and suction with endotracheal catheter unsuccessful	Collapse R.L.L. and obstructive emphysema	Half shell and several fragments of nut removed from R.M.B.	Mild laryngotracheitis for 24 hours, then normal
12	2½	F	11 "	On holiday with grandmother swallowed peanuts, choked and coughed. History not known till searching inquiry. Became feverish. Given tablets prescribed by chemist. Later penicillin course. Finally, breathing distressed and cyanosed. O.E., cyanosis, left chest hyperresonant. Air entry absent. T. 99° F. (37.2° C.); P. 140; R. 50	Obstructive emphysema left lung	Nut removed from L.M.B. with difficulty due to severe bronchospasm requiring removal of scope and reinsertion	Immediate improvement in general condition and air entry left lung, then some deterioration. Bulk of foreign body thought to have been removed; nursed in steam tent and recovered completely in 7 days
13	11	M	3 "	Inhaled drawing-pin which had been held in mouth; followed by choking and pain in right upper chest on coughing. T. 100° F. (37.8° C.); P. 96; R. 24	Obstructive emphysema left lung	Pin removed by grasping edge of head (not stem). It was dropped in the pharynx and recovered by direct laryngoscopy	Some laryngeal stridor. Recovery in 5 days
14	49	M	6 "	9 teeth extracted under inhalation anaesthesia. "Swallowed" last tooth. On recovery coughed for 15 minutes, dyspnoeic, chest wheezy and tight. Pain right lower chest, worse with breathing. Sputum stained. O.E., orthopnoeic, slight cyanosis, expiratory wheeze, dullness; decreased A.E. and V.R., R.L.L.	Molar tooth in R.M.B. with consolidation lateral subsegs. of ant. and post. segs. R.U.L., R.L.L., and L.L.L., and pneumoconiosis	Tooth in R.M.B. removed easily	Complete recovery in 3 weeks
15	9	F	2 "	3 molar teeth extracted under general anaesthesia. Immediate dyspnoea and vomiting. Attempted removal at another hospital, but lost when being withdrawn. (Slipped from right to left side.) T. 100° F. (37.8° C.); P. 136; R. 26	Tooth in L.M.B. Obstructive emphysema L.L.L.	Removed from L.M.B.; was dropped during extraction. X-ray film revealed position on right side and successful removal	Cords a little oedematous. Good recovery
16	6	F	3 months 2 " 3 weeks	Inhaled tooth. Choked and coughed. Malaise Rigors	L.U.L. atelectasis and emphysema, L.L.L.	Excessive granulation tissue in L.M.B. prevented adequate view through infants' scope and tooth not removed	Postural drainage and physiotherapy; x-ray film before thoracotomy and bronchotomy 5 days later showed tooth in stomach—it was loosened by attempts at removal, was coughed up and swallowed
17	6	M	6 days	Choked on peanut. Chronic bronchitis. Coughing and febrile since. T. 100° F. (37.8° C.); signs of consolidation R.L.L. and rhonchi diffusely	Patchy atelectasis R.L.L.	Peanut removed from R.L.L.	Readmitted a month later with consolidation post. basic seg. R.L.L. Re-bronchoscopy, but no foreign body seen. Cleared with antibiotics
18	11/12	M	3 weeks	Choked while eating mouthful of peanuts. Intermittent cough and wheezing. O.E., diffuse rhonchi, hyperresonance, and absent air entry, right lower zone	Obstructive emphysema R.L.L.	Nut removed from R.L.M.B.	Good recovery
19	1	M	1 day	Swallowed piece of bath sponge. Expiratory wheeze on exertion. T. 100° F. (37.8° C.); P. 166; R. 46	Atelectasis L.L.L. with obstructive emphysema L.U.L.	Carina obscured by sponge; which obstructed L.M.B.	" "
20	1½	F	3 hours	Swallowed sugar-coated almond. Coughed and became blue. Cough and wheeze since. O.E., wheeze; decreased air entry right chest anteriorly, rales posteriorly	Atelectasis R.L.L. emphysema R.U.L.	Fragmented foreign body R.M.B., white nut and brown skin. Much oedema of mucosa	" "
21	1½	F	5 weeks	Eating apple and choked. Since then occasional cough and wheeze on exertion. O.E., T. 98° F. (36.7° C.); P. 140; R. 24	Emphysema left lung	Piece of apple size of florin removed from L.M.B.	Recovered 4 days
22	1	M	2 "	Choking and cyanosis, while eating omelette. Later developed wheeze. Temperature lower after penicillin course but wheeze remained. T. 102° F. (38.9° C.)	Triangular piece of shell impacted in upper trachea	Difficult anaesthesia and instrumentation. Cords oedematous. Piece of shell removed through glottis and several pieces removed on sucker tip. More pieces removed through bronchoscope	Some signs of laryngeal stridor immediately; one hour later extreme cyanosis and unconsciousness required tracheotomy. Tube removed 10 days; recovered in 1 month
23	11/12	M	1 week	Inhaled walnut while on bus. Choked and became blue. Intermittent cough since. O.E., obstructive emphysema right lung	Atelectasis middle lobe and obstructive emphysema R.L.L.	Piece of walnut removed from R.L.M.B. at level of middle lobe orifice	Recovery 2 weeks
24	11/12	F	7 hours	Choked on liquorice all-sort. Cough and wheeze. O.E., generalized rhonchi. Decreased air entry R.L.L.	Obstructive emphysema R.L.L.	No foreign body found. Moderate amount of purulent secretions aspirated from lower lobes	Normal x-ray film following bronchoscopy. In retrospect, liquorice had dissolved after inhalation, causing immediate intense inflammation
25	13	F	6 weeks	Accidentally inhaled small gold safety-pin. No abnormal signs	Open pin, point up, in R.L.L.B. Basal mottling	Pin below M.L. orifice, with point embedded in mucosa. Several attempts at removal unsuccessful	Thoracotomy and bronchotomy. Head of pin lying below apical seg. of R.L.L.B. It was grasped and the pin gradually removed by straightening it out. Uneventful recovery

leaving the table: a useful trick in the case of children is to blow cigarette smoke over the patient's face.

After bronchoscopy all these patients are treated on return to bed with postural drainage, physiotherapy, and a suitable antibiotic. If removal of a foreign body has failed owing to its impaction in granulation tissue the patient is sent back to bed and treated in the same way as the others. This may allow the oedema to subside and permit a better view at the next attempt. Occasionally a small object which has

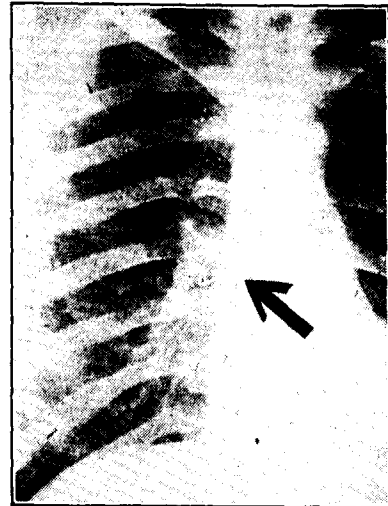


FIG. 5.—Case 2. Postero-anterior chest radiograph. Open safety-pin in right main bronchus.



FIG. 6.—Case 1. Postero-anterior chest radiograph. Pin in posterior basal segment of right lower lobe.

magnetism of alloys depends on the amount of heat received during the processing. Furthermore, the power of a magnet is inversely proportional to the square of the distance from its object, and, while intervening tissues do not impair magnetism *per se*, their presence makes contact difficult. On the whole, metallic objects in main bronchi are more easily removed by direct methods, and in deeply placed situations will usually require bronchotomy.

Prevention

Loose teeth in an anaesthetized patient should always be carefully watched. Children should not be allowed to eat nuts until they have a full set of teeth, or, if they are, the nuts should be finely ground. Small objects such as pins, buttons, and coins should not be left within an infant's reach. A parent should not set a bad example for a child by holding tacks and pins in the mouth. Children should

not be allowed to play while eating, or eat too quickly without proper mastication. The adage is still true that if nothing except food was put in the mouth the inhalation of a foreign body would be a rare accident.

Summary

Experience has been gained with 25 cases of inhaled foreign body, mostly in children. The early history of an inhaled foreign body is often missed; the later results may simulate almost any chest disease. The diagnosis is made from the history and the presence on clinical examination of atelectasis or obstructive emphysema, and from chest radiography. The importance of early removal of the foreign body by a team consisting of an experienced bronchoscopist and an experienced anaesthetist is stressed. The essential part of the anaesthetic is surface analgesia of the trachea and bronchi. If removal by bronchoscopy fails, thoracotomy and bronchotomy is justified, with the sacrifice of any destroyed lung. The majority of inhalation accidents may be prevented: nuts should not be given to young children who have no molars, small objects must be kept out of an infant's reach, and care should be taken with loose teeth in an anaesthetized patient.

We should like to thank Mr. Dillwyn Thomas, consultant thoracic surgeon, Welsh Regional Hospital Board, under whose care these patients were admitted, for his stimulation, criticism, and interest in this study. Mr. W. P. Cleland has kindly given permission to publish Case 25. We are grateful to Mrs. B. Marshall for photography, Miss Juliet Hilary-Jones for secretarial assistance, and Mr. K. Hillard for drawing Fig. 1.

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TRACHEOSTOMY, AND MANAGEMENT OF THE UNCONSCIOUS PATIENT

BY

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In recent years the indications for tracheostomy have been extended to include the management of tetanus, respiratory paralysis, and the unconscious patient. This simple operation has gained a highly valued place in neurosurgical practice, where the problem of maintaining a clear airway in comatose patients is often encountered. In the last four years in the Department of Neurological Surgery of St. Bartholomew's Hospital 16 tracheostomies have been performed. Selected cases are reported to illustrate the varying indications for the procedure. The mechanism whereby the normal gaseous exchange in the lungs is interfered with in these cases is discussed. The technique for ensuring adequate pulmonary ventilation and a satisfactory intracranial circulation in unconscious patients is also described.

Technique of Tracheostomy

It must be emphasized that so far as is possible this operation should be carried out as an elective procedure. It may be satisfactorily performed under local

analgesia, and this is particularly desirable if consciousness and breathing are depressed. It may be carried out with the patient in bed. If necessary, oxygen may be administered through a face-mask. Good illumination is essential, and the aid of an assistant is desirable. The neck must be held straight and extended as far as possible. A vertical midline incision is made, beginning at the cricoid cartilage and extending downwards for 1 in. (2.5 cm.). If desired a transverse incision can be used, but the subsequent more difficult dissection may outweigh the slight cosmetic superiority of the scar when the tube is removed. If the deep cervical fascia is incised strictly in the midline troublesome bleeding is avoided. The sternohyoid and sternothyroid muscles are separated by blunt dissection and held apart. A high tracheostomy has the advantage that the trachea is more superficially placed, and that there is less danger of the tracheostomy tube entering a main bronchus. As damage to the first ring may result in tracheal stenosis at a later date the thyroid isthmus must be retracted downwards or divided. In the latter case it must be divided after the application of artery forceps, as there may be bleeding from anastomotic branches of the superior thyroid arteries.

The incision into the trachea is made at the level of the second or third ring, and if a large tube is to be used it will be necessary to excise a small segment of the anterior part of the tracheal wall. A very large tube should be avoided, as there is a greater risk of trauma to the tracheal mucosa. The inner tube must be of such diameter that it will not be occluded by the passage of a No. 3 or 4 (English) Jaques catheter for suction purposes. It is undesirable to allow a large negative pulmonary pressure to occur during this manoeuvre for reasons that are given later. It has been found that tracheostomy tubes of sizes between Nos. 28 and 32 have been satisfactory. If there is a likelihood of the patient retaining mucoid secretions in the nasopharynx on account of dysphagia or unconsciousness, or should he be liable to vomit, then a cuffed tracheostomy tube will be advantageous, as it will prevent aspiration of these fluids. Penicillin powder may be dusted into the wound, which is not sutured; it is covered by a tulle grass dressing.

Maintenance of an Unobstructed Respiratory Tract After Tracheostomy

Suction.—The use of a mechanical suction apparatus is essential in order to remove secretions from the trachea and bronchi. A selection of sterile fine rubber (Jaques) catheters should be available. It is important to avoid the introduction of pathogenic organisms into the bronchial tree. Additional perforations near the end of the catheter will reduce the risk of trauma to the mucosa by small segments of this being drawn into the catheter. Lubrication is supplied by sterile water or a non-greasy jelly. The frequency of suction is gauged by the speed with which secretions are formed. This may be judged by whether breathing is noisy or by auscultation of the chest. If the mucus is very viscid and difficult to remove a detergent such as "Alevaire," administered by a fine nebulizer, will make it more watery and easier to remove. If there is an established bronchitis or bronchopneumonia, resulting in cyanosis, oxygen may be given either in a tent or through a catheter placed in the tracheostomy tube.

Physiotherapy.—The patient should be turned from side to side every hour in the early days of the tracheostomy, as it is at this time that the secretions are most rapidly formed. Percussion of the chest will help to dislodge mucus retained in more peripheral bronchi, and areas of reduced air entry will indicate the site for this treatment.

Complications of Tracheostomy

A formidable number of complications have been reported by several authors. Davis *et al.* (1953) mention haemorrhage, pneumothorax, and mediastinal emphysema. Perforation of the oesophagus has also been noted. None of these complications occurred in the present series. Tracheal stenosis from damage to the first ring must be borne in mind, and might be the cause for the voice alteration in Case 6 (see below). Crampton-Smith (1955) has emphasized that the introduction of a tube into the trachea, particularly if it is made of rubber, may result in a purulent bronchitis, which in turn may cause obstruction of the bronchi. On the other hand, the management of a severe chest infection in a comatose patient is easier after the establishment of a tracheostomy. Brattström (1954) believes that acute pulmonary oedema may be precipitated by suction through a tracheostomy. He thinks that a high negative pressure may develop during this procedure and overcome the normal bronchoconstrictor control over the pulmonary alveolar pressure: a sudden lowering of the alveolar tension may cause a serous transudation into the alveoli.

Indications for Tracheal Intubation or Tracheostomy

An unobstructed airway may be maintained in comatose patients by posture—that is, by placing the patient on his side in a horizontal position to prevent the tongue falling back; secretions in the mouth and pharynx may be removed by suction. If desired, a Magill airway may be inserted into the mouth. For reasons given below, in neurosurgical practice it is often desirable to keep the patient's head and chest raised. This posture will serve to reduce cerebral congestion and to facilitate a freer respiratory excursion. If coma persists from intracranial causes, and there is difficulty in keeping the airway clear, endotracheal intubation with a rubber tube may be carried out. This has two disadvantages. Firstly, the tube should not be left in position longer than 24 hours for fear of damaging the vocal cords. Secondly, the passage of a fine catheter down the tube for suction may be difficult.

In the series of cases given below the main indications for tracheostomy were: (a) Coma persisting more than 24 hours, when frequent suction was required to remove secretions from the pharynx and trachea. Cases of severe head injury frequently come into this group: when this occurs tracheostomy has been reported by Echols (1949) to be of value; (b) Difficulty in performing tracheal intubation. (c) The development of a lower respiratory infection in stuporous patients. In connexion with this indication Pitman and Wilson (1955) have advocated tracheostomy in the treatment of acute chest infections in chronic bronchitis. (d) Shallow respiration. The total volume of air may become

Groups of Cases Requiring Tracheostomy

Groups of Cases Requiring Tracheostomy	Cases
1. Coma due to acutely raised intracranial pressure	3
2. Coma persisting or recurring in spite of relief of raised intracranial pressure	5
3. Coma following operations in close relation to the brain stem	5
4. Miscellaneous	3
(a) Lesion of cervical cord	
(b) Combined head and chest injuries	
(c) Subarachnoid haemorrhage	

dangerously low. By halving the dead space tracheostomy may give a relatively greater tidal volume (Pitman and Wilson, 1955; Mushin, 1955).

The patients requiring tracheostomy are classified into four different groups according to the varying circumstances indicating necessity for this operation (see Table). An additional indication—namely, respiratory paralysis from a cervical cord lesion—is included in this group.

Case Reports

As already stated, the cases have been grouped to emphasize the differing circumstances, whereby respiration may be depressed and consciousness altered, and when tracheostomy has been required. Tracheal intubation through the mouth or nose was either impracticable for reasons given in the histories or contraindicated because of the time the tube would have remained in place. Illustrative cases are given from each group.

Group 1

In the first group there were three patients whose respiration became depressed and obstructed as a result of brain-stem embarrassment from acutely raised intracranial pressure. Tracheostomy was carried out in the hope of improving the patient's condition by establishing a clear airway, and thus rendering him more fit for the surgical procedure required to relieve the intracranial hypertension. Two cases are briefly reported.

Case 1.—A married woman aged 50 had been suffering from headache for four months. In addition she had a troublesome smoker's cough with purulent sputum. Two nights before admission she took phenobarbitone sodium 1 gr. (65 mg.); the next morning she could not be roused. On transfer to the neurosurgical department she was stuporous, her face was congested, and she was cyanosed; the respiratory rate was 20 a minute. Breathing was stertorous, and was obstructed by secretions in the pharynx and trachea; frequent suction was required. The pulse volume was poor and its rate was 120 a minute. Cerebral angiography indicated a right frontal meningioma. A tracheostomy was performed; there was a slight but immediate improvement in the level of consciousness, the cyanosis and congestion disappeared, and the pulse became slower and of better volume. The patient had been given a more favourable chance of surviving a major operation. Six hours later a craniotomy was performed and the tumour excised. Subsequent recovery was also facilitated, as suction through the tracheostomy tube probably prevented the development of a severe pulmonary infection from retained mucopurulent secretions.

Case 2.—A married woman aged 42 had had two episodes of spontaneous intracranial haemorrhage complicated by a right-sided hemiparesis and deep stupor in the previous six days. Carotid angiography revealed an aneurysm on the left middle cerebral artery. This was exposed by craniotomy and the aneurysmal neck occluded. Two days later the patient became progressively more comatose, with slow and stertorous breathing. Frequent suction of secretions from the pharynx was required. Because it was thought that this state might persist, a tracheostomy was performed. Respirations at once became quieter and there was an improvement in the peripheral circulation. The cranial wound was explored and an extremely oedematous frontal lobe herniated through the dural opening. There was no haematoma, so an internal decompression was performed by excising the frontal lobe. The patient failed to respond to these measures and died the following day from cerebral oedema, which was unrelieved by an internal decompression or by the injection of intravenous hypertonic solutions.

Group 2

In this group of five patients coma persisted or recurred in spite of surgical relief of raised intracranial pressure.

Case 3.—A man aged 23 sustained injuries to his head and face which resulted in a fissured fracture of the cranial vault and a compound fracture of the mandible. He was concussed, but after a lucid interval in hospital he developed evidence of cerebral compression and became rapidly comatose. The prompt evacuation of an extradural haematoma was followed by a partial return of consciousness. The next day his respirations became stertorous and obstructed, and he was cyanosed and showed signs of peripheral vascular failure. Secretions rapidly accumulated in the pharynx and trachea in spite of frequent suction, and his

level of consciousness deteriorated. The mandibular injury made suction difficult. After performing a tracheostomy there was an immediate lightening of the coma and improvement in the peripheral circulation; he made an uninterrupted recovery.

Case 4.—In spite of the evacuation of a post-operative extradural haematoma, this patient, a man aged 30, remained deeply unconscious the next day. His breathing was stertorous and his pulse rate 120 a minute. Lumbar puncture revealed evidence of a pressure cone, as the pressure was only 80 mm. of water and there was no rise on jugular compression. The cone was reduced by an intrathecal saline injection; afterwards there was an immediate improvement in consciousness. He then coughed more often and more vigorously, and required frequent suction to clear his nasopharynx, as swallowing was defective. Three hours later his respirations became increasingly obstructed from acute laryngeal oedema and an attempted tracheal intubation failed; an immediate tracheostomy was performed. At once there was a further improvement of consciousness; the tube was removed six days later, after he had made a speedy recovery.

Case 5.—A man aged 31, while convalescent from a mastoid operation, became increasingly drowsy and was transferred to the department in coma. A temporal lobe abscess was tapped, but, as little improvement followed, it was excised the next day. Over the next few days he developed a purulent bronchitis, which was later complicated by a basal pneumonia. Clearance of his airway became increasingly difficult and his level of consciousness and general condition began to deteriorate. Tracheostomy was performed six days later, and this was followed by a definite improvement in consciousness. His subsequent progress was slow because of the prolonged intracranial hypertension.

There were two further cases which were similarly improved after tracheostomy.

Group 3

The third group comprised five patients in whom surgical procedures were performed in close proximity to the brain stem. Consciousness was depressed for variable periods, and in addition there was impairment of coughing, swallowing, and respiration.

Case 6.—A boy aged 5 was admitted to hospital with a history of headache, sickness, and unsteadiness of gait for 12 months. Ventriculography indicated a cerebellar tumour. At operation a cystic astrocytoma was found in the antero-superior portion of the vermis: the tumour had herniated through the tentorial opening to compress the posterior aspect of the mid-brain. The day following this operation the patient had not recovered consciousness, and maintenance of the airway became increasingly difficult because of the tongue falling back and secretions accumulating in the pharynx and trachea. There was an accompanying early failure of peripheral circulation. Tracheostomy and endotracheal suction was followed by an improvement in peripheral circulation. Consciousness began to return within an hour. The patient then made good progress, although as a later complication there is some voice alteration. It is possible that the first tracheal ring was damaged.

Case 7.—A woman aged 51 had a large acoustic neurinoma which, among other disabilities, occasioned dysphagia and dysarthria. Removal of the tumour revealed that the pons had been severely distorted. The procedure was followed by prolonged unconsciousness and by peripheral vascular collapse, which was aggravated by respiratory obstruction from an accumulation of excessive secretions in the pharynx. She developed bronchopneumonia. Tracheostomy on the fourth post-operative day tided her over, and she gradually recovered consciousness and the pneumonia resolved. The brain stem had been severely embarrassed, however, and she died from decubitus three months later.

There were four more patients in this group in whom consciousness was slow to return after operation and whose condition deteriorated as a result of respiratory obstruction and depression. Tracheostomy made it possible for two of them to recover, but in the remaining two cases the operation was performed as a terminal measure. Necropsy findings here revealed only minimal pulmonary oedema.

Group 4

Case 8: Cervical Cord Lesion.—A married woman aged 57 developed a spastic tetraparesis due to spinal cord compression at the second cervical segment. A laminectomy was performed and a meningioma was excised from this level. This procedure

was followed by an early return of power to her limbs. The patient's breathing remained shallow and diaphragmatic, however, and she could only cough weakly. She was given breathing exercises; her lung bases were cleared by postural drainage. Over the next 10 days she became increasingly cyanosed, dyspnoeic, and drowsy. Some improvement followed intermittent tracheal intubation and oxygen therapy, but the peripheral circulation began to fail, and breathing became moist. Tracheostomy was carried out terminally. Post-mortem examination of the lungs revealed collapse of both lower lobes and severe pulmonary oedema of the upper lobes. The main bronchi and trachea contained only a little fluid.

Case 9: Combined Head and Chest Injuries.—A man aged 61 sustained a fissured fracture of his skull and four broken ribs on the right side. He was transferred to the neurosurgical department on account of increasing coma following a lucid interval. Exploration of the right middle cranial fossa was carried out and an extradural haematoma was evacuated. A splint was applied over the fractured ribs, where there was paradoxical movement with respiration. The next day he was conscious enough to complain of severe chest pain, and this prevented him from coughing adequately, and caused him to breathe shallowly. He retained an increasing amount of secretion in his bronchi and became progressively more cyanosed and stuporous. There was a speedy improvement after establishing a clear airway with a tracheostomy, and his subsequent recovery was uneventful.

Case 10: Subarachnoid Haemorrhage.—A man aged 21 had two subarachnoid haemorrhages within the space of five days. A general anaesthetic was required for carotid angiography, and after this he developed stridor and was unable to cough adequately. A fine lubricated catheter was passed between his vocal cords and the secretions were aspirated. This was followed by increasing stridor and cyanosis due to acute laryngeal oedema. Consciousness deteriorated. Endotracheal intubation failed because of the laryngeal oedema; tracheostomy became urgently necessary, and after its performance consciousness began to reappear, the peripheral circulation improved, and the cyanosis disappeared. The patient then continued to improve, but he subsequently died suddenly from a third intracranial haemorrhage.

These histories demonstrate that tracheostomy was life-saving in 9 of the 16 cases in which it was performed. Of the seven patients who died, three underwent the operation in a final attempt to save life. In Case 8 it should have been performed at least three days earlier and supplemented by intermittent positive-pressure respiration. The other three patients who subsequently died were temporarily benefited by the procedure, but their deaths were inevitable owing to the nature and severity of the intracranial lesions, and were not precipitated by tracheostomy.

Discussion

Unconsciousness is frequently accompanied by respiratory depression, and there is often a single pathological process responsible for the two stages. A lesion in the medulla oblongata or pons, from whatever cause, may readily alter or depress respiration and give rise to coma by interfering with the function of the reticular formation. As a result of coma the tongue falls back as the lower jaw sags, and respiration may become obstructed as well as depressed. Additional factors in the development of obstruction are the accumulation of vomitus, blood, and secretions in the mouth and pharynx. The more severe the obstruction the more stertorous will be the breathing.

Stertor.—At this stage it will be of interest to consider the mechanism of sterter. In this condition breathing is noisy and reminiscent of loud snoring. Inspiration is laboured and accompanied by obvious contraction of the accessory muscles of respiration, and the cheeks are indrawn. Expiration is slower and probably incomplete on account of the obstruction. This results in the chest being held in a state of expansion. The face appears to be congested and the neck veins to be engorged. The noisy breathing may be due to two causes. The first is that mucus lying on the vocal cords may cause them to vibrate, as movement of the mucus occurs during the respiratory excursion. The second is that the tongue may be in close contact with the soft palate, and a number of rapid "make and break" contacts between these two structures will contribute to the noise.

Factors in Respiratory Obstruction

The factors giving rise to obstructed or depressed respirations, and leading to inadequate blood oxygenation and carbon dioxide excretion in unconscious patients, appear to fall into two categories—namely, sudden loss of consciousness and prolonged coma.

1. *Sudden Loss of Consciousness.*—The causes of coma of sudden onset that are relevant to the present discussion include head injury, cerebrovascular accidents, and pressure cones from acutely raised intracranial pressure. Respiration may be stertorous. When unobstructed respiration has been difficult to maintain by posture and by an airway inserted in the mouth, and the coma has been of severe degree, an endotracheal tube has been passed with the aid of a laryngoscope. A striking feature in these cases has been that, whereas in the nose, mouth, and pharynx there has been only a small quantity of saliva, the larynx and upper end of the trachea have been filled with white frothy tenacious fluid. The laryngeal mucosa has appeared congested. The source of this fluid is of interest. Aspirated saliva might be one source. When the mouth and pharynx have appeared relatively dry, and laryngoscopy performed within a very few minutes of the onset of coma has shown its presence, then it would appear that some other explanation is required.

In a recent case of sudden loss of consciousness in a previously fully alert patient suffering from a tumour of the fourth ventricle, active steps were taken at once to prevent aspiration of saliva until the trachea was intubated. Death followed shortly after this. Post-mortem examination revealed frothy white mucus filling the bronchial tree. Similar post-mortem findings have been demonstrated in two cases in the present series. Altschule (1954) lists acute cerebral lesions among the causes of pulmonary oedema. In the cases under consideration the lungs were not oedematous and were well aerated. The fluid was contained in the bronchi. Two possible explanations for this accumulation of fluid present themselves. The first is that there is a reflex secretion from tracheo-bronchial mucous glands, of central or brain-stem origin. The presence of subarachnoid blood in the posterior fossa of cats has been found to result in mucus secretions in the bronchial tree (J. C. Seymour, 1956, personal communication). Cameron (1948) has found that placing human thrombin and fibrin in the fourth ventricle of rabbits causes secretions to collect in the trachea and bronchi, although he attributes this to pulmonary oedema. An alternative explanation is that an abnormally high negative intrathoracic pressure in the inspiratory phase of obstructed respiration causes the ducts of these glands to discharge their secretions into the trachea and bronchi.

2. *Prolonged Coma.*—The morbid processes whereby insufficient pulmonary ventilation leads to hypoxia and hypercapnia in cases of prolonged unconsciousness are more complex than in the former group. Again there are the two primary factors of respiratory depression and obstruction. Additional factors are the loss of the cough and swallowing reflexes, and the accumulation of saliva in the mouth and pharynx, and, finally, pulmonary oedema.

Obstruction of breathing is again brought about by the tongue falling back. Over a long period of time there is a greater risk of aspiration of saliva, particularly as the swallowing reflex is often lost. The secretion of mucus into the trachea becomes less obvious and is masked by aspirated saliva and by the frequent development of a bronchopulmonary infection with the production of a copious mucopurulent sputum. The inability to cough adequately causes these fluids to be retained in the bronchi. The high negative pressure occasioned by obstructed breathing during the inspiratory phase may cause the more peripheral bronchi to become blocked. Areas of segmental pulmonary collapse ensue, and the ground is prepared for a severe pulmonary infection. In the presence of shallow breathing the tidal volume becomes dangerously lowered. The oxygen tension in the alveolar air falls, and the carbon dioxide tension rises.

It becomes apparent that the blood oxygen must fall and the blood carbon dioxide rise. After a period of respiratory stimulation, if these changes pass beyond a certain level then respiration will become depressed.

The effect of a poor respiratory excursion and obstructed respiration upon the circulation will initially be an inadequate venous return to the right side of the heart. This will cause a raised systemic venous pressure, and a particularly serious aspect will be cerebral venous congestion and perhaps cerebral oedema. Either the primary intracranial lesion may be accentuated or recovery from it delayed. It has been shown by White *et al.* (1942) that hypoxia increases cerebral intercellular fluid, and that hypercapnia causes cerebral venous congestion. These factors may inhibit brain-stem function, and by the further depression of respiration a vicious circle becomes established.

Pulmonary Oedema

Altschule (1954) and Hayward (1955) have pointed out that anoxia increases capillary permeability, and may cause pulmonary oedema. Another possible cause for this condition in cerebral cases is an abnormally high negative intrathoracic pressure accompanying the inspiratory phase when breathing is obstructed. When respiration is obstructed the pressure in the pulmonary veins and capillaries may be greater than the osmotic pressure of the blood; transudation may then occur into the pulmonary interstitial tissue and alveoli. This fluid may have a high protein content and, further, draw fluid from the blood into the alveoli.

In the present series gross pulmonary oedema was found at post-mortem examination only when coma was prolonged. In Case 8, a woman suffering from a high cervical cord lesion, respiration was shallow for a number of days, and the cough reflex was inadequate to clear her bronchi of retained secretions. Coma gradually developed, presumably from long-continued hypoxia.

From the foregoing observations it becomes clear that, in addition to maintaining a clear airway during coma, it is essential to ensure that there is a satisfactory respiratory excursion. This is necessary not only to prevent circulatory failure but also to provide for adequate gaseous exchange in the lungs. In certain cases intermittent positive-pressure respiration will be of help.

The position of the unconscious patient may tend further to diminish respiratory excursion and increase cerebral venous congestion. It is a common practice to keep the patient horizontal or even tilted head downwards to encourage secretions to drain from the lungs into the mouth, from which they can be removed by suction. Some authors believe that it is wrong to elevate the head and shoulders if the coughing mechanism is defective, for fear this position will increase pulmonary hypostasis and embarrass respiration still further. Elevation of the head and shoulders, however, has the merit of allowing a greater respiratory excursion, encouraging the return of blood to the right side of the heart from the head, and reducing cerebral venous congestion. It would be unwise to adopt this position in acute head injuries, which are often complicated by bleeding into the nasopharynx or mouth and by vomiting; there is a real danger of these fluids being aspirated. Shock would be another contraindication. Elevation of the head and shoulders becomes indicated in the group of cases with prolonged coma when these complications are often absent.

It is rare that the cough reflex is completely lost. If a tracheostomy has been established, the aspiration of secretions may be prevented by a cuffed tube. Mechanical suction, which will stimulate coughing as well, will be a more efficient means of clearing the bronchial tree than the physiologically disadvantageous position of lowering the head below the heart level.

Summary

The importance of maintaining a clear airway in comatose patients is again stressed. When consciousness

is suddenly lost this may be achieved by placing the patient in a horizontal position and inserting a Magill airway into the mouth. If this is inadequate the trachea may be intubated through the mouth or nose.

If coma is prolonged there is usually a coincidental depression of respiration and of the coughing and swallowing mechanisms. Secretions may be aspirated and retained in the smaller bronchi. The blood oxygen tension falls and carbon dioxide tension rises. Secondary circulatory changes occur, and these may lead to cerebral venous congestion and oedema, and to pulmonary oedema. Tracheostomy is of value in these cases, as it halves the dead space air and allows for ease in the mechanical suction of the trachea and bronchi. A cuffed tube is advantageous in preventing the aspiration of secretion from the pharynx. The raising of the head and shoulders allows a fuller respiratory excursion by reducing the weight of the abdominal contents on the diaphragm. Venous return to the heart is thereby improved; the danger of cerebral venous congestion is reduced.

The source of the fluid accumulations in the lungs is discussed. When consciousness is suddenly lost from acute intracranial lesions it is believed that the fluid is secreted by the tracheo-bronchial mucous glands. The possible mechanisms for this are discussed. When coma is prolonged the fluid is thought to be due to the same secretions, but additional factors are the development of a purulent broncho-pulmonary infection and, terminally, pulmonary oedema.

It is emphasized that in cases of coma tracheostomy should be an elective procedure, and its performance should not be delayed until the patient has become cyanosed or has begun to develop peripheral circulatory failure. Selected case histories are described from a series of 16 patients in whom this operation was performed.

I thank Mr. J. E. A. O'Connell for his advice during the preparation of this paper, and Dr. J. C. Seymour for permission to quote from his unpublished material.

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King Edward's Hospital Fund for London Hospital Catering Advisory Service have issued a second edition of their memorandum entitled "General Hospital Diets." This is a guide to the cost of feeding patients in general hospitals based on the average wholesale and retail prices of 1955. The new edition contains a section on the extra cost of feeding maternity patients—about 3s. 6d. a week each. 36 weekly menus are given, three for each month of the year, the first set being more expensive than the other two. 662 recipes are included at the end of the book, giving ingredients for 100 portions. Copies of the booklet are obtainable from King Edward's Hospital Fund for London, 10, Old Jewry, E.C.2, price 5s., post free.

MAINTENANCE OF HIGH SICKLING RATE IN AN AFRICAN COMMUNITY

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It is accepted that the sickle-cell gene can cause early death if it is inherited in the homozygous state, yet in spite of this constant depletion it still exists at remarkably high frequencies in tropical Africa. Several attempts have been made to explain this. Neel (1953) gives a review of population dynamics in this connexion, and Edington and Lehmann (1956) trace the opinions that led up to Allison's (1954a, 1954b) formulations of the two hypotheses that at present hold the field. Firstly, Allison postulated greater fitness of sickle-cell heterozygotes (AS) as compared with normal homozygotes (AA) in respect of malaria, a higher death rate amongst the latter balancing the loss of S genes by deaths from sickle-cell anaemia. Secondly, he deduced from his own observations, and from reports in the literature, that about 25% of sickle-cell homozygotes (SS) survived and procreated. Each of these explanations raises problems that are briefly outlined below.

Differential Malarial Morbidity

The questions whether malarial infection is less easy to establish in sicklers as originally claimed by Allison (1954a), and whether malarial parasitaemia is less common in them than in non-sicklers, have been investigated by several workers. The evidence, some of which is contradictory, has been recently reviewed (*British Medical Journal*, 1955; Edington and Lehmann, 1956). In our opinion there is no reason to believe that the mere establishment of a *P. falciparum* infection is any more difficult in a sickling subject than in a normal person.

But from a genetic point of view these matters are of negligible importance. The crucial question is whether more sickling than sickling children die, directly or indirectly, from malaria. A relatively lower direct mortality from malaria in sickling children has recently been demonstrated (Raper, 1956), thus establishing that malaria is quite capable of acting as a selective agent. However, there has been a reluctance to believe that its effect could be powerful enough to account for the maintenance of some of the highest sickling rates observed.

For example, if the sickling gene (S) had no lethal effect, a population showing 36% of the phenotype S can be calculated to consist of 4% of the genotype SS, 32% of the genotype AS, and 64% of normal persons of genotype AA. One-fifth of the S genes are therefore carried by the sickle-cell homozygotes. If the latter were all to die before re-producing, the original S gene frequency could be restored only by the removal of one-fifth of the A genes, none from the heterozygotes, but all from the normal homozygotes. This would mean the death of 25% of the normal homozygotes from the selective agent alone. It has been difficult to imagine how malaria could account for this, especially when the total deaths may only slightly exceed this figure. We shall show below that the above calculation does not take account of all the facts; but we note here that it has contributed to the need for the second hypothesis, the survival of a proportion of the SS homozygotes.

Survival of Sickle-cell Homozygotes

There is no reliable information concerning how far the survival of sickling homozygotes contributes to the maintenance of high frequencies of the gene. It is difficult to accept statements asserting their survival to adult life unless the claim is supported by analysis of the haemoglobin. This criterion has become important since the recognition of haemolytic syndromes caused by the inheritance of certain other genes together with that for sickling, where both are in the heterozygous state; for such syndromes are generally compatible with longer life than is sickle-cell anaemia. For example, in West Africa sickle-cell-haemoglobin C disease (SC) in adults is not uncommon.

Only two published investigations refer to adult homozygous sicklers in Africa, and support the claim by haemoglobin analysis; those by Allison (1954b) and Edington and Lehmann (1955a). The latter found, in two healthy adults, a composition of haemoglobin indistinguishable from that seen in sickle-cell anaemia. Subsequent family studies showed, however, that these persons were in fact heterozygous for the sickling gene, and that they carried a thalassaemia (or thalassaemia-like) gene which suppressed the formation of haemoglobin A to such an extent that it could no longer be revealed by electrophoresis (Edington and Lehmann, 1955b). Allison's two examples showed "significant amounts of haemoglobin F together with more than 50% haemoglobin S," and he at that time reasonably accepted them as homozygotes; but in view of Edington and Lehmann's later experience his claim cannot be accepted as proved.

Nevertheless we thought it unlikely that every sickle-cell homozygote in Africa should necessarily exhibit a severe form of the disease, and die prematurely. In Uganda we have observed adolescents and young adults suffering from sickle-cell anaemia of no great severity, in whose cases haematological, chemical, and genetic studies were consistent with the view that they were homozygotes. But we have no knowledge of what proportion of such people succeed in reproducing and contribute to the stock of S genes in the next generation.

To obtain more evidence on these subjects we decided to examine a population showing a very high incidence of the sickling gene. The Baamba tribe shows the highest sickling rate in Uganda, and for this reason was chosen. Of this tribe it had been stated that "the incidence of sickling among the pygmyoid Baamba is 45%; this percentage must include homozygotes" (Lehmann, 1951). Even if only 25% of homozygotes survived to adult life there would still remain a good numerical chance of discovering them. Finally, if it could be shown that the survival of homozygotes made no contribution to the high sickling rate we should be able to observe the effect of any selective agent at its most intense.

The Baamba Tribe

The Baamba live in a region bounded on the south-east by the spurs of the Ruwenzori range, and on the north and north-west by the Semiliki river and its tributaries. The altitude is around 2,500 feet (760 metres). Baamba is a largely forested country, and the dense vegetation near the river is continuous with the Ituri forest in the Belgian Congo to the west. The people living here were effectively isolated by forest and mountain until 1938, when the completion of a mountain road from Fort Portal connected Bwamba with the rest of Uganda.

The Baamba consist of two linguistically different groups. The Babulibuli speak a language allied to some spoken in the neighbouring Congo; it is claimed that they have always occupied Bwamba, and were certainly there when the other group, the Babwizi, began to invade the country peacefully from the east, perhaps under pressure from more advanced pastoral peoples. For our present purposes, we may regard the two groups as having fused, over several centuries, into a fairly homogeneous tribe in a fixed habitat. The

neighbours of this tribe are the Bakonjo, who lead a separate existence on the mountain slopes above Bwamba; and in the forest are scattered groups of pygmies. Doubtless the Baamba miscegenate with both, but only to a very small extent.

Procedure

Blood was obtained by finger-prick from 623 Baamba. Each sample was distributed as follows: One drop was mixed immediately on a slide with a broth culture of *Bact. coli*, covered, and inspected for sickling after one to four hours (method of Singer and Robin, 1948). On another slide thick and thin blood films were made, except in the case of some of the adult subjects. The thick films were stained by Field's rapid method, and the thin films were fixed in alcohol for future reference. Finally, several drops of blood were collected in a small test-tube to be available for electrophoresis later in the day.

In all cases where the sickle-cell test proved positive, and in addition in about half of the negative samples, the haemoglobin was examined by paper electrophoresis. The method of Smith and Conley (1953) was used, electricity being provided by dry batteries.

Random samples were obtained by examining out-patients attending the Government Dispensary, catechumens attending a mission, and schoolchildren at a mission school near Bundibugyo, the main centre of population. People from a wide area came to these institutions. In this way we obtained samples of blood from 574 persons, 490 of them over the age of 5 years. To obtain more children we collected at two localities in the field, realizing that we should not obtain true random samples by this means. In fact, in one place the sickling rate was considerably higher, and in the other considerably lower, than that of the people examined at random.

In all cases location, name, sex, and, where applicable, family relationship were recorded. If the age was not known, a near estimate was made. In 463 instances we asked whether the people belonged to the Bwizi or Bulibuli section of the Baamba. It may be stated here that there was no apparent difference in sickling rate between the two.

Results

1. Sickling Rate

Table I summarizes our findings in subjects of different ages and at different localities.

TABLE I

Age Group	Locality	Total Examined	Sicklers
Adults (15 years and over)	Dispensary ..	162	56
	School and mission ..	117	47
Children (5 to 14 years)	Dispensary ..	20	8
	School and mission ..	191	72
	In the field ..	13	8
Infants (Under 5 years)	Dispensary ..	84	20
	In the field ..	36	16
Total ..		623	227

To arrive at a sickling rate for the adult population based on a random sample, certain data have to be excluded: (a) all children under 5 years, because among them it is assumed that equilibrium has not been reached; (b) those collected in the field, because the subjects consisted of families; and (c) the first-degree relations of any one subject—mostly the children of mothers at the dispensary.

Having excluded these groups, we were left with 277 adults, of whom 102 were sicklers, and 201 children aged 5 to 14, of whom 75 were sicklers; a total of 478 subjects with a sickling rate of 37.0%.

Two previous estimates of the sickling rate of the Baamba have been made. These had drawn their subjects from similar sources; Lehmann and Raper (1949) found 63 sicklers amongst 140 subjects (45%), and Allison (1954c) found 86 amongst 220 (39.1%). Calculation of χ^2 shows that each of

these three samples might, with a probability of more than 0.1, have been drawn from populations of identical sickling rate. For the purposes of calculation below, the three series have been added, giving an incidence of 39% (38.9%).

2. Electrophoretic Analysis

Altogether 435 blood samples, including those from all the 227 sicklers, were examined by paper electrophoresis. No variants of adult haemoglobin other than haemoglobin S were found.

Of the 227 sicklers, 223 were shown to possess both haemoglobin A and haemoglobin S, hence they were sickle-cell heterozygotes. These included all the adults and children, and all but four of the infants. In two sickling babies, aged 2 and 4 weeks respectively, no resolution of the haemoglobin was seen; a single spot was present in the position of foetal haemoglobin, indicating that the proportion of any other haemoglobin present was too small to allow it to be revealed by electrophoresis. Such a finding is quite usual in babies if there is a high proportion of foetal haemoglobin, and it is only at a later age, when the foetal haemoglobin has fallen, that the composition of the adult fraction of the haemoglobin can be determined. It is impossible to say whether these two babies were homozygotes or heterozygotes. In two instances (Cases 571 and 605, aged respectively 14 and 18 months) electrophoresis revealed only one component with the mobility of haemoglobin S. We concluded that these children were homozygous for the sickling gene. At the time of examination, neither had shown any clinical signs suggesting the diagnosis of sickle-cell anaemia. Examination of their thick and thin blood films gave the following results:

Case 571.—Thick film: Scanty *P. falciparum*, including gametocytes. Thin film: No leucocytosis; erythrocytes showed mild anisocytosis and a slight degree of polychromasia, a few macrocytes, no normoblasts. These findings needed no other explanation than the malaria which was present, and we cannot therefore conclude that this child was suffering from sickle-cell anaemia at the time of examination.

Case 605.—Thick film: No parasites. Thin film: There was a fully developed leuco-erythroblastic picture—numerous normoblasts and many irreversibly sickled erythrocytes were seen. There could be no doubt that this represented sickle-cell anaemia.

As we have pointed out above, analysis of the haemoglobin cannot prove beyond doubt that a subject is homozygous for the sickling gene. However, we did not think it necessary to test our diagnosis in these cases by family studies, as we should have done if the subjects had been adults.

3. Malaria

It is known that Bwamba is a highly malarious district. Its entomology and climate have been intensively studied by the staff of the Yellow Fever Institute of the Rockefeller Foundation; we are indebted to Dr. A. J. Had-dow for the information that malarial transmission occurs throughout the year. We examined thick blood films from 166 children and 186 adults. The only species found were *P. falciparum* and *P. malariae*. The crude malarial incidence at different ages is given in Table II, and will be seen to be characteristic of a hyperendemic area.

TABLE II.—Incidence of Malaria (All Species) at Various Ages in Bwamba

Years:	1	1-1	1-2	2-5	5-10	10-15	15+
Total cases	30	22	25	38	22	29	186
Malarial	16	13	19	28	18	6	9
Malaria rate ..	53%	60%	76%	73%	81%	21%	5%

A large proportion of this high incidence, however, was due to *P. malariae*. Taking all ages, the incidence of *P. falciparum* was 15% and of *P. malariae* 13%. In the 77 children under the age of 2 years (before the acquisition of immunity is well advanced) *P. falciparum* was present in 32.5% and *P. malariae* in 35%. But malarial transmission was probably less than the average for Bwamba at the time

of our study, which was just before the "long rains," and examination at such a time would tend to minimize especially the falciparum infection rate.

Discussion

Adult Sickle-cell Homozygotes

The sickling rate in Bwamba is 39%. If we assume for the moment that the previous generation had contained no sickling homozygotes, and had consisted of 39% heterozygotes and 61% normal homozygotes, the present generation must have contained at birth 3.8% sickling homozygotes. If only 25% of these survived to adult life, and if at the same time sufficient normal homozygotes died to restore the sickling rate to 39%, it can be calculated that the incidence of sickling homozygotes would become 0.98%. But this percentage would be exceeded if, instead of our original assumption, the previous generation had also contained 25% of adult homozygotes. Thus our random sample of 478 adults should have contained at the very least five sickling homozygotes. Surprisingly, none were found. From the Table for Poisson distribution of Pearson and Hartley (1954) an observed value 0 corresponds to an expected value between 0 and 3.69, with probability (confidence coefficient) 0.95, and to an expected value between 0 and 5.30 with probability 0.99. A survival rate of 25% of homozygotes is thus unlikely, and we conclude that the survival of sickle-cell homozygotes plays no significant part in the maintenance of the high sickling rate in the Baamba.

Balanced Polymorphism

Having established that selection against sickle-cell homozygotes is virtually complete, we can calculate the degree of selection against the normal homozygotes necessary to maintain a stable sickling rate of 39%. An adult population consisting of 61% normal homozygotes and 39% heterozygotes will give rise in the following generation to heterozygotes will give rise in the following generation to heterozygotes, 31.4%; sickle-cell homozygotes, 3.8%. The heterozygotes, 31.4%; sickle-cell homozygotes, 3.8%. The death of all the last-named involves the loss of 7.6 S genes out of 39, or 19.5% of all the S genes. A counterbalancing loss of 19.5% of the A genes, through the death of normal loss of 19.5% of the A genes, through the death of normal homozygotes only, would involve the death of 24.2% of homozygotes only, would involve the death of 24.2% of the latter. From this it can be calculated that the "fitness" of the normal homozygotes compared with the heterozygotes of the normal homozygotes compared with the heterozygotes of the presses the relative viability of these two elements of the population, or the final genetic equilibrium between them at the end of the process of selection that occurs between the moment of conception and the time of procreation. It gives no information concerning precisely how or when the equilibrium is brought about, and some further analysis of this is necessary.

We have no reason to believe that any selection operates in respect of mating, fertility, or foetal viability, and can assume that selection occurs between birth and reproductive age. It is postulated that the main reason why the normal homozygotes are less viable than the heterozygotes is that the former are more likely to die from falciparum malaria. But this may not be the only factor. Quite possibly the balance is a complex of several factors, some of which may actually be to advantage of the homozygotes; for instance, there have been suggestions (Lambotte-Légrand, 1951; Raper, 1956) that typhoid is a more serious disease in sicklers. However, the only effect of this kind that has been proved to exist is that exerted by malaria. So far as we can tell at present, malaria distinguishes between sicklers and non-sicklers only in that the former escape the heaviest and infections and rarely if ever succumb to cerebral malaria or the other serious forms of the disease (Raper, 1955, 1956). This distinction vanishes when immunity is acquired, a process that our observations suggest is completed soon after the fifth year in Baamba children. Before this age, malaria undoubtedly leads to ill-health, and perhaps contributes to mortality from other diseases, but we have little reason to suppose that this effect is significantly more important in

normal homozygotes than in sicklers. As a hypothesis, therefore, we may suppose that the whole process of selection in Bwamba is attributable to falciparum malaria in childhood, and that it is manifested by deaths directly due to this disease in normal homozygotes, none (or an insignificant number) occurring in heterozygotes. We have to consider whether this is a tenable hypothesis.

The question cannot be answered directly without a full knowledge of the vital statistics of Bwamba, which we do not possess. This information is difficult to obtain even in much more developed parts of Africa, and it then refers to deaths from malaria in the whole community. We must therefore examine the implications of the selective process in terms of the loss of life from malaria in the whole child population. One of the facts we shall have to take into consideration is the total loss of life from all causes in childhood, or, more accurately, before puberty; and fortunately we have a reliable estimate of this. Dr. J. McFie conducted a survey in the district in 1954, during which he carefully questioned all the women in one location about the number of live births claimed by each, and the number of their children who had died before the time of questioning. With his permission we are able to quote that 45 women of all ages claimed 189 live births, and recorded 111 deaths of their children. Thus at the time of the survey 58.8% of the children born to these mothers had died, and it is evident that to obtain the true wastage of life before puberty this percentage will have to be increased to take account of the fact that not all the children of the mothers questioned had yet reached puberty, and that some of these might still die. A conservative estimate of the loss of life before puberty in this location would be about 65%.

Accepting this estimate of the loss of life, we may envisage balanced polymorphism being achieved in Bwamba in two extreme ways. Suppose first that selection takes place before any other deaths occur; the process then is as shown

TABLE III.—Balanced Polymorphism in Bwamba: Selection Acting First

Population at Birth* (1,000)	Selective Mortality		Undifferentiated Mortality	
	Malaria Deaths	Survivors (805, AS being 39%)	Deaths (AS=AA=56.5%)	Survivors (350)
AS 314 ..	0	314	177	137
AA 648 ..	157	491	278	213

* This includes 38 sickle-cell homozygotes (SS).

in Table III. If we had been able to observe the deaths recorded in this table, we should have registered 157 deaths from malaria amongst the 648 normal homozygotes, or 24.2%, but for the whole community the loss of life from malaria would appear as 15.7%. But suppose, secondly, that selection takes place after all other causes of death have taken their toll; we should then find the results given in Table IV.

TABLE IV.—Balanced Polymorphism in Bwamba: Selection Acting After Other Causes of Death

Population at Birth* (1,000)	Undifferentiated Mortality		Selective Mortality	
	Deaths (56.5%)	Survivors (419; 33% AS)	Malaria Deaths	Survivors (350; 39% AS)
AS 314 ..	177	137	0	137
AA 648 ..	366	282	69	213

* This includes 38 sickle-cell homozygotes (SS).

Selection, now acting on a smaller population, still causes the death of 69 out of 232, or 24.2%, of the normal homozygotes at risk, but the observable loss of life from malaria for the whole community is only 6.9% of the children born. If malaria is imagined as causing deaths concurrently with other diseases, as would in fact be the case, the figures observed would lie somewhere between the limits assigned by Tables III and IV, and malaria would be credited with the removal of from 6.9 to 15.7% of the whole child popula-

tion, or of 10.6 to 24.2% of all normal homozygotes born. Since malarial deaths are likely to follow what must be a considerable proportion of the loss of child life—that in the first month or two—we may surmise that the observed figures would approximate to the lower rather than to the higher of these limits.

These considerations reduce the difficulty mentioned above, of requiring an excessively high malaria death rate to account for the maintenance of sickling rates as high as 39% ; we find that no very high malaria death rate need be recorded if the loss of life from other diseases is high, and especially if a large proportion of that loss consists of neonatal deaths. These are the conditions that prevail in Bwamba and many other parts of Africa.

Although, as we have said, we have no mortality statistics for Bwamba, we may compare it with large parts of the Belgian Congo. Duren (1951) reviewed the sources of information on malaria mortality in the Congo, and after taking due account of their inadequacy he concluded that below the age of 3 years deaths directly from malaria amounted to 14 to 22 per 1,000 per annum. Colbourne and Edington (1954) obtained a roughly similar figure, 17 per 1,000 for children under 1 year in Accra, and 10 per 1,000 for children from 1 to 5 years. The mortality in Bwamba is unlikely to be less than these estimates, which amount to a cumulative loss during childhood of about 5 to 10% of children born. This is very close to the figure, 6.9% or more, which we have shown to be required for preserving a state of balanced polymorphism in Bwamba, and we may therefore conclude that malaria could act as an effective selective agent under the primitive conditions of Bwamba, to maintain a sickling rate as high as 39%. It follows from our consideration of the mechanics of balanced polymorphism that the malaria situation in two regions might be the same in the sense that it caused the same loss of life before the age of, say, 3 or 5 years, yet in these two regions it might be the factor in maintaining two entirely different sickling rates. This could come about if the two populations differed in their mortality before the age at which the malaria mortality in each was at its greatest. Hence no simple measure of malaria morbidity or mortality even if it were the malarial mortality in normal homozygotes that could be measured, could enable one to predict accurately the sickling rate that might be maintained. The situation cannot be defined without reference to the whole infant mortality, and its relation in time to the malarial deaths.

Summary

The Baamba, an African tribe showing a high sickling rate (39%) has been examined to determine how this high rate can be maintained.

Of the 623 subjects examined, 227 were sicklers. No genetic variants of normal adult haemoglobin other than haemoglobin S were found. Amongst 191 sickling subjects over the age of 5 no homozygotes were detected; and it is concluded that the survival of sickle-cell homozygotes plays no significant part in maintaining the sickling rate of this tribe at its high level.

If selective death of non-sicklers from malaria was responsible for the maintenance of the 39% sickling rate in Bwamba, 10.6-24.2% of all normal homozygotes (or 6.9-15.7% of the whole child population) would have to die from malaria. Reasons are given for supposing that the actual death rate to be observed would approximate to the lower rather than the higher of the two limits, and that such a death rate from malaria is to be expected in Bwamba.

Our thanks for support in this investigation are due to the Director of Medical Services, Uganda, and to many members of the Administrative and Medical Services. We also wish to thank Dr. J. A. Fraser Roberts and Dr. C. A. B. Smith for advice and discussion of statistical problems. One of us (H. L.)

thanks the Colonial Medical Research Committee for a grant enabling him to visit Uganda and for defraying part of the expenses of this investigation.

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FAMILIAL AGAMMAGLOBULINAEMIA

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Absence of serum gammaglobulin causing lowered resistance to infection was discovered by Bruton (1952) in a boy suffering from recurrent septic infections. More cases in boys were described by Janeway, Apt, and Gitlin (1953). The condition as it occurred in boys was thought to be primary, familial, and sex-linked.

The primary disorder was subsequently described in males and females of all ages; of 38 case histories that we have been able to obtain, 18 have been those of boys. Kulneff, Pedersen, and Waldenström (1955) describe the disease in two brothers aged 9 and 7, and in a distant male relative aged 5.

The important features of the disease are repeated septic respiratory and non-respiratory infections, lack of cutaneous responses to antigens, almost complete absence of circulatory antibodies and of gammaglobulin from the blood serum and connective tissues, diminution in the number of plasma cells in the tissues, and failure of lymphatic nodes to respond to antigenic stimuli (Janeway, 1954). In most cases isohaemagglutinins have been entirely absent from the blood. Virus exanthems usually run their normal course, but in some children they recur. Infants suffering from agammaglobulinaemia may die of intractable infections (Keidan, McCarthy, and Haworth 1953; Janeway, 1954; Hutchison, 1955). Most of the female patients have had bronchiectasis, and in most of the adults the spleen has been enlarged.

Patients who have been given repeated injections of gammaglobulin (0.1 g. per kg. body weight per month) have usually responded well. Treatment with antibiotics has been found essential to control acute infections (Janeway, 1954), and has sometimes been given continuously with good effect.

The cases here described are those of two brothers who are suffering from familial agammaglobulinaemia in its classical form.

Case 1

This patient was born in November, 1945. He had bronchopneumonia at two months. Left chronic otitis media began in 1948 and persisted until 1951, when tonsillectomy was performed; both antra were washed out, with the production of mucopus. The ear dried up, but mucopurulent discharge started again within three months.

1952.—Left cortical mastoidectomy was performed. Pus and soft granulation tissue were present in the mastoid cavity. The operation wound became septic and took five months to heal. March: Shortly after the mastoidectomy chest x-ray examination showed patchy infiltration in the right lower lobe, with enlargement of the hilar glands. April: He was Mantoux 1/100 negative; six weeks later Mantoux 1/100 positive. Guinea-pig inoculation of gastric washings showed generalized tuberculosis at necropsy. E.S.R. was 10/200 mm./hr.; white cell count, 14,200 per c.mm. (neutrophil polymorphs 75%, lymphocytes 18%, monocytes 7%). Intramuscular streptomycin was given for one month. July: Chest x-ray film showed a primary focus in the right lower lobe, with a small pleural effusion; the bronchogram was normal. His ear was still discharging and there was mucopurulent discharge from his antra. A further month of streptomycin with P.A.S. was given.

1953.—Right cortical mastoidectomy was performed. A further course of intramuscular streptomycin was given. Soon after, he developed a right upper lobe pneumonia. White cells, 5,900 per c.mm. (polymorphonuclear leucocytes 33%, lymphocytes 61%, mononuclear leucocytes 2%, eosinophil leucocytes 3%, monocytes 1%, basophils 1%). September: Chest x-ray film showed a little enlargement of the right hilar shadow only.

1954.—February and April: He had further attacks of right upper lobe pneumonia. July: Mantoux 1/10,000 positive; given intramuscular streptomycin, oral P.A.S., and oral isoniazid for one month. August: E.S.R. 5 mm.; chest x-ray film showed pleural thickening right side. October: Appeared to be well; ears dry, E.S.R. 4/200 mm. hr. Shick-positive. Bronchogram showed a small saccular dilatation of a right lower lobe segmental bronchus, but there was no other abnormality. One dose T.A.F. was given.

1955.—He had right lower lobe pneumonia in February, and bronchitis and right otitis media in March. He was seen at Edmonton Chest Clinic on June 7 suffering from right lower lobe pneumonia, and was admitted to the North Middlesex Hospital. This was his twelfth hospital admission and seventh hospital. X-ray examination showed both antra to be infected. Because of the history of recurrent infections, agammaglobulinaemia was suspected, and confirmed by agar electrophoresis of the serum proteins.

Investigations.—Paper electrophoresis: The serum was subjected to electrophoresis on paper—the paper strips were dried and stained with bromocresol green, and the protein fractions were cut out. The dye was eluted with a solution of equal parts of methanol and 10% sodium carbonate, and measured by absorptiometry. No correction was made for any difference in the dye-binding of different protein fractions. Electrophoretic pattern: Albumin, 3.71 g./100 ml.; α 1-globulin 0.67, α 2-globulin 0.84, β -globulin 0.80, γ -globulin 0.05 (normal 0.8–1.4). Re-examination of the serum in November gave a similar pattern. Zinc turbidity, 0.5 unit. Blood group A (no β -isohaemagglutinins present). Schick-positive. Mantoux 1/10,000 positive. Chest x-ray examination on August 10 showed that the pneumonia had resolved. He was discharged on August 12, taking oxytetracycline, 100 mg. four times a day. When seen on December 29 he had completed a term at school without interruption for the first time, and was well.

Case 2

Case 2
This patient, the only sibling of Case 1, was born in March, 1951. He appeared to be healthy in infancy apart from an attack of gastro-enteritis at 8 months. At 10 months he was inoculated against whooping-cough and

diphtheria. He had had measles (age unknown). At 15 months he was inoculated with B.C.G. Two months later he was Mantoux 1/100 positive, and was again positive a year later (strength unknown).

In January, 1954, he had synpneumonic empyema of staphylococcal origin; a subsequent staphylococcal infection of the nose was treated with chloramphenicol. All the polymorphs disappeared from his blood, but eventually he made a satisfactory recovery. In June he was reinoculated with B.C.G. following a negative tuberculin test (multiple puncture). In July he was examined again on receipt of the information that his brother was suffering from agammaglobulinaemia. He had had bronchitis a week before, treated by oral penicillin. On examination his general appearance was healthy, but crepitations were heard at the left base. An eschar was present at the site of inoculation, and the glands in the left axilla were enlarged. Chest x-ray examination showed nothing abnormal.

A fortnight later his nose and eyes were sticky, but there were no signs of bronchitis. Chest x-ray showed pneumonitis at left base.

Investigations.—Serum electrophoretic pattern (method as in Case 1): Albumin, 3.6 g./100 ml.; α_1 -globulin 0.7, α_2 -globulin 0.85, β -globulin 0.80, γ -globulin 0.15. Re-examination of the serum in November gave a similar pattern. Zinc turbidity, 0.5 unit. Blood group, A (no β -isohaemagglutinins present). Schick-negative.

By the middle of August he had developed a more severe cough and crepitations had returned. Chest x-ray films showed no change. The eschar was healing and the axillary glands were no longer palpable. The tuberculin test (multiple puncture) was positive. Oxytetracycline (100 mg., four times daily) was given. Apart from occasional slight attacks of diarrhoea he remained well and free of cough. He attended infant school during the autumn term.

In December he had left basal pneumonia treated by increasing dose of oxytetracycline. E.S.R. was 5/200 mm. in one hour; tuberculin jelly test positive. He was discharged well, taking oral penicillin. A fortnight later he was still well.

Investigation of Relatives

The maternal grandfather was Lithuanian. A maternal uncle was constantly ill until the age of 16 years. At the time of writing he was in good health.

Blood samples obtained from the father and mother showed a perfectly normal electrophoretic pattern and normal zinc turbidity. Samples were also obtained from the father's brother and his three sisters, and parents, and from the mother's sister and three brothers. All showed normal gammaglobulin as judged from normal zinc turbidity, and sera from the maternal relatives showed normal electrophoretic patterns.

Complete genotypes of the family were made by Dr. Dorothy Parkin, of the Lister Institute. There is no constant genetic feature in the blood groups of the family which can be related to the appearance of agammaglobulinaemia.

Discussion

The occurrence of tuberculosis in Case 1 and the behaviour of the Mantoux reaction is of interest. The disease, which developed after the symptoms of agammaglobulinaemia were established, ran its normal course, complicated by septic infections, and was cut short by the usual chemotherapy and antibiotic treatment. The boy's Mantoux reaction remained positive. The second child was first vaccinated with B.C.G. before there were any symptoms suggestive of agammaglobulinaemia and the Mantoux reaction became transiently positive. On re-vaccination the Mantoux became positive, and it has persisted for eight months. The axillary lymph node glands became enlarged, a normal consequence of B.C.G. inoculation. The patients of Kulneff *et al.* (1955) were also vaccinated with B.C.G.; the first in infancy before symptoms of agammaglobulin-

TABLE IV.—Serological Types of *E. coli* Isolated from Children Under 4 Years, and Their Seasonal Distribution (91 Cases, Together with 12 Cases of Either More than 5 Days' Duration or Having Had Treatment)

Serological Types of <i>E. coli</i>	Summer (April–September)	Winter (October–March)
O 26	25 (1)	10
O 111	9 (2)	9 (1)
O 55	4	6 (3)
O 86	1	2
O 125	2 (1)	2
O 126	1	4
O 119	0	1
O 128	5 (1)	0
O 127	1	1
O 114	2	1
Others of unclassified O group	7 (1)	10
Totals ..	57 (6)	46 (4)

Figures in parentheses denote number of cases with institutional history included in totals given.

of *E. coli* did not account for this predominance, as these organisms were found in 46 out of 485 females and in 45 out of 650 males. Identified *E. coli* infections showed no seasonal trend, except for type O 26, which, like the salmonellae, was commoner in summer than in winter. From Table IV it is apparent that the commonest *E. coli* serotypes to be encountered during the period under review were O 26, O 111, and O 55, which together accounted for nearly two-thirds of the *E. coli* infections recognized. The failure to demonstrate any constancy in the H antigens within the O groups 26, 55, and 111 suggested that many infections were not related. The serotypes of *E. coli* which most commonly cause outbreaks of gastro-enteritis—that is, types O 111, O 55, O 128, and O 119—were found to account for about one-third of all these sporadic coli infections, whereas the remaining two-thirds were infected with other specific types, especially O 26. In only a few of these infections was there evidence of a second aetiological agent also present—fat in three, *Sh. sonnei* in three, *Giardia* in three, and *Salmonella* in one. These second agents are omitted from Table I.

Shigellae.—*Sh. sonnei* was the only member of the *Shigella* group encountered. While this organism infected many children in nurseries, it was less common among young children at home. It was found in less than 7% of all cases under 24 months, but more frequently in the older age group.

Salmonellae.—These were found in 3.2% of the series. More cases occurred in summer than in winter, but there was little variation with age or sex. Of the 37 infections 32 were due to *Salm. typhi-murium*.

Proteus and Other Non-lactose-Fermenting Organisms.—The non-lactose-fermenting flora was recorded only when the growth on primary culture was profuse. Like the *E. coli* serotypes, *Proteus* strains were found more often in children under 24 months than in older children—an incidence of about 12% as compared with about 3% respectively. Most strains were *Proteus mirabilis*.

From a few children, organisms of the Providence group were isolated; in some instances they were present together with blood and pus. These organisms did not always grow reliably on deoxycholate citrate agar, but were easily isolated on MacConkey agar (Ridge and Thomas, 1955).

Fatty Diarrhoea or Epidemic Steatorrhoea

The stools from characteristic cases were very pale or putty-coloured and soft or fluid. Occasionally an aluminium sheen was evident.

A record of excess fat globules in Table I does not refer to the results of chemical analyses, which were often within the normal range for healthy children, but indicates that numerous globules of neutral fat (staining with Sudan III) of diameter 2 to 20 μ were visible in every microscopical field. Liquid paraffin had not been administered, and castor oil in three cases only, which were discounted. In normal stools at any age the only fats recognizably microscopically in quantity are soaps. While diets grossly over-supplied with

fat may disturb the balance, no oily globules were seen in the faeces of 647 healthy control children under the age of 5 years who were taking a daily dose of cod-liver oil under supervision; 133 of these healthy children were under 1 year.

Steatorrhoea in this sense appeared as an independent abnormality, not as a complication of the symptom of diarrhoea, since it was eight times commoner in the absence of other abnormalities than in their presence. In very few cases indeed was undigested starch also seen. The incidence was highest in children under 24 months old, and it showed a winter rise in prevalence.

In our experience it was not associated with giardiasis, for it was not found either in the 29 cases included in Table 1 or in a further 92 contact infections under the age of 5 years.

As is shown in Table I, fat globules were the sole abnormality in 13.1% (149 cases) of the whole series. On only 14 occasions were these globules found when known potential pathogens were also present.

Visits to the homes of affected children revealed that more often than not other persons in the household had had diarrhoea or vomiting a few days before or after the onset of symptoms in the index case. The severest illnesses were among pre-school children, who might ail for a fortnight, whereas older persons were seldom upset for more than two or three days, and it was rarer for fat globules to be seen in their stools. Examination of the urine from typical cases revealed no bile or sugar, but a gross excess of urates was often found. Two cases of coeliac disease were discovered, and were excluded from the series.

Discussion

In this survey of diarrhoea in pre-school children the proportion of cases showing certain abnormalities in the faeces has varied in a definite manner with sex, age, and season. Male cases predominated. Both in the 306 infants under 1 year old and in the whole series of 1,135 children the ratio of male to female was 1.3 to 1. This figure compares closely with the findings of Ian Taylor (1954) and of Scott (1953) in the London County Council area. The exception to this rule was a very slight female excess among the *E. coli* infections. There was a clear age trend; *Sh. sonnei* and *G. lamblia* infections rarely affected children under 1 year old, but became progressively commoner thereafter, whereas serological types of *E. coli* were identified in 11.5% of all cases of diarrhoea occurring in children under 2 years old, but in only 2.8% of those aged 2 and 3.

A form of "fatty diarrhoea" was common up to 3 years and still fairly frequent in the 3-year-old group. Indeed, this "steatorrhoea" was the most frequent single finding in the whole series, being present in 13.1% of the 1,135 cases. This finding is associated with pale stools, purging, nausea, and dehydration, and has already been described (Thomas, 1952, 1954a). It was very rare to find either cells or undigested starch in such stools.

During the acute stage, when these patients eat poorly or not at all, the percentage of fat in dried stools from representative cases has ranged from 5 to 60 g.%. In spite of the microscopical recognition of numerous globules of neutral fat, biochemical examination revealed more than half of the total fat weight to be in the split form, and gross amounts might fall within normal ranges. Some temporary failure of fat emulsification and of bile secretion, perhaps with an associated defect in absorption, appeared characteristic of this disease in young children. There was no evidence of failure to digest starch.

The brief but variable duration of the condition makes standard fat studies difficult; but a search for sequelae might be rewarding, for Sheldon (1955) suggests the possibility that coeliac disease may follow infantile gastro-enteritis. During these studies two first attacks of fatty diarrhoea were encountered in children subsequently thought to have coeliac disease.

This fatty diarrhoea may be the juvenile form of one of the "winter vomiting" group of diseases, such as types of

virus enteritis described by Gordon (1954). Its more general recognition might protect some infants from the misapplication of antibacterial drugs, which appear to be ineffective in treatment. Our experience has been that sulphonamides often provoke vomiting, but seldom control the diarrhoea.

The summer incidence of diarrhoea, as represented by the numbers of stool specimens sent to the laboratory, was lower than that in winter. Epidemic steatorrhoea was responsible for many winter cases, and such cases were often part of a household outbreak of vomiting and diarrhoea. Only salmonellae and *E. coli* O 26 showed a summer increase in prevalence, perhaps representing food-borne infection, since these organisms and O 114 have been found in animal infections (Ørskov, 1951; Charter, 1956).

Bacillary dysentery accounted for only 11.1% of all cases of diarrhoea. This and the low incidence of Boardman, infection corresponds with the experience of Boardman, Cassel, and Kahn (1955), who studied 200 African children, but contrasts with the view put by Felsen (1945) that most cases of diarrhoea were demonstrably due to shigellosis. During and after epidemics shigellae may predominate temporarily, but any aetiological picture must alter as circumstances change.

Summary

Faeces were examined from 1,135 children aged up to 4 years within five days of the onset of a diarrhoeal illness. Excess fat globules were found in 13.1% of these cases, and the significance of the finding is discussed. *Sh. sonnei* was found in 11.1%, *Salmonella* species in 3.2%, and serological types of *E. coli* in 8%. The incidence of the latter and of *Proteus* species was very much higher in those under the age of 2 years. Diarrhoea was more common in winter than in summer months, and affected more boys than girls.

We are grateful to the several laboratories which have carried out fat analyses for us. Much of the bacteriological technical work was carried out with great care and accuracy by Mr. J. H. Coward and Miss M. Kinsley, to whom our thanks are due. We are grateful to Dr. Joan Taylor, Colonel H. Bensted, and Dr. G. S. Wilson for reading the manuscript and for helpful advice.

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Speaking on July 27 at Aston Hall Hospital, a mental deficiency hospital near Derby, the Minister of Health, Mr. R. H. TURTON, reviewed the problem presented by the long waiting-lists for beds in such hospitals. The position was far from satisfactory, he said. At the end of last year there were nearly 7,000 mentally deficient patients on local authorities' waiting-lists, more than half of them really urgent cases; but in spite of wars and financial difficulties, there were 51,334 patients in mental deficiency hospitals, although some of these hospitals, like Aston Hall, were very overcrowded. The Government's programmes for building "that we have at present approved or are considering," continued Mr. Turton, would provide 5,400 new beds for mental defectives. Of these beds 4,400 came into the centrally financed programme announced by his predecessor two years ago. This was building work of essential national importance. "This was recognized," said Mr. Turton, "when the Government declared that nearly alone of all building programmes, this hospital building programme should suffer neither postponement nor cut."

A FAMILY HISTORY OF UTERINE AND GASTRO-INTESTINAL CANCER

BY

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Since Paget (1857) reported uterine cancer in a mother, daughter, and granddaughter, numerous pedigree charts showing familial occurrence of uterine cancer have been published. Atthill (1868) related that a woman of 28 years, her mother, and two sisters died of uterine cancer, and Cullen (1900) reported cancer of the uterine body in three sisters. Hutchinson (1901) details a family in which the grandmother, mother, two maternal aunts, and two sisters all died from uterine cancer.

Sir Halliday Croom (1912) recorded uterine cancer in identical twins. Both began to menstruate on the same day; both developed menorrhagia at the age of 30 years; both reached the menopause at 50. At 53 years one sister had the uterus removed; it contained a degenerating fibroid and a fundal carcinoma. Her sister died in the same year, and necropsy revealed a uterus with a degenerating fibroid and a carcinoma of the fundus.

More recently, Auvray (1927) reported cancer of the corpus uteri in a grandmother, mother, and daughter; and Purdie (1944) recorded that two sisters, one a multipara of 34 and the other a nullipara of 32 years, had cancer of the corpus, their mother having died from rectal cancer.

Warthin (1913, 1925) investigated a very comprehensive pedigree of "family G." The family consisted of 146 members, of whom 28 died from cancer. In females the cancers predominantly involved the uterus and in males the gastro-intestinal tract. The uterine cancers were all adenocarcinomas. When followed up in 1936, 174 members had reached the age of 25 years. There were 43 cancers in 41 members, and with two exceptions all involved the gastro-intestinal tract or uterus. The 23 uterine cancers were endometrial in origin, and no cancers of the cervix were found.

Cholewa (1932) published two family pedigrees showing a genetically determined localization of cancer. In one of the families the mother had cancer of the uterus and the father carcinoma of the stomach. Of the eight children, one of three sons died from gastric cancer and three of five daughters died from uterine cancer. In the other family the mother developed uterine cancer at the age of 70, unilateral breast cancer at 71, and breast cancer in the other side at 72, from which she died. Two sons were cancer-free, but of 10 daughters three have died from uterine cancer, one from ovarian cancer, and one from breast cancer.

History of "Family N"

In three generations there are 19 members of this family, and nine members have had confirmed cancers (see Family Tree). One of the four male members has had cancer and died, and of the 15 female members eight have had cancer and six have died: one had carcinoma of the rectum, one had carcinoma of the stomach, and four had carcinoma of the uterus (see Table). The two surviving females had multiple primary cancers and are still alive.

Case 9.—In November, 1949, when the patient was 48, total hysterectomy and bilateral salpingo-oophorectomy were performed and a uterus containing a small intramural fibroid and a columnar-cell papillary adenocarcinoma of the body was removed. The patient kept well until January, 1956, when a mass

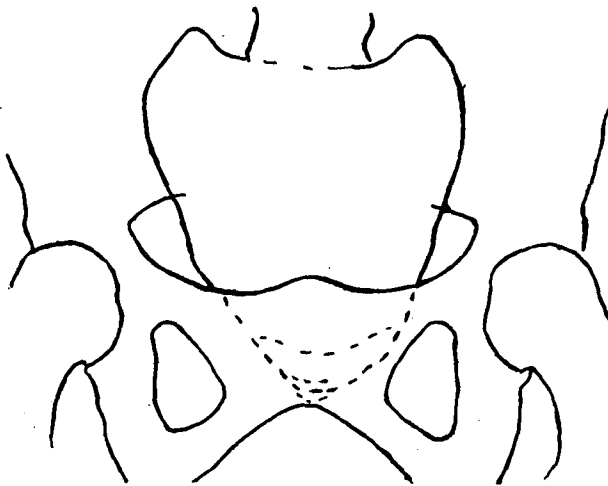


FIG. 2.—A vertical radiograph and outline drawing of the same patient in 30 degrees of Trendelenburg tilt, revealing the narrow angle of vision into the pelvis and the degree to which the symphysis pubis obscures the sacrum and the pelvic viscera which must lie in front of it.

Apart from the question of encroachment of viscera it is commonly thought that better access to the pelvic cavity can be gained when the patient's head is lower than the pelvis itself. In fact, the reverse is true, for the more the patient's head is lowered in relation to the pelvis the further does the symphysis pubis move over to obscure the contents thereof (Figs. 1 and 2). In order to obtain direct vision the surgeon standing on the patient's left must then incline to his right, a tiring position to maintain for long periods. When the patient is horizontal direct vision into the pelvis can be gained, as is normally achieved for other approaches within the abdomen, by both surgeon and assistants without their recourse to bodily contortion. Nevertheless the stance and viewpoint which result from the Trendelenburg position are used routinely by the majority of pelvic surgeons, who are, indeed, conditioned to its use by their training.

Surgical access has been the prime consideration in using steep Trendelenburg tilt, but in fact such access is in most cases made more difficult by the tilt imparted to the pelvis and the inclination from vertical of the line of vision. There is therefore a surgical reason for abandoning the steep Trendelenburg position; from the anaesthetist's point of view there are more cogent reasons why such head-down tilt should be discontinued.

Disadvantages of the Tilt

Embarrassment of Respiration.—Impairment of tidal exchange with consequent reduction in minute ventilation results in inadequate expansion of the lungs—particularly the lower lobes. Such impairment may result from depressed respiration with high relaxant dosage or from "diaphragmatic splinting," when the whole of the weight of the abdominal contents lies heavily upon the under surface of the diaphragm in the Trendelenburg position. In this position the partially curarized diaphragm has to make its "descent" against the force of gravity and the weight of the abdominal viscera together with the abdominal packs used to contain them. Controlled breathing will overcome this difficulty, but it is doubtful whether it is advisable or indeed justifiable to employ controlled respiration upon all cases of this type.

Vasomotor Failure.—Vasomotor tone may become depressed during operation. Under normal conditions, with the patient horizontal, this will become manifest as a fall in blood pressure in the presence of a steady pulse rate (Inglis, 1952). When head-down tilt is adopted this type of vasomotor collapse is masked and no fall in blood pressure may be seen. In the absence of an increased pulse rate there may be no other indication of collapse until the horizontal position is resumed; a marked and dangerous fall in blood pressure may then become manifest at a time when the operation has been completed.

Venous Return.—The venous return from the lower limbs and abdomen is assisted when the Trendelenburg position is adopted. Where right-sided cardiac function is impaired the increased venous inflow can result in congestion and embarrassment of heart action.

Cerebral Circulation.—Owing in part to the same mechanism and in part to the reversal of the normal gravitational pull, the venous return from the head will be slowed down. Thus the cerebral circulation may stagnate, with an increased tendency to cerebral thrombosis.

Gastric Regurgitation.—Regurgitation of stomach contents is a very real danger, especially in emergency cases. A cuffed endotracheal tube with free drainage from the pharynx is an essential safety factor whenever the Trendelenburg position is used; without this, aspiration of gastric contents becomes a real danger with flooding of the chest when the horizontal is resumed. Respiratory secretions may also gravitate down the endotracheal tube and repeated suction become necessary.

Nerve Palsies.—Of recent years many instances of brachial plexus palsies following the use of arm-boards on anaesthetized patients have occurred. Such palsies are more prone to occur when arm-boards are used in conjunction with Trendelenburg tilt, since the force of gravity tends to increase the angle of abduction of the arm. Shoulder-rests can, if incorrectly placed, result in plexus damage from pressure in the supraclavicular fossa; indeed, elaborate and expensive devices have been described to obviate this.

Conclusions

From the anaesthetic aspect no advantages accrue from the routine use of the Trendelenburg position. It is of value as an emergency measure in collapse or in sudden vomiting; as a routine it may add to the dangers and difficulties of anaesthesia. Steep Trendelenburg position is not essential for operating within the pelvis, and its use is for the most part a relic of difficulties experienced in the past; nevertheless it continues to be employed largely as a matter of custom. With modern relaxants operative approach to the pelvis is facilitated, and the patient may be kept horizontal, a posture which invokes fewer complications than the Trendelenburg position and permits more direct vision into the pelvis.

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Medical Memoranda

Torsion of the Spermatic Cord: A Plea for Manipulative Reduction

The accepted treatment of torsion of the spermatic cord is operative reduction. That this is a comparatively rare surgical emergency all surgeons will readily admit. As O'Connor (1933) pointed out, however, the condition is probably much commoner than is generally realized, most cases never reaching a surgeon, and, in fact, never being diagnosed at all. They are looked upon by their doctor as cases of simple orchitis, and treated conservatively. If no attempt is made to reduce the torsion the pain will disappear after two to five days, and the swelling will disappear by the end of 10 days or a fortnight. Only if the doctor sees the case a long time afterwards, and notices that the patient has one atrophic testicle, will he have a chance of recognizing his mistake. One wonders whether it is impressed strongly enough on the young doctor that orchitis is extremely rare, while torsion of the testis is comparatively common in the young subject.

The results of operative reduction are unfortunately extremely bad, and most figures go to show that approximately 50% develop subsequent atrophy of the testis.

The reason for this is presumably the testicle's intolerance to ischaemia, and it is therefore of the utmost importance that reduction should be carried out at the earliest possible moment. The period elapsing between the consultation in the doctor's surgery and the operating table may be just sufficient to make the difference between a lost and a saved testis. If the patient has the normal complement of two testes, this may be of small importance, but it is very different if only one is present, and there is always the danger of mumps striking down the other later. Where the testis is fully descended non-operative reduction is often an exceedingly simple manoeuvre, which can be carried out by any doctor in his surgery or in the patient's home.

This non-operative treatment has not been advocated in this country on the grounds that failure to fix the testis may result in recurrence. This seems a most inadequate argument, as orchidopexy can always be performed at a later date if necessary, and, if immediate manual reduction may save the patient from a 50% chance of losing his testis, surely it is something which must be attempted.

CASE REPORT

A man aged 21 was admitted to hospital at 9.30 a.m. on April 2, 1955, with the diagnosis, by his private doctor, of torsion of the left testicle. Sudden pain had developed in the left testicle 1½ hours before admission, and had persisted. On examination there was a tender swelling in the lower end of the left inguinal canal, about the size of a grape, and the left testis was retracted up to the top of the scrotum. This appeared to be an early case of torsion of the spermatic cord in a patient with a normal scrotal testis the ideal subject for non-operative reduction. The testis was gently rocked to see which way the torsion had occurred, and then rotated in an anti-clockwise manner. The swelling and then rotated in an anti-clockwise manner. The swelling in the cord became smaller, and the pain diminished. As the testis dropped down to the bottom of the scrotum. There was no further pain, and no swelling of the testis occurred. The patient being discharged from hospital the next morning. One cannot, of course, say for certain whether or not atrophy will develop in this case, but as there had been no swelling of the testis and no hydrocele one feels that there is little doubt but that reduction was performed before any serious vascular changes had taken place.

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Acute Bilateral Retrobulbar Neuritis

In June, 1954, a clergyman aged 42 complained of dimness of vision of the left eye and neuralgia over the left frontal region. Within 48 hours the left vision was limited to counting fingers. Ocular movements were full but painful, and there was tenderness on palpation over the insertion of the superior rectus muscle. The pupil reaction to light was of the typical Marcus Gunn type. The optic disk was normal. Acute retrobulbar neuritis was diagnosed. Five days later there was blurring of the disk margin, with no perception of light. Ten days later the optic disk was definitely pale. Throughout these events the right vision was 6/6 and the right eye normal.

In view of the severity of the left visual loss he was admitted to hospital. The Wassermann reaction, E.N.T. examination, blood count, x-ray film of the skull, and examination of the teeth all showed no abnormality; neurological examination revealed, apart from the ocular changes, no abnormality in the central nervous system. Eleven days after the onset of symptoms in the left eye he suddenly found that the smaller newspaper print could not be seen by the right eye. The right ocular movements were full, with no pain on movement or tenderness on palpation. The reaction of the right pupil to direct light was poorly sustained. The right optic disk and the fundus appeared normal. Within 24 hours the right vision had fallen to 6/18. The right peripheral field was temporally contracted midway to fixation point. A considerable scotoma extending to 30 degrees above and below and to the temporal side of the fixation point was present.

Corticotrophin, 10 units six-hourly, was given. After three injections the right vision recovered to 6/9. The right optic disk was slightly paler than normal, but there was no oedema of the disk or fullness of the veins. There was pallor of the left optic disk—a rather surprising finding in view of the brief history. The right visual field was full to 3/330, but on the Bjerrum screen there was a small scotoma on the temporal side only, partial to 2/1000 in a semicircle up to 6 degrees from the fixation point and complete in a further 2 degrees semicircle external to this. It was considered that the only possible diagnosis was bilateral retrobulbar neuritis of the nature of Devic's disease.

Corticotrophin, 10 units six-hourly, was continued for 10 days, after which the vision began to fail again and a further scotoma developed. Corticotrophin was increased to 50 units in 24 hours and continued at this level for 17 days. Then 20 units in 24 hours was given, and this amount was gradually lowered until corticotrophin was discontinued altogether 10 days later. By that time the right vision had recovered to 6/6 and Jaeger 1. The peripheral field was full. Only a minute partial scotoma remained in the lower temporal area. Twenty months later these findings for the right eye were unchanged. With the left eye hand movements are seen in the upper nasal field; there is no projection of light elsewhere.

At no time has there been any associated myelitis, but the two classical components of Devic's disease are by no means invariably associated. The severity of the attacks of bilateral retrobulbar neuritis, their close association in time, the response to corticotrophin therapy, and the complete absence, then or subsequently, of any other abnormal signs in the central nervous system are very strongly suggestive that this was, in fact, an incomplete form of neuromyelitis optica rather than a manifestation of other demyelinating diseases of the central nervous system, such as a multiple sclerosis.

I thank Dr. Mark Lester for watching this case and Mr. A. J. B. Goldsmith for kindly confirming the ophthalmic findings.

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Leukoplakia of the Bladder

Leukoplakia of the bladder, whether alone or associated with similar changes in the upper urinary tract, would appear to be rare enough to warrant comment whenever a case arises.

CASE REPORT

A man aged 59 was admitted to this hospital in April, 1950, with severe haematuria. He was anaemic-looking and had a blood pressure of 160/80 mm. Hg. The bladder was not palpable abdominally, the kidneys did not appear clinically to be enlarged, and rectal examination suggested no abnormality of prostate or seminal vesicles. Neither was any abnormality found in other systems. A provisional diagnosis of vesical neoplasm was made. As his haemoglobin was only 53% a blood transfusion was given, and this was repeated twice in the subsequent few days.

His Wassermann reaction was negative, and intravenous pyelography showed the kidneys to be normal. Ten days

after admission he developed clot retention, and suprapubic cystotomy was performed by one of us (L. M. Z.). After evacuation of many clots no evidence of vesical neoplasm could be found and a clear efflux was observed from both ureteric orifices. The bladder mucous membrane had a peculiar white appearance and was very smooth. A biopsy of the bladder wall was taken and the bladder closed round a suprapubic tube. The histological report stated: "The covering epithelium is composed entirely of



Low-power view of bladder wall. (x114.)

keratinizing epidermoid type with eleidin granules. There is subacute inflammation in the subjacent connective tissue, and beneath this is smooth muscle. The epithelium is remarkable if it comes from the bladder, as it does not at all resemble normal vesical epithelium." (See Figure.) As it did in fact come from the bladder a diagnosis of leukoplakia was made. After operation the bleeding slowly subsided and the suprapubic fistula was allowed to heal. The patient was discharged 27 days after operation, passing clear urine quite normally.

He remained symptom-free until November, 1952, when he was again admitted with fairly severe haematuria. This persisted, and as cystoscopy was unsatisfactory and it was feared that a squamous carcinoma might now have developed, the bladder was again opened. The state of affairs was exactly as before and no growth could be seen. Histological examination of a further biopsy merely confirmed the previous findings. Again the bleeding settled after the cystotomy, and he was discharged after 26 days.

Since 1952 he has had very little haemorrhage, but the suprapubic scar has broken down three times, and there has been leakage of urine. Each time, however, it has healed readily after urethral bouginage and antibiotic treatment.

Cystoscopy was last performed in December, 1954, and showed a whitish bladder mucosa with much fibrinous

debris on its walls due to superadded infection. There was no haematuria, but the urine was rather dirty and foul-smelling, and yielded a heavy growth of *Pseudomonas aeruginosa* which was insensitive to all antibiotics except polymyxin. The haemoglobin was 87% and the blood urea 30 mg. per 100 ml.

DISCUSSION

Leukoplakia of the urinary bladder was first described by Rokitsky in 1861, and has been the subject of much controversy ever since. Up to 1929 Patch could find only 123 cases in the literature, including cases where the kidneys and ureters as well as the bladder were involved. Connery (1953) found only 45 cases of proved leukoplakia of the bladder in the records of the Mayo Clinic covering the years 1915 to 1947.

Leukoplakia is a disease of undetermined aetiology involving mucous membrane. It is characterized by an epidermoid metaplasia in various stages of keratinization, and histologically the end-result closely resembles normal skin. Though the true aetiology remains obscure, most writers strongly favour chronic infection or chronic irritation as the most likely cause. Another theory is that vitamin-A deficiency may be a factor in causation, and a number of cases have been associated with a positive Wassermann reaction. It has hitherto been generally agreed that leukoplakia is a precursor of squamous carcinoma, but recent work suggests that this is incorrect, although the condition itself is still considered irreversible. Our own experience gives us no reason to suspect that the condition is pre-cancerous.

From the cases reported it appears that leukoplakia of the bladder is three times as common in the male as in the female, and is most frequent in the fifth decade of life. The usual urinary symptoms are haematuria and dysuria, but these are probably due to the superimposed chronic cystitis. Clinically the picture may be confused by such symptoms as loss of weight, fever, nausea, and vomiting. X-ray examination of the kidneys and bladder usually reveals no abnormality, so that most investigators consider that diagnosis before operation is highly improbable. However, the appearance of desquamated epithelial tissue in the urine must be considered pathognomonic. The bladder appears to be the most common site of leukoplakia in the urinary tract, and the renal pelvis to be less often affected, while it is estimated that in only 10% of cases of the latter is the bladder also involved.

Various methods of treating the condition have been suggested, including massive doses of vitamin A and a full course of antibiotic therapy, for which aureomycin is considered best. Winsbury-White (1932) reports a case of leukoplakia in which radium implanted into an ulcerated area at the base of the bladder led to the healing of a suprapubic fistula created during a diagnostic cystotomy. Ewert and Hoffman (1944) report good effect from instillation of sterile cod-liver oil into the bladder, and Helfert and Bremen (1953) claim apparent arrest of renal leukoplakia with bladder involvement following a course of A.C.T.H. As a preventive measure the thorough treatment of chronic urinary infection is emphasized, and the treatment of tertiary syphilis if this is also present.

Our thanks are due to Dr. A. J. McCall for the histological reports and to Dr. W. G. D. Caldwell for the photograph.

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Reviews

ABDOMINAL SURGERY

Textbook of British Surgery. Volume I: The Abdomen. Edited by Sir Henry Souttar, C.B.E., D.M., F.R.C.S. (Pp. 547+viii; illustrated. £5 5s.) London: William Heinemann Medical Books Ltd. 1956.

Whether one likes it or not, textbooks and examinations occupy such a key position in the educational system that the appearance of a new textbook designed to meet the requirements of "candidates for the higher examinations in surgery"—in this country the final F.R.C.S.—is an important event. The present work is the first of three volumes under the editorship of Sir Henry Souttar, to which eventually forty different authors will contribute. The two questions to which one seeks answers are: Has the editor chosen his contributors well, and has he moulded their contributions into an organic whole? For a textbook should be more than a mere collection of individual contributions, and should have a general educative as well as a detailed instructional value. It will not be possible to give a final answer to the second question until all three volumes are available, particularly since the volume dealing with the main general principles of surgery will apparently be the last to appear. But the sample provided by the fourteen authors who contribute to this first volume on the abdomen should enable one to hazard a close guess to the answer to the first question.

The thing that at once impresses and refreshes is that, while all fourteen authors will from their experience and status be accepted as authoritative, almost all are distinguished by not being burdened by an excessive seniority. The general level of contributions is high, and it may be a little invidious to particularize. But perhaps special mention may be made of Mr. Rodney Smith's article on intestinal obstruction, which is surely destined to become a classic and a model of what a textbook article should be; while Mr. Lees Ferguson manages to invest his article on the now somewhat pedestrian, though still very important, subjects of appendicitis and peritonitis with an originality and literary charm which are only marred by a slightly tedious catalogue of differential diagnoses. The line drawings of Professor Goligher's excellent article on the stomach and duodenum make one regret that in other chapters similar line drawings have not replaced some of the photographs. And there are other excellent chapters that space will not allow mention of. In all the articles details of operative treatment are given in much greater measure than is usual in a textbook of surgery as opposed to a textbook of operative surgery, and this seems a very useful innovation. On the debit side, the criticism may perhaps be made that in two of the sections—those on the gall-bladder and on hernia—classification and a desire for completeness have been carried so far that it is a little difficult to see the wood for the trees. In spite of this, operative cholangiography, surprisingly enough, is not even mentioned, though Fig. 72, which is of a residual common-duct stone demonstrated in a post-operative cholangiogram, must have brought regret that the picture was not available before the abdomen was closed.

Misprints are few, but the last line of (5) on page 475 is clearly one, and there would appear to be another on coloured plate III, on which an obvious almost pure cholesterol stone is labelled "pigment." One brief, but not small, final point. Could not the title of the work be altered to "The more correct 'British Textbook of Surgery'?" A "Textbook of British Surgery" has an implication of chauvinism unworthy of the subject. Surely surgery, even more so than "le militarisme" in the well-known aphorism of Georges Wolfromm, "n'a pas de patrie."

DAVID PATEY.

VETERINARY PARASITOLOGY

Veterinary Parasitology. By Geoffrey Lapage, M.D., M.Sc., M.A., M.Inst.Biol. (Pp. 964+xvi; illustrated. 63s.) Edinburgh and London: Oliver and Boyd. 1956.

Dr. Lapage was successively lecturer in parasitology at the Universities of Exeter, Manchester, and Cambridge; subsequently he was external examiner in veterinary parasitology. His book, which is well produced and weighs 4 lb., reflects his long experience of the laboratory and classroom. In the first two chapters the general principles of parasitism and its effects upon the host are discussed. Then follow four sections, each of which is devoted to a phylum: 199 pages to the roundworms, 29 pages to the flatworms, 361 pages to the arthropods, and 152 pages to the protozoa. The systematic anatomy, life history, epidemiology, effects, and control measures of each species parasitic of domesticated animals in Britain and overseas are described fully and illustrated by 34 photographic plates and 694 text figures. A bibliography of 20 pages, which covers a wide range of specialist literature, is followed by a carefully arranged index.

The quality of some of the text figures, which have been reproduced from old publications, could be improved. The bot flies at page 524 and on Plate 22 are misspelt. The high standard of the author's work on the taxonomy is not maintained in the clinical sections. His description of pathology, symptomatology, and therapy tends to be a laboured compilation which lacks the convincing touch of the experienced veterinary clinician. The notion that the quality of an illness is measurable by the animal's age or the number of parasites in a sample of its faeces, also the confusion of tolerance with immunity, appear to be long a-dying among parasitologists.

TOM HARE.

AMERICAN ENDOCRINOLOGY

Textbook of Endocrinology. Edited by Robert H. Williams, M.D. 2nd edition. (Pp. 776+xii; illustrated. 91s.) Philadelphia and London: W. B. Saunders Company. 1955.

This is the second edition of a good textbook. The chapters on the adrenals, ovaries, pancreas, and parathyroids have been rewritten. Forsham and Thorn write on the adrenals, and Reifenshtein on the parathyroids. These two sections are the real strength of the book; in them the three authors display unrivalled experience and authority. Their work contains much information which cannot be found in any other texts; and they give an admirable account of diagnostic techniques, of operations, and of drugs which are just coming into general use in Britain. However, even this 1955 edition contains no reference to Conn's aldosterone tumour and the relation of hyperaldosteronism to the potassium-losing kidney. The chapter on laboratory diagnostic and assay procedures is a comprehensive and critical survey of techniques, both of those which are commonly employed and of those not yet generally available.

Doughaday has succeeded Newburgh as the author writing on obesity, and in consequence there has been some change of emphasis. The patient with Cushing's syndrome is now allowed to be obese, and the curious shift in fat distribution in this disorder is mentioned though not explained. Fiedgood's chapter is now less speculative, but remains an interesting account of the psychological, neurological, and biological relationships of endocrinology. The alterations in this essay and in the chapter on obesity have removed some, but not all, of the conflicting statements which marred the first edition of this book.

Adopting Trousseau's advice to the patient to "take it while it still cures," one might say to the intending student of this book, "Read it before it is out of date."

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BRITISH MEDICAL JOURNAL

LONDON

SATURDAY AUGUST 11 1956

PREVENTION OF TETANUS

During the 1914-18 war the introduction of routine passive immunization for all wounded reduced the incidence of tetanus in a few months from approximately 8 to 1 per 1,000, and later this figure was lowered still further. Immunization in the civilian population had a like effect, but has never prevented tetanus entirely. The chief reasons for this partial failure are that many cases among civilians are due to wounds which are so trivial that they are not taken to a doctor, or, if taken, are considered too slight to merit antitoxin. In some cases no wound can be detected, perhaps because it is internal, or tetanus has followed conditions such as chronic ulcers, infected cavities, puerperal sepsis, and others in which its possibility is not suspected. For such reasons it is inevitable that a certain proportion slip through the net of passive immunization. A further disadvantage is that some patients are sensitive to horse serum, so that reactions when tetanus antitoxin is given are by no means rare and may be severe; very occasionally they are fatal. Further, patients who receive it are not only sensitized to further injections of horse serum but the protective effect of a second injection is less than the first.

In the 1939-45 war active immunization by toxoid was carried out on a large scale in the Allied armies, and the results were remarkably successful. In the British Army two injections of toxoid were given at an interval of not less than six weeks, with a further reinforcing dose at yearly intervals during service. If a man was wounded he was given antitoxin as soon as possible or, in the American army, a further dose of toxoid. The results of both these procedures were highly satisfactory. Reactions to toxoid were slight and rare and there were no other disadvantages.

How great was the success of active immunization is shown in a recent report of the Army Pathology Advisory Committee.¹ This summarizes the results in detail and defines precisely the indications for both active and passive immunization in Service personnel.

The committee indicates that a person is to be considered actively immunized for a period of six months if he has received two injections of toxoid, the second not less than six or more than twelve weeks after the first, and that he is to be considered immunized for a period of five years if he has received three injections of toxoid, the second not less than six weeks after the first and the third not less than six months and not more than twelve months after the second. It recommends that a dose of toxoid should be given immediately to all wounded men irrespective of whether they are actively immunized or not. In addition tetanus antitoxin should be given as soon as possible after wounding to any non-immunized person and repeated at seven-day intervals at the medical officer's discretion. In peacetime a reinforcing dose of toxoid for all actively immunized persons is recommended every five years. The evidence the committee gives suggests that thorough application of these rules would practically stamp out tetanus.

By contrast active immunization of the civilian population in Britain is casual, and apart from those who have been in the Services the majority of the population have never had it; consequently the problem of prevention for civilians is a complicated one. In a recent paper N. H. Moynihan² considers this aspect from the point of view of the casualty officer in hospital. Apart from the difficulty of deciding whether a particular wound needs antitoxin he is concerned with the frequency, inconvenience, and danger of reactions to horse serum following passive immunization, and the methods by which they may be mitigated. On inquiry at 37 hospitals in different parts of the country he found that 31 were still using the intradermal test of skin sensitivity as a guide to general or constitutional sensitivity, though this test is recognized to be unsatisfactory. This led him to investigate the practical outcome of this test on a series of 8,900 patients treated in three hospitals. It was found that, of these, 1,027 (11.5%) who were judged to need prophylaxis were not given it because the intradermal test was positive. A further 293 did not receive prophylactic antitoxin for other reasons: 140 because they had had a previous injection within a period which varied from three weeks to 18 months, and this was erroneously deemed to be sufficient protection by the doctor; 70 because of a personal or familial history of allergy; 24 because a general reaction followed a sensitivity test dose; and 59 because they refused. It is now known that effective protection following a dose of 1,500 units lasts for less than four weeks and may be as short as three days in patients who have had a previous injection. When it was found that these so-called positive skin

tests formed such a high proportion of the total, he carried out two further investigations, using physiological saline and tap water as controls against the test dose of antitoxic serum in 100 cases. The results showed that saline produced a similar reaction to antitoxin in 47% and tap water in 28%. All of the 200 patients were subsequently given the full dose of prophylactic antitoxin, and only 4.5% of these developed serum sickness and 5.5% a localized reaction at the site of injection. He emphasizes that the method of intradermal testing for sensitivity to horse serum which is at present used in so many hospitals is unreliable and should be replaced by the "trial dose" method fully described by L. J. M. Laurent and H. J. Parish.³ This consists in preliminary subcutaneous injections of a small dose of serum with a view to testing the patient's general reaction before giving a large one. Moynihan also draws attention to the important observation of G. Payling Wright and his colleagues⁴ that previous injection of a soluble antigen leads to a much faster removal from the circulating blood of a second or subsequent injections and consequently curtails the prophylactic effect. They therefore recommend that "once a person has received an injection of any horse-serum antitoxin, irrespective of the disease for which it may have been given, that person should be promptly immunized against diphtheria and tetanus with the appropriate toxoid." Moynihan points out that this recommendation was not carried out in 36 of the 37 hospitals he visited.

The excellent results obtained with active immunization in the Services contrasted with the 60 or so deaths from tetanus a year in the civilian population in England and Wales speak for themselves. Moynihan's paper also shows clearly some of the difficulties inherent in the application of passive immunization, and his recommendation that every hospital should have written rules for the guidance of house officers is a sound one. His observation that there is no valid reason why active immunization should not be practised universally is sounder still.

CO-OPERATIVE RESEARCH IN THE
COMMONWEALTH

During the early months of this year the East African and West African Councils for Medical Research held meetings, and in another part of the world an Advisory Committee for Medical Research in the British Caribbean Territories was created. These new international organizations have sprung into being during the last few years from a quickening consciousness of the need and opportunities for medi-

cal research in tropical parts of the Commonwealth; and they have been generously and wisely aided by grants from Colonial Development and Welfare Funds. They constitute an important venture, promising to benefit not only the peoples of the different tropical territories but also the progress of medical knowledge in general. The research being undertaken under the aegis of these organizations is wide in scope, and, although primarily oriented to the needs and opportunities of particular regions, it is already throwing light on problems of fundamental importance and general interest. Malaria, filariasis, and yellow fever and other virus diseases are prominent among the disorders being studied in East and West Africa; and in the Gambia, in Nigeria, and in Tanganyika the effects of persistent malaria are being unravelled. In the Caribbean region malaria forms less of a problem, and in British Guiana, where formerly it was prevalent, it has now been almost completely eradicated. Work on virus disease is, however, going on there as in the other two regions, and in each it is mutually complementary—work done in one commonly helping in the interpretation and furthering of that done elsewhere. In West Africa, for example, it has been found that, although in many areas serological surveys indicate that yellow fever is highly endemic, the disease is seldom seen clinically. Cross-immunity has, however, been demonstrated between yellow-fever virus and West Nile and Uganda S viruses isolated in East Africa; work is going on to determine whether these together with Zika and possibly other viruses are responsible for the serological changes which taken at their face value suggest previous infection with yellow fever.

In Nigeria the life cycle of the chrysops fly—which conveys the filarial infection loiasis—has been determined, although 5 or 6 years ago virtually nothing was known of it. This knowledge opens the way to means of destroying the fly and eradicating the disease it conveys. Work is also to be undertaken for the West African Council for Medical Research on onchocerciasis, a filarial infection which is responsible for much blindness among Africans. Under the East African Council detailed studies are also in progress to determine the prevalence there of filarial infections and the means whereby they may be controlled. Under the Council in Nigeria research on sweat responses to increases in body temperature has thrown much light on the aetiology of heat hyperpyrexia, hitherto little understood. This work has already benefited men working in the mines and in especially warm industrial environments in the Tropics. In Nigeria, too, investigations have shown the high nutritive value and digestibility possessed by a flour

¹ Barr, M., and Sachs, A., *Army Pathology Advisory Committee Report*, W.O. Code, No. 11262.

² Moynihan, N. H., *British Medical Journal*, 1956, 1, 260.

³ Laurent, L. J. M., and Parish, H. J., *ibid.*, 1952, 1, 1294.

⁴ Littlewood, A. H. M., Mant, A. K., and Wright, G. Payling, *ibid.*, 1954, 2, 444.

containing 50% protein and prepared from the residue remaining when oil is expressed from ground-nuts. Work on milk substitutes made from plant proteins is in progress in Uganda. The scope of the research going on in the Caribbean was indicated by the conference held in connexion with the first meeting of the Advisory Committee for Medical Research in the British Caribbean and reported recently in this *Journal*.¹ Papers on yaws, vomiting sickness, veno-occlusive disease of the liver, and a non-nutritional neuropathic disorder were presented.

In Britain research is being carried out under the Medical Research Council and at the Schools of Tropical Medicine in London and Liverpool which both stimulates and is complementary to that going on overseas. This research also is wide in its scope, being concerned with filarial infections, schistosomiasis, nutrition, leprosy, tuberculosis, microbiology, protozoology, applied physiology, and the haemoglobinopathies. Research costs money, and the expenses of the work undertaken abroad have to date mostly been met by Governments of the territories concerned and by the Colonial Development and Welfare Fund. The function of the latter is to initiate schemes of value to the people of the Colonies, and the contribution from this source is therefore expected to be reduced in time and that from overseas Governments to increase. It is to be hoped, however, that private persons and industrial concerns overseas will feel that these efforts are worthy of their support.

These international research organizations represent a new aspect of co-operative effort within the Commonwealth. But they represent more than that: they embody recognition of a basic truth in medical progress—that medical research is indivisible and that at any time knowledge gained anywhere may be indispensable elsewhere. It reflects great credit on the Colonial Medical Research Committee, which operates under the joint auspices of the Colonial Office and the Medical Research Council, that its members have firmly grasped this truth and succeeded in giving it practical expression. Not only have they fostered the development of these overseas research bodies and organized complementary research in this country, but they have effectively linked the two together so that the free interchange of knowledge and co-operation, on which progress depends, is provided for and stimulated. The way is now open for advantage to be taken of these opportunities to advance medical knowledge, for men in this country and men in the Tropics to come together and to broaden and complement their experience to the mutual benefit of themselves and of their different

countries. Time, which changes political systems, customs, and alliances, does not alter problems of disease. The concept of these new affiliated research organizations seems, however, to be more deeply based, to rest on the requisites of medical progress itself. It is possible to hope, therefore, that they may represent the beginning of an enduring development.

ORDEAL BY SPENS

The statement issued to the press by the Ministry of Health after the meeting between the profession's representatives and the Minister on August 1 seems to have been ignored by most newspapers, with the notable exception of the *Manchester Guardian*. It appears in this week's *Supplement*. The meeting between the two has been "adjourned pending the submission by the Committee of further particulars of the legal aspects of their claim." Does this represent a modification of the attitude expressed in Sir John Hawton's letter that the Ministers do not accept the premises of the claim put forward by the Negotiating Committee? It is important that the legal implications of the Government's promises of 1946 and 1948 should be unfolded. But what the medical profession will regard as more important is the moral obligation of successive governments, in the words of the Spens Reports, to maintain "in the future the proper social and economic status of general medical practice and its power to attract a suitable type of recruit," and "the proper social and economic status of specialist practice and its power to attract a suitable type of recruit, having regard to other forms of medical practice." The examination of the legal position will take time. Parliament does not re-assemble until October. And the summer holidays have to be enjoyed in spite of the weather. The medical profession will have, therefore, to be patient in the meanwhile, but at least may gain comfort from the fact that the Minister's "No!" has had the edge taken off its sharp and emphatic note.

DIARRHOEA IN YOUNG CHILDREN

Gastro-enteritis, once a major cause of death in babies, is following the trend of some other infectious diseases and becoming less of a scourge with each succeeding year. In 1947 the total number of deaths of babies under 1 year of age in England and Wales attributed to gastro-enteritis was 4,571 (5.13 per 1,000 live births), whereas in 1954 the figure was 461 (0.68 per 1,000). Such a change, though gratifying, cannot be accepted with complacency, for many babies develop this disease, and it is still the cause of much worry to clinicians,

particularly those in charge of institutions for young children. Modern methods of treatment, with carefully controlled fluid replacement and antibiotics, have played a large part in reducing the number of deaths.

The study of juvenile diarrhoea by Dr. Mair Thomas and Miss Ruth Charter at p. 339 of the *Journal* this week is of particular interest in that it is concerned with the disease as seen in general practice, whereas most papers on this subject have described outbreaks occurring in institutions. A similar, though smaller, study has been reported by W. J. Smither.¹ Thomas and Charter find that the infecting organisms are rarely present in their material, a finding which contrasts with those of G. Ormiston and colleagues,² who investigated outbreaks in residential nurseries, where the evidence suggested that *Giardia lamblia* was of importance. In Britain *Shigella sonnei* is the most common cause of dysentery affecting the young child rather than the baby, as shown by Thomas and Charter and by A. I. Ross,³ The majority of cases occur in the winter months. The results of R. I. Hutchison⁴ suggest that spread may occur as the result of handling contaminated articles by children who are too young to understand the principles of hygiene. E. Hormaechi and colleagues,⁵ working in Uruguay, found that many different *Shigella* species affected young babies, and accept it as a major cause of diarrhoea among babies in that country, as well as in older children. It would appear that dysentery may be a major cause of diarrhoea in babies in warm climates, whereas in temperate climates it is not. In 1914 and in following years *Proteus* was regarded as the cause of infantile diarrhoea, and the careful work of D. M. Bertrand,⁶ in which strains isolated from a London outbreak were identified by serological methods, provides reasonable evidence that those views were correct. That *Proteus* is rarely found in epidemic gastro-enteritis at the present time has been noted by many workers, the only recent cases in this country which might be attributed to this cause being described by U. James and colleagues.⁷ It is doubtful if *Proteus* can be accepted at the present time as a cause of intestinal disease.

Modern investigations have related various serological types of *Escherichia coli* to enteritis in young babies. Most of this work has been done on babies in hospitals or residential nurseries in countries with temperate climates. With this background, the results are that *E. coli* infection is high as compared with salmonella and shigella infections in babies under 1 year of age. The age incidence of *E. coli* infection has been investigated by J. C. McDonald and Charter⁸ and J. Taylor and Charter in this country,⁹ and by A. Friedman in Israel.¹⁰ Thomas and Charter also find that *E. coli*

infection is most common among young babies, but rather surprisingly find that type O.26 is more frequent than others. The descriptions of institutional outbreaks have implicated many types, but usually not O.26. The source of *E. coli* serotypes has been investigated by S. Thompson,¹¹ who isolated certain serotypes from milk, cow, and chicken faeces, but there were differences between the majority of animal strains and those from humans. Nevertheless, this work, and that of H. Fey,¹² suggests that milk should be considered as a source of infection. Against this view is the fact that liquid milk is pasteurized and is rarely used as baby food, and that J. Papavassiliou has failed to isolate specific serotypes of *E. coli* from pasteurized milk in the London area. Dried cows' milk is the usual baby food, but serotypes of *E. coli* have not been isolated from dried milk powder. The evidence presented by K. B. Rogers¹³ suggests that infection is spread as the result of direct or indirect contact between sick babies and other children. The work of Taylor and Charter¹⁴ has shown that the healthy carrier may also spread infection.

Thomas and Charter describe the finding of fat globules in stools; they believe them to be an indication of an infective agent which they are unable to isolate by the usual methods of stool culture. They also suggest that this finding may indicate "winter vomiting" disease, which many workers in Britain believe may be caused by virus infection. The work of J. Gordon¹⁵ in the U.S.A. has shown that two different viruses have caused clinically similar diseases to some outbreaks of "winter vomiting" disease in Britain. Thomas and Charter state that some patients with steatorrhoea were found in household outbreaks of diarrhoea and vomiting. The suggestion that steatorrhoea may be a sign of virus diarrhoea is worth investigating in more detail.

CHRONIC ARSENIC POISONING

Arsenic, that standby of the mediaeval professional poisoner, is ubiquitous in nature and is commonly met with in industry. Arsenical compounds occur in the smelting and refining of ores, in the subliming of white arsenic, and in the manufacture of sheep dips, insecticides, weed-killers, and pharmaceutical substances, in some paints, dyes, and soaps, and in calico printing. In the past glucose, owing to arseniferous acids used in its manufacture, has conveyed arsenic into beer, confectionery, syrups, and other foodstuffs. Nevertheless, industrial processes result in relatively few cases of chronic arsenical poisoning, eight cases being reported during the years 1950 to 1954.¹

Poisoning has been reported from inhalation of dimethylarsine produced by moulds growing on wallpaper and from absorption of arsenical dusts from decorated ceilings and cornices. In a recent case before the Kensington magistrates' court,² defendants summoned for not paying rates submitted a medical report stating they had been exposed to fumes from arsenic found in the wallpaper. But the commonest cause

¹ *British Medical Journal*, 1956, 1, 1359.

¹ Smither, W. J., *British Medical Journal*, 1953, 1, 376.
² Ormiston, G., Taylor, J., and Wilson, G. S., *ibid.*, 1942, 2, 151.
³ Ross, A. I., *Monthly Bull. Minist. Hlth (Lond.)*, 1955, 14, 16.
⁴ Hutchison, R. I., *ibid.*, 1956, 15, 10.
⁵ Hormaechi, E., Surraco, N. L., Peluffo, C. A., and Aleppo, P. L., *Amer. J. Dis. Child.*, 1943, 66, 539.
⁶ Bertrand, D. M., *Ann. Inst. Pasteur*, 1914, 28, 121.
⁷ James, U., Kramer, I. R. H., and Armitage, P., *Lancet*, 1948, 2, 555.
⁸ McDonald, J. C., and Charter, R. E., *Proc. roy. Soc. Med.*, 1955, 48, 85.
⁹ Taylor, J., and Charter, R. E., *J. clin. Path.*, 1955, 8, 276.
¹⁰ Friedman, A., *Amer. J. Dis. Child.*, 1953, 85, 675.
¹¹ Thompson, S., *J. Hyg. (Lond.)*, 1956, 54, 311.
¹² Fey, H., *Riassunti delle Comunicazioni, 6th International Congress of Microbiology*, 1953, 11, Sec. 12, No. 605, p. 308.
¹³ Rogers, K. B., *J. Hyg. (Lond.)*, 1952, 64, 729.
¹⁴ Taylor, J., and Charter, R. E., *J. Path. Bact.*, 1952, 64, 729.
¹⁵ Gordon, I., *Proc. roy. Soc. Med.*, 1954, 47, 1067.

of arsenic poisoning may be prolonged therapy with liquor arsenicalis. In the past such therapy was so commonly given in the treatment of psoriasis that when a psoriatic subject felt unwell the physician's first thought was that arsenic might be the cause. Arsenic affects the capillary beds and may damage renal glomeruli and tubules, and it may depress the bone marrow. It may cause encephalopathy, peripheral neuritis, and cirrhosis of the liver. Early signs of poisoning consist of weakness, falling hair, brittleness of nails, conjunctival injection, oedema of lower eyelids, and catarrhal inflammation of nose, throat, and larynx simulating coryza. Nausea, vomiting, and diarrhoea sometimes alternating with constipation occur. Mental hebetude may be associated with signs of peripheral neuritis affecting the legs more than the arms. Pigmentation of skin is common; it may be local or general and "rain-drop" or diffuse in character. Epithelial hyperplasia, with formation of keratoses, chiefly on palms and soles and less commonly on trunk and head, may appear within a month after the first ingestion of arsenic or not until thirty years after medication has been discontinued; in 20% of patients with such keratoses, epitheliomata may appear either in the keratoses themselves or as superficial epitheliomata elsewhere on the body.³ More recently it has been suggested that multiple internal carcinomata may develop.⁴ Cancer of the skin from industrial processes appears to be rare but has occurred in sheep-dip workers. A relative excess of cancer of skin and respiratory tract has been found in a group of workers exposed to inorganic arsenical dust.⁵ O. Neubauer⁶ and A. N. Currie⁷ review the role of arsenic in carcinogenesis. Dusts may lead to flexural eczemas and pigmentation of head and neck, but painless perforation of the nasal septum is perhaps the most common and characteristic lesion in this group. Other industrial hazards arise from arsenuretted hydrogen, which acts as a haemolytic agent, and from organic arsenic compounds, which have vesicant as well as systemic effects.

In the treatment of arsenic poisoning dimercaprol removes the inhibition of enzymes by arsenic, but cell damage may be irreversible and H. J. Wade and E. S. Frazer⁸ found that hyperkeratoses or skin pigmentation did not improve from such treatment. In cases of chronic poisoning arsenic can be detected in urine or vomitus; it may be retained in keratin, nails, and hair for a long time after ingestion. While the estimation of small quantities of arsenic is conventionally performed by the Gutzeit method or spectographic analysis, W. A. Dewar and J. M. A. Lenihan⁹ have recently described a case of chronic arsenical poisoning in which the arsenic content of skin, hair, and nails was determined by a

radioactivation technique. The specimens were placed in a nuclear reactor; the induced radioactivity measured by Geiger counter provided an indication of the amount of the target element present in the original samples. Provided a source of sufficiently high neutron flux is available a much higher sensitivity is claimed for this method than for chemical methods.¹⁰ Analysis by radioactivation was first suggested by G. V. Hevesy and H. Levi,¹¹ but it was not a practical proposition until the advent of modern nuclear reactors, and was first applied to the estimation of arsenic in biological material by A. A. Smales and B. D. Pate.¹²

JELLY-FISH STINGS

The stings of some jelly-fish, such as *Chiropsalmus*, the Japanese "fire-medusa," and *Physalia*, the "Portuguese man-of-war," can be serious or even fatal. The latter is brought near Britain only occasionally by freak storms, and it remains to be seen whether the recent storms have swept any to our coasts. Fortunately none of the five species found regularly in British waters is so dangerous. The commonest, *Aurelia*, marked with four purple rings on the bell, and the largest, *Rhizostoma pulmo*, recognizable by the absence of marginal tentacles and its pale blue colour, are harmless. The other three, however, may cause unpleasant and sometimes alarming effects. They all have long tentacles and can most easily be identified by the colour of the bell, which is blue or yellow in the two kinds of *Cyanea* and white with brown radial striations in *Chrysaora isosceles*.

The exact nature of the poison with which they sting is unknown, but it is thought to be a mixture of proteins; there is no foundation for the old belief that it is formic acid. Experiments on small animals with various extracts from jelly-fish and allied organisms have shown a toxic effect on the central nervous system, motor nerve-endings, and the alimentary and respiratory system as well as the skin. Furthermore, repeated small doses of at least one of these extracts have been shown to produce a state of allergic hypersensitivity similar to anaphylaxis. On the other hand, examples of natural immunity are found in certain fish and crabs which exist as commensals with jelly-fish or sea-anemones, and this immunity has been transferred passively to susceptible members of the same genus. This observation might point the way to an antitoxin suitable for clinical trial. Both local and general effects have been reported in human victims. At the site of contact there is usually an immediate burning sensation followed within a few minutes to an hour by erythema, weals, or vesicles, which may be haemorrhagic and, rarely, even result in superficial necrosis with permanent scarring. Localized atrophy of subcutaneous fat has been recorded. In most cases the local symptoms and signs last only about a week, though the areas may remain hyperaesthetic for much longer. General effects may appear from one to twenty-four hours after the sting. They include erythema and urticaria, nausea, anxiety, painful cramps and clonic muscular spasms affecting chiefly the abdominal muscles and the diaphragm

and leading to respiratory distress, and a state resembling anaphylactic shock. This last phenomenon may be due to sensitization by a previous sting, which may not have been noticed or remembered.

In treatment the patient's first need is rest and careful observation for at least twenty-four hours. Application to the primary lesions of local anaesthetics such as benzocaine or antihistamine creams would probably give more relief than simpler remedies; hydrocortisone ointment might be worth a trial. Parenteral analgesia, including even morphine, may be needed. Urticaria would probably respond to antihistaminics given orally, but adrenaline should be injected promptly if severe shock develops. Muscular cramps have been relieved by either calcium gluconate or barbiturates given intravenously.

PSEUDHAEMOPHILIA

The term pseudohaemophilia has at some time been applied to almost every haemorrhagic disease of undefined aetiology. The name is now generally accepted as referring to a bleeding tendency in a patient of either sex, where the significant demonstrable abnormality is a prolongation of the bleeding time. The whole-blood coagulation time, the platelet count, and the one-stage prothrombin test are normal. The tourniquet test is positive in about half the patients.

By these criteria of diagnosis it is probable that the reported cases do not form a homogeneous group. In some of the patients a capillary defect has been shown by direct visualization of the nail-bed capillaries, which appeared distorted in shape and failed to constrict normally after injury. This was reported by R. G. Macfarlane in 1941,¹ and has been confirmed in some subsequent reports but not in others. A second view of the pathogenesis of the disease postulates a qualitative defect of the platelets. When platelets were collected from some of the patients and added to platelet-free normal plasma, they failed to induce normal retraction of clot or the utilization of prothrombin during clotting. This variety of pseudohaemophilia is sometimes called thrombocytoasthenic.² At least some of the patients reported by E. A. von Willebrand probably belonged to this group.³⁻⁵ It was he who originally stimulated interest in pseudohaemophilia, and it is still sometimes in consequence called von Willebrand's disease. He and R. Jürgens⁶ believed the disease to be due to poor agglutinability of the platelets. Of relevance also is a report from F. S. Bigelow of normal serotonin activity in the plasma of two patients believed to have pseudohaemophilia.⁶ A third group of patients have been found to have defective prothrombin consumption, indicating an abnormality in the thromboplastin system of the blood. This has been ascribed again by some as due to a functional platelet abnormality, but has also

on occasion been due to an associated deficiency of antihaemophilic globulin.⁷

The symptoms of pseudohaemophilia are very variable in intensity, but the condition usually causes less disability than severe haemophilia. Among the most frequent symptoms are epistaxis, gingival bleeding, excessive bleeding from minor cuts, and in females excessive menstrual bleeding and serious post-partum haemorrhage. Abnormal haemorrhage may follow extraction of teeth or other operative procedures. Excessive bruising can follow minor trauma. The condition is distinguished from haemophilia by its occurrence in both sexes and by the marked prolongation of the bleeding time. In haemophilia there is demonstrable deficiency of a plasma-clotting component, antihemophilic globulin, and the bleeding time is normal. A differentiation between the two conditions can usually be made on these grounds, but rare cases occur in which there is a deficiency of antihemophilic globulin associated with a prolongation of the bleeding time.⁷

No treatment is satisfactory. Blood transfusion may be indicated for anaemia, and cortisone has been reported of benefit in the control of bleeding.⁸ Local pressure to control haemorrhage can be applied in this condition, whereas it is often contraindicated in haemophilia. The hereditary pattern of the disease is difficult to determine. There is some evidence that it is a dominant sex-linked character, but the available information is not adequate to provide a final answer; the histories of most of the patients suggest that it is constitutionally determined. Pseudohaemophilia is a rare disease, but, apart from haemophilia and Christmas disease, it is probably the most common of the constitutional haemorrhagic disturbances. It has recently been well reviewed by J. C. Buchanan and B. S. Leavell.⁹

CHROMOSOME NUMBER OF MAN

It has generally been believed that the somatic cell of man contains 48 chromosomes. Now J. H. Tjio and L. Levan¹ have suggested that the number should be 46, and in support Dr. Tjio showed preparations of human chromosomes at the Congress on Human Genetics held last week at Copenhagen. Tissue cultures of fibroblasts from human embryonic lung were treated with colchicine to effect an accumulation of mitoses. Before fixation they were treated for one or two minutes with hypotonic saline solution, a method which had been used before by T. C. Hsu² to induce scattering of the chromosomes. Fixation followed in 60% acetic acid twice exchanged to wash out the salts left from the culture medium and the hypotonic saline that would otherwise have caused precipitation with orcein. Ordinary squash preparations were then made in 1% acetic orcein. Single cells were squashed under microscopical observation by slight pressure with a needle, and it was seen that no chromosomes escaped. On 22 cultures 261 chromosome counts were made, and the chromosome number was found to be 46 (2n = 46).

¹ Tjio, J. H., and Levan, L., *Hereditas (Lund)*, 1956, 42.
² Hsu, T. C., *J. Hered.*, 1952, 43, 67.

¹ Annual Report of the Chief Inspector of Factories, 1954, H.M.S.O., London.

² *Daily Telegraph*, July 17, 1956.

³ Montgomery, H., *Arch. Derm. Syph. (Chicago)*, 1935, 32, 218.

⁴ Sommers, S. C., and McManus, R. G., *Cancer*, 1953, 6, 347.

⁵ Hill, A. B., and Fanning, L. E., *Brit. J. Industr. Med.*, 1948, 5, 1.

⁶ Neubauer, O., *Brit. J. Cancer*, 1947, 1, 192.

⁷ Currie, A. N., *Brit. med. Bull.*, 1947, 4, 402.

⁸ Wade, H. J., and Frazer, E. S., *Lancet*, 1953, 1, 269.

⁹ Dewar, W. A., and Lenihan, J. M. A., *Scot. med. J.*, 1956, 1, 236.

¹⁰ Meinke, W. W., *Science*, 1955, 121, 177.

¹¹ Hevesy, G. V., and Levi, H., *K. danske videnskab. Selsk. Mat.-fys. Medd.*, 1936, 14, 5.

¹² Smales, A. A., and Pate, B. D., *Analyst*, 1952, 77, 196.

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Correspondence

Because of heavy pressure on our space, correspondents are asked to keep their letters short.

Effect of Fatty Meals on Blood Coagulability

SIR,—The article by Dr. G. H. Hall (*Journal*, July 28, p. 207) has naturally been of much interest to me. He seems to have shown that the accelerated clotting times after a high fat meal are not shortened when plasma rich in platelets is used. However, I find it difficult to understand the conclusions he draws from this finding. No one, I think, would presume to state dogmatically the conditions of *in vitro* clotting which most closely approximate those which hold *in vivo*. It has seemed to us that the clotting time of whole blood in silicone-coated tubes is a measure of coagulability which is less artificial than any other, and Dr. Hall's work does nothing to detract from the significance of our findings or from the tentative deductions we have drawn from them.

In addition, I would disagree strongly with Dr. Hall when he states: "It is difficult to see, however, why a change affecting the whole blood should promote the development of atheroma preferentially in certain areas—for example, the coronary arteries—and this fact argues that the initial defect is in the arterial wall and not the blood." Conditions of blood flow differ in the coronary arteries from those in any others, in that during ventricular systole there is marked reduction or cessation of flow. This factor would readily allow deposition of pre-formed fibrin on the intima of the coronary arteries, while continuous blood flow would lessen the tendency of this occurrence elsewhere. Indeed, far from agreeing with Dr. Hall's view, I would go so far as to say that the high incidence of atheroma in the coronary arteries is one of the considerations favouring the hypothesis that the initial defect in atheroma is in the blood and not in the arterial wall.—I am, etc.,

Aberdeen

H. W. FULLERTON.

REFERENCE

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Medical Evidence at Inquests

Sir,—Thirty years ago, when I was doing my resident hospital appointments, medical evidence from one or more house officers was required by the coroner at every inquest held following a death in hospital. Whether the house officer was paid or not depended on the coroner, for fees to hospital residents were permissive but not obligatory. Curiously enough, I was a resident in an area where the coroner paid no fees when the law was altered and fees for all medical witnesses made obligatory. It was very revealing to observe the economy which the coroner exercised in his calling of medical evidence from that time on. The explanation lies in the curious anomaly that a coroner should be paid in a block grant from which all expenses, including witnesses' fees, are paid. Economy in the calling of witnesses was a direct saving to the coroner personally. I believe this is still the method used.

At that time many hospitals had no pathologist, and necropsies were done by police surgeons or hospital residents. The police surgeons were usually general practitioners. I remember the case of a Finnish seaman who was stabbed in eleven places and died on the operating table under my ministrations. I spent the greater part of one day doing a necropsy and writing a detailed report for the coroner (the police surgeon was present but played no part). On the following day I spent the morning at the inquest and the afternoon at the police court, and the sum of one guinea for the last was the only payment I received. Now the pathologist has come into his own, and all necropsies are conducted much more expertly by experienced men who devote much of their time to this work. As a consequence of this, the coroner has come to depend

more and more on the pathologist who gives precise, dogmatic, and incontrovertible evidence on the cause of death as revealed at necropsy. Secure in this knowledge, they can, and not infrequently do, ignore the clinician whose knowledge of the patient in life might have put a different complexion on the medical evidence at the inquest.

Perhaps one of the less important consequences of this practice is that house officers are never given an opportunity of attending an inquest, which should be part of their education, nor of collecting an occasional fee. More important is the building up of a clinical picture by the pathologist from his post-mortem findings, which is often widely at variance with the facts as observed by the family doctor or the hospital officer. Sometimes in evidence statements are made which are taken by the relatives to reflect on the competence of the doctor who attended the deceased, though no such reflection was intended. The object of an inquest is to arrive at the true cause of death, and post-mortem findings divorced from the clinical history are not always dependable, and may indeed give a less accurate picture than the clinical history taken by itself. I can recollect one case in which a verdict of natural causes was returned, which was, in fact, a suicide. This is a verdict which no one would wish to upset, but it could have been the other way round.

Most of us are too busy to wish to waste time at inquests, but, even though we are not called, we could sometimes give important information if requested by the coroner. We are not asked because the coroner does not wish to pay a fee and because the pathologist considers his own evidence sufficient. What is needed is a closer contact between clinician and pathologist and another method of paying coroners.—I am, etc.,

Preston

F. M. ROSE.

Vaccination Against Tuberculosis

SIR,—While agreeing with the views expressed by Dr. Kenneth Marsh (*Journal*, July 21, p. 174), one would have liked to see more emphasis laid on the last few words of his excellent letter, where he suggests extending B.C.G. vaccination to Mantoux-negative subjects over the age of 14 years.

The reasons for offering this protection to 13-year-old schoolchildren apply with equal force to all who are over this age, and such persons would seem to be more in need of B.C.G. than infants. It would be logical to offer B.C.G., with wide publicity, to all persons over the age of 13, among whom there are many thousands who are Mantoux-negative.

If the practical problem of Mantoux-testing and inoculation is too great, the scheme could be limited in the first instance to persons up to the age of 25, but with a little organization both these procedures can be done very quickly. They might perhaps be linked with mass radiography, and no doubt general practitioners and industrial medical officers would be willing to do their share if the task is too great for the resources of the local authorities and the chest clinics.—I am, etc.,

Bromsgrove, Worcs

R. B. MAYFIELD.

Apartheid in Blood Transfusions

SIR.—Dr. J. Torley's letter (*Journal*, July 21, p. 179) at first sight appears to administer firm but gentle admonition to Dr. David J. Adderley (*Journal*, June 30, p. 1546). However, on careful study it raises some very important points. Does Dr. Torley really believe that the South African Government's decision is based on scientific integrity? Would he care to suggest a "scientific" theory for the South African Government's apartheid policy in general? This is not a question of offering gratuitous advice to the profession in South Africa. There is an important moral and ethical principle at stake here, and we must not prostitute science to condone a flagrant violation of our present standards. From

his letter Dr. Torley appears to be either an apologist for South African racial doctrines or grossly ill-informed about conditions in that country. Do not let us be so naive as to imagine that this is one isolated incident in South Africa. It must be assessed against the background of apartheid in general and also the profession's attitude in that country to apartheid in science.

In 1947 an Indian doctor was appointed senior resident officer at a hospital in Capetown, and as such was responsible for supervising the work of the junior house officers and also for doing the emergency surgery—general surgical, traumatic, and gynaecological. The post also carried with it the responsibility for bleeding white blood donors for emergency transfusions at the hospital. 'Because he was non-white, the blood transfusion service in Capetown refused the senior resident permission to do this, and instead one of the white junior house officers was entrusted with this duty. The profession raised no objection to this and completely condoned the action of the blood transfusion service. It may surprise Dr. Torley to know that since 1945 non-white medical students at the University of Capetown Medical School have been forbidden to attend any class, clinic, or operation on a white patient or attend a necropsy on or dissect a white corpse. When they register at the University they are required to sign a document undertaking to abide by this. Does that meet with Dr. Torley's requirements for scientific integrity or his interpretation of the Hippocratic Oath?

Hippocratic Oath ?
Of course it is known that group A seems to be commonest in western Europe, B in south-east Asia, and O among so-called primitive groups such as Australian and American aborigines, but surely we do not suggest having separate blood banks in England, for instance, to serve the needs of the numerous racial groups living in this country. Would Dr. Torley refuse to accept a transfusion of compatible blood from a negro donor on the remote off-chance of the presence of a hypothetical injurious factor to be discovered in South Africa in the still more remote future ? No, Sir, do not let us emulate the South African ostrich and hide our heads in the sands of pseudo-science.

To the exponents of theories of racial superiority, of *Herrenvolk*, the word "blood" possesses a highly emotional content. The *Oxford Dictionary* states: "Blood is popularly treated as the typical part of the body which children inherit from their parents and ancestors; hence that of parents and children, and of the members of a family or race, is spoken of as identical and as being distinct from other families or races." Dobzhansky' says, "It is most unfortunate that the theory of 'blood,' though invalidated decades ago, still colours not merely the thinking of laymen, but finds its way, explicitly or implicitly, into textbooks." It took a world war to disclose to us the depths to which scientists could

If the medical profession in South Africa has initiated this present move, let it publish the grounds on which it bases the incompatibility of negro and white blood. On the other hand, if this is merely another political stunt of the South African Government, we hope that country's medical men will challenge it, but whatever happens we must question the integrity of a radical departure from the accepted standards and criteria of blood compatibility.—
I am, etc.,
RALPH A. A. R. LAWRENCE.

Leabrooks, Derby.

RALPH A. A. R. LAWRENCE.

REFERENCE

REFERENCE

1. Dobzhansky, *The Teaching Biologist*, 1943, 12, 101.

SIR.—Dr. J. Torley (*Journal*, July 21, p. 179) in commenting upon the South African Government's (not the profession's—the head of the Medical Service is himself severely critical of it) proposed measure to segregate blood of different origin, has rather by-passed the essential objection to it. I fully support his postulate that there may be differences between such bloods, as yet unknown. This scarcely affects any individual transfusion, which would only be given after cross-matching and having taken all known precautions.

Assuming that this has been done, what objection remains? Surely, only that of a possible "taint" being acquired by the recipient, and it is that superstition to which I am opposed. This is no political theory, but an honest objection to this concept. We all deplore the introduction of politics into science, and I hope we may express our united support for the resentment against the imposition of this measure.—I am, etc.,

London, S.E.13.

DAVID J. ADDERLEY.

Diesel Oil and Lung Cancer

SIR,—The subject of the effect of exhaust fumes on public health has been discussed at length in the transport technical press, and whether by accident or design in certain cases the main issues have become confused. From this one is led to the conclusion that if the outcome of the present investigations prove that the exhaust fumes from diesel engines have a contributory effect upon the growth in the number of cases of lung cancer the establishment of this fact will have a profound effect on the transport industry, if not upon the economy of the country, bound up as we are in the use of fuel oil in all phases of transport. A doctor and friend who is much interested in the subject of diesel engine exhaust fumes and cancer has drawn my attention to the correspondence in your issue of June 2, and he has asked my opinion about the catalytic exhaust filter mentioned by Dr. Handley Howell (p. 1297).

The researches of Dr. Handley Howell and others, which some of us have had the benefit of studying, show that means of counteracting the noxious and/or poisonous fumes are available in the catalytic exhaust filter, which is extensively used in the United States of America, and no doubt transport operators will be ready to give this equipment a thorough trial. It would appear, however, that the catalyst is not effective until a fairly high temperature is reached, which is not attained until a diesel engine is running at 60% of full load or more. When running below such load conditions the catalytic reaction may not be fully effective, but with 60% of full load it has been stated that 60%-85% of the noxious ingredients in the exhaust gases are eliminated.

Thus it may be easy to obtain ideal conditions for using catalytic filters with stationary engines, but with motor-bus engines, idling for much of the time at stops or while the vehicles are running at low speed, the effectiveness of the equipment must be questioned. One can only trust that more information can be made known, as this seems to offer hope, quite apart from the fact that the exhaust from diesel engines is unpleasant anyway and creates a further discomfort in the streets and congested areas of towns to-day.—I am, etc.,

Southwick, Hants.

B. R. MILLER.

Personality and Cancer

SIR.—At least since 1930, when Le Gros Clark and his colleagues¹ outlined the link between the emotional thalamic drive and the endocrines, and Engels² extended the work from the endocrines to cancer, the clinician has had rational support for his experience that worry of the type your annotation (*Journal*, June 30, p. 1537) describes does in fact often precede cancer. The link is not more generally recognized because, in the words of your annotation, "many of the workers found what they were looking for . . . their observations were in part determined by their preoccupations." The suggestion here is that to search for confirmation of a hypothesis is somehow intellectually inferior to detached observation of what an experiment yields and what answer a statistical computer provides.

This latter attitude has been challenged very recently by both Carl Jung³ and Professor R. A. Kapp.⁴ In his *Interpretation of Nature and the Psyche* the former says, "The experiment imposes limiting conditions on Nature, for its aims are to force her to give answers to questions devised by man. Every answer of Nature is therefore more or less influenced by the kind of questions asked and the result

is always a hybrid product. The so-called 'scientific view of the world' based on this can hardly be anything more than a psychologically biased partial view which misses out all those by no means unimportant aspects which cannot be grasped statistically."

Kapp's criticism is no less formidable: "If the laws of physics do not preclude any events that are logically possible, those of biology seem nevertheless to do so. For there is evidence that the laws of biology lead to specified order whereas the laws of physics do not." In other words, the current subordination of the medical mind to the statistical and experimental methods excludes the logically possible. This is a reversal of the teaching of Osler and Horder. Clinical observation is the fact, the hypothesis is the logically possible, hence Horder's insistence on the mastery of *Jevons's Elements of Logic*.⁶

My object in writing this is to invite attention to the fact that no section of any of our learned societies and no section of our professional press is devoted to study of the logically possible, and the R.S.M. apparently has no committee able to initiate such a study. Your annotation again expresses the prevailing opinion: "Evidence that [personality] plays a part in the aetiology of cancer can be satisfactorily derived only from controlled studies." Some of us in *ad hoc* committees have found it impossible to devise experiments involving personality. It is, on the other hand, logically possible to express a rational evolution of structure and function from such a basic presupposition as, for example, monism, and I venture to plead for a subsection within organized academic medicine dedicated to this end.—I am, etc.,

Caernarvon.

GRIFFITH EVANS.

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- Kapp, R. A., *Nature (Lond.)*, 1956, 177, 997.
- Jevons, W. S., *Elements of Logic*, 1885. London.

Increase in Lung Cancer Deaths

SIR,—Following the correspondence which questions whether the increase in the number of deaths from lung cancer is real or purely apparent and due to better diagnostic facilities, attendance at x-ray departments, etc., and the increased facilities at hospitals following the advent of the National Health Service Act in 1948, might I ask Dr. Jane M. Fullerton (*Journal*, May 26, p. 1238) and Dr. John S. Willmann and Dr. E. Gallop (*Journal*, June 30, p. 1543) to consult the Registrar-General's *Statistical Review for 1952* (published 1955), page 149? Diagram 12 illustrates the incidence per million living of deaths from cancer of the lung from 1936 to 1952.

It can be seen that, for men over 40, there has been a steady increase of this condition since 1935, and the graphs, from ages 55 to 70 in particular, approximate to a straight line. There is therefore no evidence that rate of increase of the diagnosis of cancer of the lung has changed since 1948, and, indeed, the reverse appears to be the case with a falling off of the increase since 1946 in the age groups 40 to 50. If better hospital facilities were the sole cause of this increase then surely during the war years, with the shortage of medical practitioners and extreme pressure on existing facilities, there would at least have been a halt in the increase, but this is not the case.

Dr. Fullerton's figures suggest that at St. Olave's Hospital, at least in the years 1950-2, approximately 50% of the actual cases were being diagnosed "ante-mortem," so that undoubtedly extension of pathological services will lead to an apparent increased incidence of pulmonary carcinoma, but nevertheless in addition to this fact it is likely that there has been an increase in the true incidence of carcinoma of the lung.

Might I refer your correspondent Dr. P. H. Cummins (*Journal*, July 7, p. 43), who has questioned the role of cigarette paper, to a recent paper by Cardon and Alvord to the American Association of the Advancement of Science

(abridged in the *Chemical Engineering News*, January 16, 1956, volume 34, p. 224) which shows that when cigarette smoke was drawn through acetone by a smoking machine and analysed the average packet produced 2½ µg. of 3-4-benzpyrene, of which 25% came from the paper and 75% came from the tobacco?—I am, etc.,

Stafford.

H. BINYSH.

Cigarette Smoking

SIR,—While one cannot fail to applaud the representatives of the B.M.A. in their efforts to maintain the health of the nation, one does not agree that cigarette-smoking should be banned, unless it is excessive and involves inhalation.

I do not think we have had any *proof* that the habit is a cause of disease. If nicotine is to be noted as an instance of a drug which is to be banned, what is to be done about tannin? Surely excessive tea-drinking can be quoted as harmful also? The deep and frequent potations of the hard-working charlady if abolished or curtailed would produce severe psychical results, however beneficial to the physical well-being of this valuable worker.

What is the alternative to cigarette-smoking? Chewing-gum? Heaven forbid!—I am, etc.,

London, W.1.

J. HAMILTON MCILROY.

SIR,—In speaking of the evils of heavy smoking, cancer of the lung seems to occupy the stage, but there are other evils of great importance rarely, if ever, mentioned.

I was a heavy smoker for over 50 years, and stopped 4½ years ago at the age of 67 years. I found the following changes for the better: (1) A great improvement in my mental processes, most marked by an ability to make an immediate decision after looking at a matter in all its angles, especially marked in financial matters such as buying and selling stock. (2) An immediate improvement in the state of my digestive tract, which for years had been affected with pains and wind-eructations and at last vomiting every few days of a light green bitter fluid, often about a pint to 1½ pints (0.6 to 0.9 litres) in volume. Indeed, it was the immediate improvement in my digestive system with lack of pain and a revival of appreciation of the taste of food with gain of weight and feeling of general well-being that enabled me to break off the habit at once permanently. (3) At times a feeling of vertigo, especially after morning smoking on an empty stomach. (4) I was fully 35 lb. (16 kg.) underweight for many years and regained it when I stopped. (5) An immediate improvement in my chronic bronchial cough with sputum. But this took about three years to be completely relieved.

Finally, now that they are investigating smoking and its evils in Britain, I feel that all these bad effects and many more (effect on arteries, heart, etc.) should be looked into at the same time.—I am, etc.,

Montreal, Canada.

A. E. BOTSFORD DENOUAN.

Staggered Dumping and Sugar Tolerance

SIR,—In my article (*Journal*, March 31, p. 714) I reported on the radiological signs in a series of patients with dyspepsia referable to distension of the terminal oesophagus and of the pyloric antrum. Common to all was the helical pattern of the mucosal relief observed especially in the second and third parts of the duodenum and in jejunal loops. The appearances on the screen of the meal's passage through the pyloric canal, the duodenum, and the jejunum were compared to loopwise discontinuous cascades and described as "staggered dumping." In conjunction, the observations suggested that the muscularis mucosae acted in these segments as a co-ordinated peristaltic organ, propelling the meal by means of successive and adjoining helical springs. It was further suggested that intermittent mucosal prolapse—into the duodenal cap at the pylorus and upwards into the diaphragmatic part of the oesophagus—could readily be explained as mechanically conditioned side-effects of the helical spring peristalsis at the natural straits of the digestive canal.

To verify the physiological affinity between dumping *en bloc* (post-gastrectomy syndrome) and "staggered dumping" it was decided to determine the sugar tolerance in patients exhibiting the latter syndrome, but no significant deviation from the normal rate of gastric emptying *in toto*. This was done, so far, in six patients, and it was already available in a seventh. Jejunal and duodenal motility was "normal"—according to current radiological standards—except in Cases 1 and 2, in which the rapid filling of the ileum was commented on.

Minutes After Taking 50 g. Glucose	Blood Sugar (mg.%) in Seven Patients with "Staggered Dumping" (1-7)						
	1	2	3	4	5	6	7
0	92	79	85	103	95	80	79
30	134	153	167	360	155	145	127
60	888	231	185	190	190	175	120
90	76	213	124	108	145	135	105
120	76	147	91	90	95	115	57
150	64	102	75		70	75	86
180	64	94	79		60	75	78
210							
240	66						
300	70						
360	64						

The fasting blood sugar was normal in all patients. Hyperglycaemia and glycosuria occurred in four (2, 3, 4, and 5). The occurrence of hyperglycaemia was made probable in another (6) between 30 and 60 minutes (blood presence of sugar in the urine passed at 60 minutes (blood sugar 175 mg.%) but not in the other specimens. In six patients (2, 3, 4, 5, 6, and 7) there was a lag in the return to fasting level. Hypoglycaemia was demonstrated in five patients (1, 3, 5, 6, and 7). One (1) exhibited typical and diurnal hypoglycaemic symptoms between 4 and 7 p.m. The hypoglycaemia was not established in this case by the standard two-hour tolerance test, but it became apparent when Dr. William T. Foley, of New York, carried the test—in keeping with the timing of the patient's symptoms—to 6 hours.

The patient whose blood sugar rose from the fasting 103 to 360 in the first half-hour (4) had had for 30 years, since the age of 20, attacks of sudden faintness with extreme muscular weakness and carried the diagnostic label "Familial periodic paralysis." The major attacks occurred as a rule during a spell characterized by daily episodes of minor degrees of the same symptoms. Some kind of periodic dumping was suggested, apart from the cited tolerance curve and its variability at different times, by the patient's observation that major attacks were usually preceded by gurgling epigastric distension and their passing heralded by gurgling in the abdomen; this, however, and "snake-pit activity" in the lesser degree of weakness which was soon followed by a lesser degree of weakness which would last for several hours and was due, presumably, to would last for several hours and was due, presumably, to reactive hypoglycaemia. I had the chance of seeing him in an acute attack; it came on about ½ hour after a meal, in a blood taken from the cubital vein contained 450 mg.% blood taken from the cubital vein contained 450 mg.% sugar, while sugar was absent in a specimen of urine passed only approximately 8 minutes before.

On preliminary impression, the sugar tolerance in patients with staggered dumping is comparable to the findings in the early and the delayed type of the post-gastrectomy syndrome as reviewed and analysed by W. M. Capper.¹—I am, etc.,

London, W.1.

REFERENCE

- Capper, W. M., in *Modern Trends in Gastroenterology*, 1952, edited by F. Avery Jones, pp. 459-476. London.

T. CSATO.

Treatment of Measles

SIR,—For the past three years I have been in the habit of administering sulphonamides as a routine prophylactic measure in the treatment of measles. I have treated approximately 200 cases in this way and have had no complications. After reading the recent report by the study group of the College of General Practitioners¹ I began to administer antibiotics or sulphonamides only to selected cases with the

indications mentioned in the report. Of the 12 cases treated since reading the report, three were mild cases with no indications and therefore were not given the usual prophylactic sulphonamide (sulphadimidine). Two developed otitis media and the third a residual catarrhal bronchitis. The other nine cases treated as usual with sulphadimidine were uncomplicated.

I realize that my figures would not stand up to examination by a statistician, but I feel that in future I shall be reverting to my old practice of the routine use of a prophylactic measure.—I am, etc.,

Harold Wood, Essex.

C. R. LYNN.

REFERENCE

- The Complications of Measles, June, 1956. College of General Practitioners, London.

Atypical Weil's Disease

SIR,—Dr. H. R. Miller's letter (*Journal*, July 14, p. 100) raises some interesting points. I agree with him that toxic confusional states are not a rarity in leptospirosis. I can recall several cases occurring in soldiers occupationally exposed in Malaya during the period 1951 to 1954. In these cases it was probably related to severe physical exertion and unavoidable delay in evacuation to hospital. Toxaemia and meningeal irritation aided by anaemia in severe infections might well be the precipitating factors. With regard to jaundice, Trimble¹ states that it only occurred in 3% of cases at that time.

Weil's disease as such was relatively rare. Broom² carried out a serological survey of 200 cases and only found *L. haemorrhagiae* in less than 1%. Over 90% were due to *L. autumnalis* and *L. hebdomadis*.

However, there may still be a case for retaining Weil's name. As Dr. Miller stated, *L. haemorrhagiae* was the first leptospira to be discovered. It may well be that this particular species was the original prototype, and the multiplicity of species and strains now catalogued may have evolved from it. Until this theory is disproved I still have a regard for the term Weil's disease, and, anyway, old names, though not strictly scientifically accurate perhaps, have an affectionate familiar sound. Such names die hard.—I am, etc.,

Taunton.

J. G. P. POWER.

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- Trimble, A. P., *Proc. Alumni Ass. King Edw. VII Coll. Med.*, 1954, 7, 182.
- Broom, J. C., *Trans. roy. Soc. trop. Med. Hyg.*, 1953, 47, 273.

Abdominal Migraine

SIR,—Regarding the letters recently appearing in the *Journal* on the above subject, may I suggest that the derivation and/or nomenclature of migraine are not clinically important? In fact, they might easily be misleading, or at least be unhelpful in diagnosis.

Sir John Parsons, in a letter to the *Journal* (October 29, 1949, p. 980) replying to a suggestion that migraine might cause permanent scotomata, strongly emphasized that migraine is a symptomatic syndrome, and that the syndrome when complete is unmistakable, but in mild forms only parts may occur. He considered scintillating scotomata the most frequent symptom and doubted a diagnosis without them. I wrote in the *Journal* (November 19, 1949, p. 1177) that, after a great many years' interest in the condition, I did not consider the scintillating scotomata the most frequent sign, but that the bad headaches, feeling of sickness, photophobia, and wishing to rest in a darkened room were the most symptomatic. After seven more years' experience I am convinced that after the headaches the abdominal symptoms are the most pathognomonic of the syndrome, and without any history of such I would be slow in diagnosing migraine. I therefore see every reason to be grateful to Dr. H. G. Farquhar for his able study (*Journal*, May 12, p. 1082).

Two years ago an architect patient of mine found himself away from home in the Midlands one week-end. He had been cured of migraine for 18 months before this. On the Saturday afternoon he was taken suddenly ill with acute abdominal pain, sickness, and prostration. He was rushed

Medical Education

SIR,—Some of Professor G. W. Pickering's remarks (*Journal*, July 21, p. 113) are very disturbing. First, the implication that the introduction of the compulsory year of residence might justify substantial change in the teaching of the students. Does this mean reduction of his clinical teaching?

Even before the pre-registration year was introduced a very large number of the newly qualified did one or two resident appointments, so that a reduction in, for example, dressing and clerking now would mean that for the majority there would in fact be less clinical teaching before a man left the shelter of a hospital appointment. Further, it is almost certainly true that the best students get the best resident appointments in their own hospitals, and the weaker ones have to be content with perhaps appointments in special departments and perhaps with appointments in non-teaching hospitals, in which, at any rate in my experience many years ago, there was practically no instruction.

Those of us who consider it perhaps our highest honour that we are able to be teachers in a medical school have no confusion of mind as to what we are trying to do, nor do we think that our methods differ in principle from those of our forebears. In teaching a man to be a doctor, of course, we teach him about the implications of what he is doing. If he is instructed on how to pass a catheter he can scarcely escape being instructed on what the result may be, and why, and how. I can remember my teacher, the late Dr. James Russell, sitting on the bed of a patient and setting fire to our curiosity and interest in a way that few who have been taught by him have forgotten (1920). It is upsetting that medical scientists joining a medical school to-day should suddenly imagine that these elementary principles of thinking and understanding are something quite new in a medical school. I notice also some confusion of thought in that the arts department in the university considers the medical school badly educated, and the science department thinks that a medical student must be taught how to think.

When I was a student I could not fail to see among my teachers men who were humane, devoted, reliable, and in every way a pattern of what a doctor should be, and I think that there is scarcely any finer education than to work with such men. If I were to suggest a change in the medical curriculum, it would be that we would protect ourselves from it becoming a pure faculty of medical science, and that perhaps we should find a place—as, for example, instead of botany—for some general philosophical instruction, so that a young man might be encouraged to think about his place among his fellow men and in eternity. I am sure that in the world as it exists to-day the thing of the greatest importance is the preservation of the morale of the medical profession.

As to what we propose to produce as a basic doctor, there cannot be much argument about this. It is governed by an Act of Parliament through the General Medical Council, and it is a clinician.—I am, etc.,

Birmingham.

H. DONOVAN.

Artificial Respiration

SIR,—Following a recent visit to England, I am not surprised at the contents of the letter (*Journal*, May 26, p. 1239) by Dr. R. E. W. Fisher concerning artificial respiration in a moving ambulance. The advice he offers on behalf of the chief medical officers of the area gas boards only befits an obsolete state of affairs in relation to ambulance equipment in England.

Several years ago all the civil ambulances throughout the state of Victoria were equipped by the Hospitals and Charities Commission with oxygen resuscitators and suction apparatus. The oxygen resuscitator, known as the "R.M. resuscitator," is a modification of the Oxford inflator with certain improvements. The suction apparatus is worked by simply connecting it to the intake manifold of the engine of the ambulance. So successful has been this type of apparatus that its use by the ambulance crew, apart from any more skilled medical help that may be available, is

now taken for granted, and a long list of impressive "saves" have accumulated over the years. The lives saved have been due either to the apparatus in the ambulance entirely or to the maintenance of life during an asphyxial episode while the patient is being conveyed to hospital in order to receive specialized treatment in the hands of anaesthetists, such as emergency bronchoscopy, etc.

To me it is a paradox that a country like England, which has contributed so much to anaesthetic progress and to whom I am indebted for my own training, should be so backward as regards the installation of suitable oxygen resuscitators and suction apparatus in ambulances.—I am, etc.,

Victoria, Australia.

NORMAN R. JAMES.

Radiation Hazard

SIR,—The holiday season is with us, and during this period many people will, as usual, sustain injuries requiring hospital treatment at long distances from their homes. Many of these will obtain primary treatment at the local hospitals wherever they happen to be, and will be referred back for continuation of treatment in the accident services of the hospitals in the main population centres where they reside.

May I address through your columns an urgent plea to casualty officers, who deal with these cases in the first place, to take the greatest possible care that sufficient and accurate information is transmitted to the hospitals that will be responsible for further treatment? This particularly applies to relevant x-ray films, which should always accompany the patient.

Although the early transmission of x-ray films, which may sometimes have to be sent in the custody of the patient, may give rise to considerable administrative inconvenience, it is surely of primary importance that they should be made available without delay to the surgeon responsible for the care of the case. A very substantial number of x-ray exposures could be avoided if patients' previous x-ray films were always available when they first attend the accident services in their home towns.—I am, etc.,

Rotherham.

H. L. McMULLEN.

Blindness

SIR,—In your annotation (*Journal*, July 21, p. 146) you state: "The largest single cause of blindness is still senile cataract, and this is *par excellence* a remediable condition; yet of those so registered 82% have received no treatment, though some 50% are considered to be amenable to surgical relief."

I have found in many of these old patients that the deterrent is a fear of hospital and not a fear of operation. This fear of hospital would appear to arise in the main from three causes: (1) fear of the unknown; (2) fear of entering an institution where relatives, friends, and neighbours of the same age group have died within the past year or two; (3) fear of losing the home or the room occupied by the patient in the home. In this last case the fear is often justifiable, and I have on many occasions had difficulty in persuading younger relatives to have the older patients back home after a short stay in hospital.

It occurred to me that it might be feasible to take cataract surgery to the patient in cases where the patient refused to come to hospital. Most of the homes are not suitable to operate in, but I thought that a mobile surgical truck could be taken to the patient's home and the operation performed there. I realized that collaboration between the patient, the family doctor, the district nurse, the Institute for the Blind, and the hospital service would have to exist, and I suggested an outline for this scheme to the Institute for the Blind and the regional hospital board in the first place. It is interesting to note the different reactions of these two bodies to the suggestion.

The superintendent of the Institute for the Blind agreed with me. He thought the idea of a mobile surgical theatre was a good one, and in wishing me success in my efforts he said that I could rely upon the utmost co-operation from him. The senior medical administrative officer of the regional hospital board said that the scheme would be

quite unacceptable to the board for many reasons, and that there was no possibility of such a scheme being adopted. I showed this letter to the superintendent of the Institute for the Blind, who expressed great surprise at the general tone of it. He noted that no reasons were given, and he thought that it was very discouraging and frustrating to have a useful proposal turned down in such a summary fashion.

I myself thought that any suggestion which was made to deal with so serious a problem would have received the serious attention of one's medical colleagues at the regional hospital board.—I am, etc.,

Dudley.

L. H. G. MOORE.

Wound Healing

SIR,—I was interested to read the report of the 8th Quarterly Clinical Forum of the Ciba Foundation on wound healing (*Journal*, May 19, p. 1167), particularly in reference to the mechanism of "wound contracture" presented by Mr. M. Abercrombie. In a previous article¹ I have presented quantitative experimental data dealing with restorative processes in mammalian wound healing, with particular reference to contraction in wounds, and it is gratifying to find my conclusions supported by Mr. Abercrombie. It is indeed remarkable that the phenomenon of contraction in wounds receives such passing attention and faulty descriptions in current textbooks of pathology and surgery.

In 1876 Sir James Paget² clearly recognized contraction as a dominant restorative mechanism in the healing of wounds with tissue loss. Paget's descriptions of the healing of external wounds compares more than favourably with current textbooks, and it appears that many of the fallacies underlying current descriptions stem from results on wound healing obtained by an analysis of physical factors involved in the tensile strength of artificially closed wounds. Perhaps the time is ripe to stress that a biological approach to growth mechanisms involved in wound healing demands recognition of a wound as a traumatic loss of tissue, and the basic conception of healing to be a restitution of the spatial deficit with living tissues.

In reference to the mechanism of "wound contracture," Mr. Abercrombie indicates that contracture is "due to the activity of the cellular components of granulation tissue," and again that "contractility—was probably a property common to many members of the fibroblast family of cells." While I am essentially in agreement with the former proposition, experiences based on radiobiological investigations on contraction and other aspects of wound healing fail to support the latter hypothesis. It is well known that cells which undergo active shortening to create tensile forces as an essential physiological function are extremely radio-resistant—for example, smooth, cardiac, and voluntary muscle—and, indeed, huge doses of irradiation require to be administered to interfere with this physiological mechanism. In the rabbit, arterial and arteriolar smooth muscle obliterated *in vivo* in Sandison Clark type ear chambers will tolerate single tissue doses of x or γ rays in excess of 6,000 r without apparent alteration in shortening induced by lished observations). However, I have shown that single doses of irradiation as low as 200 r significantly lengthen the latent period in wound contraction, and decrease the linear rate of contraction in wounds in the rabbit.¹ It has been found that the relationship between the rate of contraction and the dose of irradiation follows an exponential curve (unpublished observations). I have suggested that the mechanism responsible for contraction in wounds is essentially similar to that for growth in general—viz., cell movement or migration—and that the processes of granulation tissue formation and contraction essentially follow the patterns of regenerative growth in lower animals—viz., epimorphosis and morphallaxis respectively. Both of these processes are essentially similar, involving the tactical mechanism of cell movement and reorientation, but differ on a regional basis, depending on the development of axial symmetry in organs

and organisms together with the limitations placed on re-orientation of cell groups and tissues, *en masse*, by exoskeletal and endo-skeletal structures.

It is considered that the spatial reorientation of a cell in growth processes in embryonic and regenerative mechanisms should not be confused with the physiological mechanism of cellular contractility. The changes in protein structure involved in the two processes, based on observed changes in the ultra structure of protoplasmic constituents, show marked differences, and indeed this difference is paralleled by the profound differences in behaviour to tensile gradients and with certain other physical agents, particularly ionizing radiations.—I am, etc.,

Melbourne, Australia.

H. A. S. VAN DEN BRENK.

REFERENCES

- 1 Van den Brenk, H. A. S., *Brit. J. Surg.*, 1956, 43, 525.
- 2 Paget, J., *Lectures on Surgical Pathology*, 1876. Longmans, Green and Co., London.

No Doctor at Sea

SIR,—May I use a little of your space to explain to Dr. R. D. MacLean (*Journal*, May 19, p. 1175) that I omitted all reference to the *International Code of Signals* in my original letter (*Journal*, April 28, p. 981) because I believe it to be, for all practical purposes, defunct. The G.P.O. tells me that the case-stating section of it is never, or hardly ever, used by ships requiring medical advice. The *International Code* was originally intended to overcome language difficulties in international communication, not as a means of abbreviation. For the latter purpose, indeed, it is hardly suitable. My objections to it would occupy too much space to be detailed here, but I have communicated them to the G.P.O., and they say they may consider the matter again.

I agree with the suggestion contained in Dr. MacLean's final paragraph that messages should be dealt with by someone with seafaring experience, but foresee difficulty in arranging this. The volume of traffic is insufficient to support a full-time appointment, and it is unlikely to be easy to arrange 24-hour coverage by local practitioners with the necessary background. Perhaps the easiest solution would be to refer medical advice messages to the nearest naval hospital.

The *Ship Captain's Medical Guide* is already available to the hospitals at present concerned; there would be little point in providing also the *International Code* until shipmasters can be induced to make use of it.—I am, etc.,

Victoria, Australia.

S. J. LLOYD.

Fluoroscopy for Children

SIR,—It is the common experience of most radiologists, as well as physicians, including the paediatricians, that children scream and create trouble during fluoroscopy, however they may be reassured by kind words. Even if the mothers are allowed to stand by the side of their children, it does not allay their fears, as the room becomes dark.

Recently I have tried out the following simple method, and since adopting it the crying of children during fluoroscopy has practically vanished from my hospital practice. It consists in simply asking the child to close its eyes and to open them when commanded by me. The lights of the room are switched off after the child closes the eyes, and are switched on before the child opens them. I think children are afraid of darkness, as well as strange objects and strange persons. As soon as they close their eyes they become oblivious of their surroundings, and immediately become patient and co-operative. I think this method can be employed while taking x-ray pictures of the children.

I am sure this procedure has not been described by any radiologist nor is it mentioned in any works on radiology, including standard works like *Textbook of X-ray Diagnosis* by British authors.¹ It will be interesting to know if any of your readers have had a similar experience.—I am, etc.,

Bombay, India.

M. V. CHOKSI.

REFERENCE

- 1 *Textbook of X-ray Diagnosis*, edited by S. C. Shanks, P. Kerley, and E. W. Twining, 1938. London.

Obituary

R. J. McCONNELL, M.Ch.

Mr. R. J. McConnell, consulting surgeon to the Royal Victoria Hospital and to the Ulster Hospital for Women and Children, Belfast, died at his home at Belfast on July 22. By his death the Belfast Medical School has lost one of its best-known and most popular consultants. He was 72 years of age.

Owing to the early death of both his parents, Robert John McConnell was brought up with the family of his uncle, Mr. (later, Sir) Thomas McConnell, and was educated at Bedford Grammar School and Queen's University, Belfast. After graduating M.B., B.Ch. in 1912, he became demonstrator in anatomy under Professor Johnson Symington and passed the primary examination for the Fellowship of the Royal College of Surgeons of England at the first attempt. While he was working in the anatomy department he made a special study of the gall-bladder and bile ducts and read a paper on the subject at the meeting of the British Anatomical Society in Glasgow.

The first world war interrupted McConnell's studies, and with his friends, S. R. Foster and Harry Malcolm, he joined the R.A.M.C. and served in France with the 59th North Midland Territorial Division. In 1916 he was invalided home with trench fever and was sent as a patient to the Ulster Volunteer Force Hospital, Belfast, and on discharge from the hospital became its house-surgeon for the later years of the war. But he never completely overcame the war legacy of illness. After demobilization he returned to the serious study of surgery and by obtaining the degree of M.Ch., with distinction, qualified himself for a hospital appointment in Northern Ireland. A period of service as clinical assistant in the Ulster and the Royal Victoria hospitals was soon followed by appointments to the surgical staffs of both these hospitals, and to both of them he gave faithful service till the age of retirement. A member of the British Medical Association for nearly forty years, he served as a vice-president of the Section of Orthopaedics, Including Treatment of Fractures, when the Association held its Annual Meeting at Belfast in 1937.

Mr. S. T. IRWIN writes: R. J. McConnell began his consultant work at a time when it was still considered respectable to be a general surgeon, and so, although perhaps he paid most attention to the abdomen, he had a wide acquaintance with the surgery of the other regions. When the British Orthopaedic Association met in Belfast in 1927 he made a considerable contribution to the meeting on the subject of club foot. In both his hospital appointments he gave much time to teaching and his classes soon became popular, especially with final-year students. He was at his best with a small class around the bed or when discussing a case with his assistants over a cup of tea. He disliked large audiences and could rarely be persuaded to speak at public meetings. This reticence prevented him from accepting the presidency of several medical societies which he was offered, and he refused to become chairman of staff in either of his hospitals. He had a wide and accurate knowledge of surgical literature. His retentive memory, coupled with his dexterity and power of anticipation, made him an invaluable surgical assistant in his earlier years. No apology need be made for recording his gallantry in the devastating air raid of May 4, 1941. On that particular night he was on duty at the Ulster Hospital when it was almost completely demolished by explosive and incendiary bombs. He

worked with the casualties throughout the night in the midst of fires and falling masonry, and in the morning drove members of the nursing staff to the homes of friends through streets littered with debris. He received an official commendation for his brave conduct. He was most at home in his own unit in the Royal Victoria Hospital. This unit was perhaps the happiest and certainly the most attractive to resident pupils, house-surgeons, and nurses, to whom he showed the greatest consideration at all times. He was adored by all his patients, whether they were children in the Ulster Hospital or adults in the Royal. To him the interest of the patient was always of prime importance. In his student days and for some years after he was a keen sportsman. He rode in point-to-point races, played golf and Rugby football. But when he gave these up he adopted photography as his hobby, an art in which he made himself an expert. When cine-films in colour were introduced he became interested in this aspect of photography, and had a very considerable collection. These included weddings in the families of his friends, operations, and foreign scenes, but perhaps his best-known film was an amusing skit on the Smith-Petersen operation. This was indeed a masterpiece, and has been widely shown to visiting medical societies in Belfast. Apart from his professional work, perhaps his greatest interest was in reading. He was a voracious reader, and his nightlight was rarely extinguished before 2 a.m. He had an extensive library, mainly historical and biographical, and almost to the end of his days he remained the student. It would be true to say that for a period of 30 years no member of the Belfast Medical School enjoyed to a greater extent than "Bobby John," as he was known to colleagues and students alike, the confidence of the general practitioners of the province or was more beloved by successive generations of medical students.

DORIS GORDON, M.B.E., M.B., F.R.C.S.Ed., D.P.H.

Dr. Doris Gordon, who did much to stimulate public opinion on the progress of obstetrics, particularly in New Zealand, died recently at Stratford, Taranaki, New Zealand. She was 65 years of age.

Doris Clifton Jolly, the daughter of Mr. Alfred Jolly, general manager of the National Bank of New Zealand, was born in Victoria, Australia, but went to New Zealand with her family in 1894. She was educated at Otago University, graduating M.B., Ch.B. from the University of New Zealand in 1916. Later she obtained the D.P.H. After graduation she held an appointment on the medical staff of Dunedin Hospital, and was lecturer in bacteriology in 1916-17. In the latter year she married Dr. W. P. P. Gordon, and in 1918 they set up in practice at Stratford.

Dr. Doris Gordon devoted the whole of her professional life to the problems of maternity and child welfare. The arguments she used in a thesis written in 1924 helped to form the basis of the New Zealand Government's maternity service scheme. Under the scheme every primigravida became entitled to a fortnight in hospital free of charge, together with the best available medical attention and the use of analgesia in childbirth. She was always a staunch advocate of the use of chloroform, about which she had many differences of opinion with her professional colleagues, including the late Sir Truby King. She was director of the Maternal and Infant Welfare Health Department in New Zealand from 1946 to 1948.

In 1925 Dr. Gordon became the first woman from Australasia to obtain a Fellowship in any Royal College. In that year she was elected F.R.C.S.Ed., her husband being admitted to the Fellowship also at the same ceremony. When the British (now Royal) College of

Obstetricians and Gynaecologists was founded in 1929 she was elected a founder Member, becoming a Fellow in 1937. On the occasion of the silver jubilee celebrations of the College in 1954 she was awarded honorary Fellowship in recognition of her distinguished services to obstetrics and gynaecology in her own country, and in particular for being instrumental in obtaining funds for the endowment of a chair at Dunedin. She organized an appeal in 1930 which produced over £30,000. She was also responsible for the foundation in 1927 of the New Zealand Obstetrical and Gynaecological Society. She was appointed M.B.E. in 1935. Her autobiography, *Backblocks Baby Doctor*, was published last year. Dr. Gordon is survived by her husband and the three sons and one daughter of the marriage.

W. POINTON DICK, M.R.C.S., L.R.C.P.

The obituary of Dr. W. Pointon Dick was printed in the *Journal* of August 4 (p. 305).

Dr. A. J. HAWE writes from Kumasi, Gold Coast: W. Pointon Dick's decision in 1952 to accept the post of tuberculosis specialist in the Gold Coast was probably influenced by the knowledge that his father, Dr. W. B. Dick, had practised medicine there some decades earlier. Pointon Dick found the disease to be widespread and dreaded by patients and relatives alike. The condition had earned such an evil reputation that fear and often panic followed its diagnosis. He was the best possible choice for the task of combating tuberculosis in the Gold Coast and threw himself into the work with great energy. By establishing treatment centres and using mass radiography and tuberculin surveys he was able to bring help to those areas where it was most needed. The work was very strenuous and demanded great physical exertion and much travelling. His friendly attitude and kindness to his patients soon won him popularity, and his success in the treatment of patients—often with advanced disease—established his reputation and raised the morale of the population. It is largely due to his work that patients in the Gold Coast no longer regard the diagnosis of tuberculosis as tantamount to a sentence of death. His passing will be mourned all over the extensive territories where he laboured so hard. It is pleasing to know that the Prime Minister of the Gold Coast has requested that the tuberculosis wards in the Gold Coast Hospital shall be named "The Pointon Dick Memorial Wards," and so help to perpetuate his name.

Dr. D. F. WHITAKER died suddenly at his home at Guildford on August 1 at the age of 56. Donald Faraday Whitaker was born on July 17, 1900, the son of the late Sir James Smith Whitaker, the first Medical Secretary of the British Medical Association. Receiving his medical education at University College Hospital, he qualified M.R.C.S., L.R.C.P. in 1926, and then held the appointments of house-surgeon at Hampstead General Hospital and house-physician at the Seamen's Hospital, Greenwich, before he settled in general practice at Guildford early in 1929. For a time he was also assistant anaesthetist to the Royal Surrey County Hospital, and later became out-patients medical officer to the physiotherapy department of the hospital. In his home life as a youth Dr. Whitaker must have heard many references to the British Medical Association, of which his father was Medical Secretary from 1902 to 1912. A member of the Association since 1930, he came to prominence in the affairs of the B.M.A., both centrally and locally, immediately before the outbreak of the second world war. He was honorary secretary of the Guildford Division from 1938 to 1944; its representative at the Annual Representative Meeting on several occasions from 1938 to 1954; and its chairman in 1951-2. It was perhaps appropriate that in 1953 Dr. Whitaker should become a member of the Constitu-

tion Committee of the Association, which was set up in that year to review the Association's constitution, because his father was a member of the Constitution Committee appointed by the B.M.A. in 1900, the establishment of Divisions within the Branches of the B.M.A. being among the recommendations of that committee. Dr. Whitaker also served on a number of other B.M.A. committees, including the General Medical Services Committee, the Joint Formulary Committee, the Central Ethical Committee, and the Protection of Practices Committee. During the second world war he acted as emergency officer for Guildford and was honorary secretary of the local medical war committee. Since the introduction of the National Health Service he had served on the Surrey Executive Council and on the Surrey Local Medical Committee, of which he had been chairman since 1953, having become vice-chairman in 1951.

Dr. NOEL E. WATERFIELD writes: The news of the sudden death of Donald Whitaker from coronary thrombosis has been received by his colleagues with profound sorrow and regret. For many years while engaged in a very busy practice he gave up a considerable part of his leisure time to the service of his colleagues in the profession. We in Surrey have particular grounds for gratitude for his work as chairman of the Surrey Local Medical Committee. He filled this post with conspicuous success, and by his wise interventions kept members to the point, soothed ruffled tempers, and helped the committee to arrive at wise decisions. His presence on the Surrey Executive Council and its many committees, where he was equally respected, did much to maintain friendly relations between the practitioners in Surrey and the council. Many of us have lost a good friend and the profession generally a wise counsellor.

Dr. M. K. JOHNSTON died in Yardley Green Hospital, Birmingham, on July 19 at the age of 53. Munro Kennedy Johnston was born on September 18, 1902, the third of four sons of the Rev. William Johnston, of Troon, Ayrshire. After graduating M.B., Ch.B. from Glasgow University in 1930, he began his career as a psychiatrist at Stoneyetts Mental Hospital, Glasgow. He then held an appointment at the Mansfield and District Hospital from 1931 to 1933. In 1935 he became medical officer at Brookwood Hospital, Surrey, where later he was promoted to deputy medical superintendent. He obtained the D.P.M. of the English Royal Colleges in 1936. Joining the R.A.M.C. in 1939, he served throughout the second world war until 1945, attaining the rank of major, and for some time was in charge of Rudolf Hess, from whom he elicited valuable information about the German war effort. After the war he was appointed consulting psychiatrist to the Staffordshire County Council, but in 1947 he contracted pulmonary tuberculosis, from which he died after a prolonged illness. Dr. Johnston's friendliness and modesty and his keen sense of humour made him a charming companion. He is survived by his widow and three daughters. One of his brothers is Dr. Lennox Johnston, of Wallasey.

Dr. T. B. COSTELLO, one of the oldest medical practitioners in Ireland, died at Tuam, Co. Galway, on July 14 at the age of 92. Thomas Bodkin Costello was born at Tuam in January, 1864. After leaving the local school of the Christian Brothers, he was apprenticed to his uncle, Dr. Nicholas Mahon, of Galway, and later studied medicine at the former Queen's College, Galway, and the Carmichael Medical School, Dublin. He graduated M.D. from the old Royal University of Ireland in 1888, and took the D.P.H. of the Irish Royal Colleges in 1906. Shortly after graduation he became dispensary medical officer on the island of Lettermore, Co. Galway, where he was the only doctor for many miles around. With no qualified nurses or midwives to help him and with the nearest hospital and dentist both 40 miles away, his early life as a doctor called for physical strength and endurance almost as much as it did for professional skill. His area included a number of islands off the coast of Galway, and to reach them he used a currach, in all weathers. He left Lettermore to

Sir Francis Fraser has been elected a representative of the University on the governing body of Queen Elizabeth College.

Professor M. A. Rushton, M.D., F.D.S.R.C.S., and Professor F. C. Wilkinson, M.D., F.D.S.R.C.S., have been appointed representatives of the University on the General Dental Council set up under the Dentists' Act, 1956.

Professor W. J. Hamilton has been appointed representative of the University on the governing body of Charing Cross Hospital, in place of Sir John Stewart-Wallace.

UNIVERSITY OF MANCHESTER

The following candidates have been approved at the examinations indicated:

CH.M.—H. Bolton.
FINAL M.B., CH.B.—R. Abendstern, M. B. Bailey, J. H. E. Baines, A. T. Battle, J. R. D. Bedford, K. Boothby, R. Brown, A. J. Burkhardt, K. N. Butteriss, D. H. Carroll, G. E. Clews, M. J. Conway, A. J. Cook, F. B. Cookson, R. Crowther, Janet M. Dawson, J. M. Dickey, Hazel M. Fearn, S. B. Foulds, Elisabeth D. Hahn, T. M. Hardiker, A. Harris, Mary Heald, G. D. Hunt, Barbara Y. Hutchinson, Maureen P. Kenmare, J. A. Lee, J. D. Lece, A. H. Levy, J. B. Lynch, J. D. McLean, I. W. Manson, C. S. Mellor, R. Michaels, R. Millon, Elizabeth A. M. Parkes, P. B. Parnaby, B. L. Poston, A. J. Ralston, Jean Rowley, Felicity H. Sambrook, G. B. Seddon, Jean Shackleton, D. Smith, Rita Smith (distinction in surgery), Patricia V. Sutcliffe, Margaret M. Sutherland, W. R. Swinburn, W. F. White.
DIPLOMA IN PUBLIC HEALTH.—F. R. Calvert, Marjorie T. Dare, Mary S. Gilbody, Katie Keane, G. A. Levell, Joan M. MacCarthy, L. G. Nicol, Geraldine T. O'Carroll, J. D. Willis.

UNIVERSITY OF WALES

The following candidates at the Welsh National School of Medicine have been approved at the examination indicated:

M.B., B.Ch.—Hannah M. Beddow, June M. Birch, D. H. Blackall, B. K. Bondzi-Simpson, P. Coy, D. Daley, D. E. Davies, I. A. Davies, J. A. Dodge, J. G. Elias, A. G. Evans, D. H. Evans, D. J. Griffiths, M. F. Holding, D. S. B. James, Enid P. Jarvis, R. A. C. Jones, W. J. Jones, Sheila B. Kidd, G. S. Lodwig, W. S. B. Loosmore, R. G. Penn, G. A. D. Rees, G. E. Roberts, Marise E. Roch, Joan M. Summerell, W. G. Thomas, G. L. Williams, J. M. Williams, Margaret D. Wyatt.
With distinction in pathology and bacteriology. With distinction in social medicine and public health. With distinction in surgery. With distinction in forensic medicine and toxicology. With distinction in medicine (including psychological medicine) and child health.

UNIVERSITY OF BIRMINGHAM

Professor A. B. MacGregor, F.D.S.R.C.S., M.B., B.Chir., has been appointed representative of the University on the General Dental Council set up under the Dentists' Act, 1956.

The title of the Department of Pharmacology and Therapeutics has been changed to the Department of Medical Biochemistry and Pharmacology.

The title of the post held by Dr. C. R. Lowe has been changed from Lecturer in Public Health to Lecturer in Social Medicine.

The title of University Research Fellow in Medicine has been given to Dr. H. A. V. Muth and in Surgery to Dr. J. F. Nunn, both holders of research posts financed from the Teaching Hospital Endowment Research Fund.

Dr. F. Letemendia has been appointed Research Fellow in the Department of Experimental Psychiatry.

In Congregation on June 30 the following degrees were conferred:

M.D.—J. M. Bishop, R. H. Gosling, J. A. Litchfield.
Ph.D.—In the Faculty of Medicine: J. S. Knight, H. J. Yardley.
M.B., CH.B.—G. Cumming, Margaret J. Darch, C. T. Dollery, W. A. Lishman, M. E. Abrams, W. W. Alderman, R. M. Baddeley, Lavinia J. Bailey, N. C. Bhandari, M. H. Bletcher, V. A. W. Blunt, D. G. Boddington, P. H. Boyle, A. R. Brathwaite, A. Brickman, Mary Burman, Cecilia H. Butt, Margaret A. Calver, D. Carling, Kathleen M. Cash, G. W. Chance, J. Cockin, M. A. Cole, T. L. D. V. Dhupa, T. C. Dixon, D. Evans, C. J. Garrett, J. Gelson, P. H. D. G. W. Hollands, Barbara L. Hooker, J. S. Horner, R. P. Jordan, R. A. Margat, J. Kelly, Maria J. Kielbinka, M. R. Landeg, A. J. Lyne, A. N. Mitra, J. P. Neasham, R. I. Patel, G. Phillips, F. J. Pickworth, Jennifer M. Radford, J. M. Rolfe, P. A. Roxburgh, S. O. Schandorf, H. G. Schroeder, P. R. Seed, E. M. Skinner, B. S. Smith, Jacqueline J. Speake, P. A. J. Starr, J. Steinert, D. A. Stephens, Gillian H. Stillwell, J. R. Taylor, A. L. Thomas, I. D. Thompson, R. O. Walker, J. W. D. Windsor, H. O. Wooller, A. Wootton, D. Wright.
With honours. With second-class honours. Distinction in surgery. Distinction in medicine. Distinction in pharmacology and therapeutics. Distinction in social medicine. Distinction in pathology and bacteriology. Distinction in obstetrics and gynaecology. Distinction in paediatrics and child health. Distinction in forensic medicine and toxicology.

The following scholarships, etc., were awarded in the Faculty of Medicine: *Queen's Scholarships*.—Final year, G. Cumming; Fifth year, Marigold J. Parsons; Third year, J. Herbert. *Ingleby Scholarships*, W. A. Lishman (obstetrics and gynaecology), R. O. Walker (paediatrics and child health). *Special Undergraduate Scholarships*, I. A. O. D. Brodie, E. F. Evans, D. Gompertz, J. D. Hamer, J. Herbert, J. A. Hickman, P. H. W. Rayner, A. G. Ringer, B. Stone, N. R. Whiting. *Arthur Foxwell Memorial Prize in Clinical Medicine*, Sampson Gamgee Memorial Prize

in Surgery, Beckwith Whitehouse Prize in Obstetrics and Gynaecology, and Douglas Marsh Ear, Nose, and Throat Prize. G. Cumming. *Joseph Sankey Prize in Clinical Surgery*, J. Cockin and Margaret J. Darch (divided). *Queen's Hospital Joseph Sampson Gamgee Prize in Surgery*, A. D. Barnes. *Cyril Raison Prize in Surgical Diseases in Children*, H. G. Schroeder. *Russell Memorial Prize in Nervous Diseases*, W. A. Lishman. *Priestley Smith Prize in Ophthalmology*, G. S. Willetts. *Leith-Newman Prize in Pathology (Medical)*, Marigold J. Parsons. *Bostock Hill Memorial Prize in Social Medicine*, Edwina E. Rogerson. *Peter Thompson Prize in Anatomy*, P. Hicken.

In Congregation on June 30 the following degrees were conferred:

M.D.—J. M. Bishop, R. H. Gosling, J. A. Litchfield.
Ph.D.—In the Faculty of Medicine: J. S. Knight, H. J. Yardley, H. Saha (in absentia).
M.B., CH.B.—G. Cumming, Margaret J. Darch, C. T. Dollery, W. A. Lishman, M. E. Abrams, W. W. Alderman, R. M. Baddeley, Lavinia J. Bailey, N. C. Bhandari, M. H. Bletcher, V. A. W. Blunt, D. G. Boddington, P. H. Boyle, A. R. Brathwaite, A. Brickman, Mary Burman, Cecilia H. Butt, Margaret A. Calver, D. Carling, Kathleen M. Cash, G. W. Chance, J. Cockin, M. A. Cole, T. L. Cooksey, D. R. Cowman, M. D. Cox, D. R. Cumpsty, B. W. Davis, D. V. Dhupa, T. C. Dixon, D. Evans, C. J. Garrett, J. Gelson, P. H. Grant, C. P. Gray, P. M. Green, I. F. G. Haddow, Ethel J. Harris, D. G. W. Hollands, Barbara L. Hooker, J. S. Horner, R. P. Jordan, R. A. Jupe, J. J. Kelly, Maria J. Kielbinka, M. R. Landeg, A. J. Lyne, Margaret J. McBroom, F. E. McGuinness, N. M. C. Mayne, S. Mesbah, A. N. Mitra, J. P. Neasham, R. I. Patel, G. Phillips, F. J. Pickworth, Jennifer M. Radford, T. M. Rolfe, P. A. Roxburgh, S. O. Schandorf, H. G. Schroeder, P. R. Seed, E. M. Skinner, B. S. Smith, Jacqueline J. Speake, P. A. J. Starr, J. Steinert, D. A. Stephens, Gillian H. Stillwell, J. R. Taylor, A. L. Thomas, I. D. Thompson, R. O. Walker, J. W. Warburton, G. S. Willetts, C. W. O. Windsor, H. O. Wooller, A. Wootton, D. Wright.

With honours. With second-class honours. Distinction in medicine. Distinction in surgery. Distinction in pharmacology and therapeutics. Distinction in social medicine. Distinction in pathology and bacteriology. Distinction in obstetrics and gynaecology. Distinction in paediatrics and child health. Distinction in forensic medicine and toxicology.

UNIVERSITY OF LIVERPOOL

The following candidates have been approved at the examinations indicated:

M.D.—D. J. B. Ashley, K. Baker, D. B. Mossman, W. R. Parkes, R. H. Roberts, J. Winter, V. Wright.
M.B., CH.B.—R. D. Gartside (with second-class honours and distinction in surgery), V. S. D. Logan (with second-class honours and distinction in obstetrics and gynaecology), D. J. Weatherall (with second-class honours and distinction in surgery), J. M. Abbott, Erika M. Adler, E. O. O. Arbener, J. S. Bamforth, T. J. Barnett, R. F. Beckett, H. Bodsworth, P. Boggiano, B. F. Bracewell, Pauline M. Carruthers, R. Carruthers, M. D. B. Clarke, M. C. Crocker, N. Dale, H. Dinnick, W. Durrant, I. R. Entwistle, D. G. Evans, Jean M. Fell, C. Gallagher, Patricia E. Gaughan, A. F. Gilbertson, Sheila M. Griffin, Mary C. Hardicker, A. A. M. Hardy, Margaret O. Harrison, B. J. Hawe, G. Hughes, I. W. Hughes, Jarvis, Doris Johnson, Doreen E. Jones, K. Jones, Marjorie, V. Jukes, J. Kelly, A. Kennedy, A. Kirby, Margaret A. W. Kneale, P. C. Lawson, Shirley A. Leslie, K. Longstaff, B. W. McGuinness, D. P. Manning, T. W. Murphy, June Nelson, Nora M. Norris, Heather B. Nunnerley, Margaret M. O'Kane, T. A. O'Malley, Pauline M. B. Park, D. Parker, A. Patterson, G. W. Pennington, Ruth M. Poland, D. J. Pollock, Shona H. Russell, Dorothy E. M. Speed, D. Sykes, C. A. Veys, B. A. Walker, R. A. Walmsley, R. S. Walton, D. S. Williams, Marguerite J. Williams, N. E. Williams, R. D. Williams, J. G. Winwick (with distinction in obstetrics and gynaecology), P. Worthington, J. E. Wright, Ann C. Young.
DIPLOMA IN PUBLIC HEALTH.—H. P. Burrows, D. M. Cameron, B. Didsbury, Mary P. Haran, E. M. Hughes, D. L. Lewis, T. F. McElligott, A. McGregor, Mary A. R. Marshall, L. A. Nettleton, C. W. R. Pyne, Esther M. E. Ramsay, Myfanwy R. H. Roberts, K. P. Sivam, T. D. Thomas, Sheila M. Tyrrell, Megan E. Wilkinson.

DIPLOMA IN RADIOLOGY.—Radiodiagnosis: H. J. J. Beyleveld, R. S. Miller, V. Rogers, M. C. Winter. Radiotherapy: B. Lall, S. H. M. Zaidi.

UNIVERSITY OF SHEFFIELD

The following full-time appointments are announced: Dr. G. Weber, Senior Lecturer in Biochemistry; Dr. G. C. Bates, Demonstrator in Anatomy.

ROYAL COLLEGE OF SURGEONS OF ENGLAND

At a meeting of the Council of the College held on July 12 Professors and Lecturers for the ensuing year were appointed as follows:

Hunterian Professorships.—Sir Hugh Poate, one lecture; Dr. Raymond Greene, one lecture on the diagnosis, pathology, and treatment of discrete nodules in the thyroid gland; Mr. D. F. Ellison Nash, one lecture on congenital spinal palsy—the management of incontinence; Mr. Robert Cox, one lecture on the management of dysphagia due to malignant disease of the thoracic and abdominal oesophagus; Mr. J. I. P. James, one lecture on paralytic scoliosis; Mr. Myer Makin, one lecture on the surgical management of Friedreich's ataxia; Mr. F. J. Gillingham, one lecture on the management of ruptured intracranial aneurysm; Mr. Edwin Haigh, one lecture on the acute abdomen in neonates;

Professor A. K. Saha, one lecture on zero-position of gleno-humeral joint—its recognition and clinical importance; Mr. A. A. Jefferson, one lecture on pituitary chromophobe adenomata and Rathke pouch cysts; Mr. H. J. Shaw, one lecture on radical surgery in laryngopharyngeal cancer—some problems in perspective; Mr. R. T. Turner-Warwick, one lecture on the lymphatics of the breast in relation to the spread of carcinoma and its treatment.

Arris and Gale Lectureships.—Professor G. W. Causey, one lecture on cytological investigations with the electron microscope; Mr. P. P. Rickham, one lecture on the metabolic response to neonatal surgery; Mr. D. G. Walker, one lecture on facial development.

Erasmus Wilson Demonstratorships.—Dr. G. T. Allen, Dr. F. C. Chesterman, Dr. L. W. Proger, Dr. A. J. M. Reese, Dr. H. G. H. Richards, and Dr. J. B. Walter, one demonstration each.

Arnott Demonstratorships.—Miss Jessie Dobson, Mr. B. E. Greenfield, Professor R. J. Last, Dr. R. McP. Livingstone, Dr. Frank Stansfield, and Dr. B. D. Wyke, one demonstration each.

ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH

At a quarterly meeting of the College held on July 24, with the President, Sir Stanley Davidson, in the chair, the following were elected Members of the College:

J. A. W. McCluskie, E. G. Oastler, J. B. Rennie, I. Gordon, S. A. A. Sabry, G. K. Laxton, C. Freed, H. Singh, W. Davies, B. J. Kelly, K. K. Sinha, A. P. Poole, H. T. W. Jayasekara, D. O'Brien, J. C. Little, B. O. Mulvihill, L. G. Young, B. Dhar, H. Samy, F. Bakir, E. N. Coleman, B. W. Subhivah, J. Ghosh, C. F. H. Vickers, J. Crooks, R. G. Brackenridge, S. E. Levin, J. F. L. Aldridge, I. R. Ferguson, S. M. Rab, H. M. S. Hamidi, G. P. Crean.

ROYAL COLLEGE OF SURGEONS OF EDINBURGH

At a meeting of the College held on July 11, with Sir Walter Mercer, President, in the chair, the following candidates, having passed the requisite examinations, were admitted Fellows:

M. M. Abu-Sittah, R. B. Baluch, M. L. Blaggana, W. G. Bowes, M. N. Ellis, R. M. Gibson, J. D. Green, B. Hammar, A. A. Hooper, D. W. H. Hurley, W. F. Kerr, W. G. Lucas, K. A. McCluskey, I. McKechnie, I. K. Mikhail, R. B. Patil, H. Roberts, D. E. Rothery, R. Shanon, D. T. Thompson, W. G. Thomson, J. C. Wardill, G. I. Young.

ROYAL COLLEGE OF PHYSICIANS OF IRELAND

At a meeting of the College held on June 6, Dr. A. M. Cantor was admitted to the Membership and Henry K. Takyi was admitted to the Licence of Medicine and Midwifery.

The following candidates were duly admitted Licentiates in Medicine and Midwifery on June 25, having passed the final examination in medicine, surgery, and midwifery of the Conjoint Board of Ireland:

R. Allaye, Mary C. I. Brady, D. S. T. Breen, H. A. A. Brown, S. Collins, R. T. W. L. Conroy, P. I. Coyle, M. M. Davies, V. R. Devan, Columba Devlin, J. E. Dignan, G. E. Edwards, R. A. Falkiewicz, R. K. Gilbert, A. L. Greenburgh, T. M. Griffin, C. L. Huang, G. C. Inerfield, Agnes E. Jackson, G. Kay, Orla M. Kiernan, S. Lal, Ann Leahy, Phyllis M. May, C. L. Mootoo, Eileen J. Mulligan, Moira T. M. McMahon, Deirdre M. O'Phelan, T. J. Quinn, K. A. Rahimulila, L. Raymond, J. R. Harper-Smith, A. H. Smithen, J. Szeps, R. Weinberg.

ROYAL COLLEGE OF SURGEONS IN IRELAND

On July 6 J. O. M. C. Craig was conferred with the Fellowship of the College and H. K. Takyi was conferred with the Licence of the College.

SOCIETY OF APOTHECARIES OF LONDON

The following candidates have satisfied the examiners at the examination for the Diploma in Industrial Health:

S. K. Biswas, A. J. de Villiers, P. S. Edgecombe, D. I. C. Finlayson, J. R. Glover, A. S. Sethi, M. Zeville.

ROYAL COLLEGE OF OBSTETRICIANS AND GYNAECOLOGISTS

At a meeting of the Council of the College held on July 28 the following officers were re-elected: *Honorary Librarian*, Mr. A. J. McNair; *Honorary Curator of the Museum*, Mr. R. A. Brews; *Honorary Treasurer, Australian Regional Council*, Mr. J. N. Chesterman; *Honorary Treasurer, Canadian Regional Council*, Mr. G. A. Simpson; *Honorary Treasurer, New Zealand Regional Council*, Mr. J. E. Giesen.

The following were admitted to the Membership: Margaret B. Malloch, C. F. Macdonald.

The following candidates were elected to the Membership:

L. A. Aller, A. Bates, R. G. Blair, Tara B. Borker, G. L. Bourne, Nancy I. Cardno, E. Cassar, W. Chanen, P. A. Deck, J. N. De Villiers, J. A. G. Dunlop, J. P. Hendrickse, B. M. Hibbard, R. A. St. C. Hoyte, Elsie S. Jaikaran, P. J. Joubert, A. M. Kelso, A. W. Laughland, D. W. Leslie, Cecilia M. Liggins, G. C. Liggins, E. M. Little, J. D. O. Loudon, P. C. McAuliffe, Clara J. McFarlane, Marion C. Miller, S. Nan, W. J. O'Sullivan, S. W. Page, J. K. P. Perera, N. A. Regan, Kathleen J. Rennie, P. Rhodes, D. W. T. Roberts, I. D. Ronayne, A. O. Sankey, H. H. A. Sauer, T. Schneider, J. S. Skipper, T. S. Train, N. W. F. Weir, A. J. Woolf, Janet W. Worling.

CONJOINT BOARD IN SCOTLAND

The following candidates, having passed the final examination, have been granted the diploma of L.R.C.P.Ed., L.R.C.S.Ed., L.R.F.P.&S.Glasg.:

M. N. Birsell, Cho-Man Chung, J. F. Corr, A. Dasen, R. G. FitzPatrick, E. T. T. Hu, P. Jago, J. P. King, G. M. Lorde, I. F. Lundy, K. S. Pauw.

ROYAL AUSTRALASIAN COLLEGE OF PHYSICIANS

In the list of new Members of the College, printed in the *Journal* of August 4 (p. 311), the name of Dr. I. J. McKelvie, of Queensland, was mis-spelt "McGelvie."

ROYAL AUSTRALASIAN COLLEGE OF SURGEONS

The following, having satisfied the Court of Examiners, were admitted to Fellowship of the College by the Council on June 23:

E. L. G. Beavis, J. H. Brown, J. K. Clarebrough, D. S. Cole, T. A. R. Dinning, W. G. Doig, P. C. Grayson, G. L. Grigg, I. A. Harris, L. L. Hoare, L. C. Hudson, G. R. Jones, N. W. Kinny, J. M. Langham, W. J. McCann, H. K. McComb, T. P. Nash, R. K. Newing, E. D. Smith, A. A. Tye, G. W. Westlake, R. F. Zacharin.

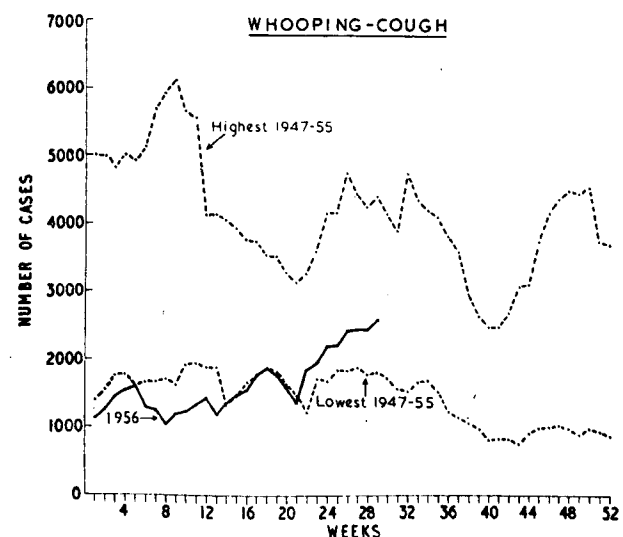
Vital Statistics

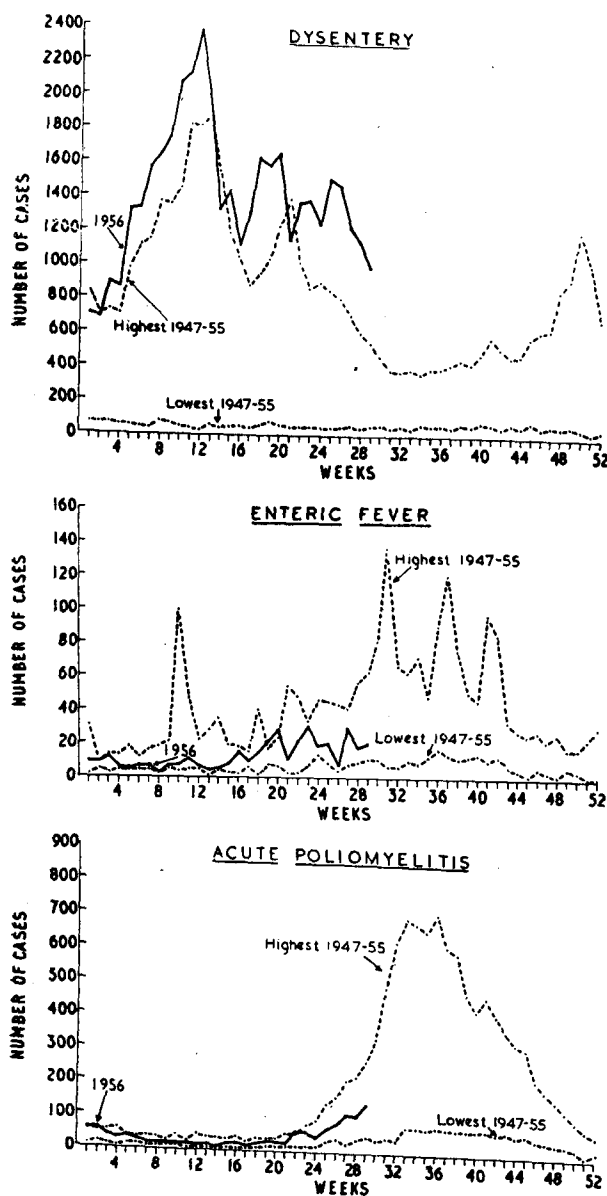
Week Ending July 28

The notifications of infectious diseases in England and Wales during the week included: scarlet fever 573, whooping-cough 2,388, diphtheria 3, measles 3,270, acute poliomyelitis 160, dysentery 843, paratyphoid fever 25, and typhoid fever 4.

Graphs of Infectious Diseases

The graphs below show the uncorrected numbers of cases of certain diseases notified weekly in England and Wales. Highest and lowest figures reported in each week during the nine years 1947-55 are shown thus -----, the figures for 1956 thus ———. Except for the curves showing notifications in 1956, the graphs were prepared at the Department of Medical Statistics and Epidemiology, London School of Hygiene and Tropical Medicine.





Infectious Diseases

The largest fluctuations of the infectious diseases in England and Wales in the week ending July 21 were a rise of 154 for whooping-cough from 2,404 to 2,558, and a fall of 179 for dysentery from 1,149 to 970. Measles notifications fell by 25 from 3,276 to 3,251, and scarlet fever rose by 16 from 514 to 530. Notifications of acute pneumonia rose by 11, from 210 to 221.

Notifications of whooping-cough rose by 20 in Cheshire from 58 to 78, by 32 in Essex from 174 to 206, by 20 in Kent from 70 to 90, by 51 in Lancashire from 357 to 408, by 26 in Nottingham from 74 to 100, and by 25 in Surrey from 44 to 69; they fell by 31 in Derby from 76 to 45 and by 22 in Durham from 90 to 68. Notifications of measles increased by 51 in Cornwall from 124 to 175, by 70 in Lancashire from 435 to 505, by 22 in Oxford from 44 to 66, and by 38 in Southampton County from 73 to 111; they fell by 42 in London from 329 to 287, by 32 in Essex from 213 to 181, and by 54 in Norfolk from 162 to 108.

The main centres of dysentery were Lancashire 104 (Salford C.B. 11), Leicester 67 (Market Harborough U.D. 22), London 138 (Lambeth 16), Rutland 18 (Uppingham R.D. 18), Staffordshire 55 (Smethwick C.B. 27), Warwickshire 77 (Coventry C.B. 63), and Yorkshire West Riding 158 (Leeds C.B. 39).

INFECTIOUS DISEASES AND VITAL STATISTICS

Summary for British Isles for week ending July 21 (No. 29) and corresponding week 1955.

Figures of cases are for the countries shown and London administrative county. Figures of deaths and births are for the 160 great towns in England and Wales (London included), London administrative county, the 17 principal towns in Scotland, the 10 principal towns in Northern Ireland, and the 14 principal towns in Eire.

A blank space denotes disease not notifiable or no return available. The table is based on information supplied by the Registrars-General of England and Wales, Scotland, N. Ireland, and Eire, the Ministry of Health and Local Government of N. Ireland, and the Department of Health of Eire.

CASES in Countries and London	1956					1955				
	Eng. & Wales	London	Scot.	N. Ire.	Eire	Eng. & Wales	London	Scot.	N. Ire.	Eire
Diphtheria ..	2	0	5	0	3	8	2	3	0	
Dysentery ..	970	138	150	4		548	46	213	20	1
Encephalitis, acute	7	0		0		1	0		0	
Enteric fever:										
Typhoid ..	4	1	0	0	1	9	1	1	0	
Paratyphoid ..	16	4	4(B)	1		20	3	3	0	
Food-poisoning ..	291	21		1		450	103		4	
Infective enteritis or diarrhoea under 2 years ..				9	28				17	19
Measles* ..	3,251	287	80	74	256	14,536	192	64	95	77
Meningococcal infection ..	34	0	10	0	1	34	7	12	2	
Ophthalmia neonatorum ..	24	2	5	0		35	3	10	0	
Pneumonia† ..	221	13	133	1	2	248	9	95	2	6
Poliomyelitis, acute:										
Paralytic ..	70	2		0	24	93	15		0	1
Non-paralytic ..	72	4		0		84	20			
Puerperal fever‡ ..	222	27	9	0		234	38	9	0	
Scarlet fever ..	530	29	79	12	16	352	23	26	9	8
Tuberculosis:										
Respiratory ..	610	65	95	8		715	99	98	36	
Non-respiratory ..	101	3	21	2		98	6	19	3	
Whooping-cough... ..	2,558	132	177	20	85	1,788	91	64	53	108

DEATHS in Great Towns	1956					1955				
	Eng. & Wales	London	Scot.	N. Ire.	Eire	Eng. & Wales	London	Scot.	N. Ire.	Eire
Diphtheria ..	0	0	0	0	0	0	0	0	0	0
Dysentery ..	0	0		0		0	0		1	
Encephalitis, acute		0			0		0			0
Enteric fever ..	0	0	0	0		0	0	0	0	
Infective enteritis or diarrhoea under 2 years ..	2	0	1	0	4	6	0	1	1	2
Influenza ..	1	0	0	0	0	1	0	0	0	1
Measles ..		0	0	0	1		0	0	0	0
Meningococcal infection ..		0	1				0	1		
Pneumonia ..	142	16	14	3	3	156	18	6	5	5
Poliomyelitis, acute	3	0			1	1	0			0
Scarlet fever ..		0	0	0	0		0	0	0	0
Tuberculosis:										
Respiratory ..	36	3	5	1	3	57	9	9	1	6
Non-respiratory ..		0	2	0	1		2	2	0	1
Whooping-cough... ..	1	0	0	0	0	0	0	0	0	0
Deaths 0-1 year ..	204	29	27	2	12	188	22	19	5	14
Deaths (excluding stillbirths) ..	4,443	594	486	84	134	4,235	656	553	88	125
LIVE BIRTHS ..	7,749	1171	1030	253	376	7,562	1193	952	262	388
STILLBIRTHS ..	219	21	29			203	28	25		

* Measles not notifiable in Scotland, whence returns are approximate.
† Includes primary and influenza pneumonia.
‡ Includes puerperal pyrexia.

Medical News

B.M.A. Visit to Russia.—The B.M.A. delegation which is visiting Russia at the invitation of the president of the U.S.S.R. Academy of Sciences (see *Journal*, July 7, p. 53) left London Airport on August 4 on their journey to Moscow.

Chairs of Surgery at Edinburgh.—Appointments are announced to both the Regius Chair of Clinical Surgery and the Chair of Surgery at Edinburgh University. Both are at present combined in the person of Sir JAMES LEARMONTH, who is due to retire on September 30. The QUEEN has appointed Mr. JOHN BRUCE, vice-president of the Royal College of Surgeons of Edinburgh, to the Regius Chair of Clinical Surgery, and the University announces the appointment of Professor M. F. A. WOODRUFF, Ralph Barnet Professor of Surgery at Otago University, New Zealand, to the University Chair of Surgery, which is to be renamed the Chair of Surgical Science. Mr. BRUCE graduated, with honours, at Edinburgh in 1928, and held a succession of surgical appointments at Leith Hospital and the Royal Hospital for Sick Children and the Royal Infirmary, Edinburgh. He served with distinction in the R.A.M.C. during the second world war, being mentioned in dispatches twice in the campaigns in Norway and Burma, and being awarded the C.B.E. while acting as consulting surgeon to the 14th Army. Mr. Bruce's present appointments include those of lecturer in surgery and applied anatomy at Edinburgh University, and surgeon-in-charge of the general surgical and gastro-intestinal units at the Western General Hospital. He is also president of the section of surgery of the Royal Society of Medicine, and author of numerous papers on surgery. Professor WOODRUFF, who emigrated from London to Australia at an early age, began by graduating in electrical engineering, with first-class honours, at Melbourne University. He then abandoned engineering for medicine, graduating M.B., B.S. at Melbourne in 1937 and later proceeding M.D. and M.S. During the world war he served with the Australian Army Medical Corps in Malaya, being a prisoner of war for most of the time. After his release he wrote an account of deficiency diseases in Japanese prison camps which the Medical Research Council printed in its *Special Report Series* (No. 274). He then returned for a short time to Australia, being first assistant at the Royal Melbourne Hospital. In 1946 he was appointed a tutor in surgery at Sheffield University, and two years later he became senior lecturer in surgery at Aberdeen University. During his tenure of the latter post he was awarded a W.H.O. travelling fellowship and a Hunterian professorship of the Royal College of Surgeons of England. In 1952 he was appointed to his present chair at Otago University. Sir JAMES LEARMONTH became professor of surgery at Edinburgh in 1939 and regius professor of clinical surgery in 1946.

Manufacture of Poliomyelitis Vaccine.—Extremely detailed requirements for the manufacture and testing of inactivated poliomyelitis vaccine came into operation on August 1 under the Therapeutic Substances Amendment Regulations, 1956 (S.I. No. 1131 of 1956, H.M.S.O., price 3d.). The provisions, which deal among other matters with the inspection of manufacturers' records, ingredients to be used or avoided in making the vaccine, preservatives, antibiotic content, methods of inactivation and its testing, sampling and safety tests, certification, and labelling, are given in a Schedule of 16 paragraphs. The last of these reads: "Poliomyelitis vaccine shall not be issued for sale combined with any other material without the consent of the licensing authority."

Radon from Coal.—Two workers from the physics department of the Institute of Cancer Research report in the July 28 issue of *Nature* (p. 203) the results of their

analysis of 10 samples of coal from different coalfields in Britain for their radium content. They find that the radium contents of the coals are in a "narrow range of values," and conclude that "the absence of levels of a higher order suggests that the contribution of radon from this source does not represent a significant addition to the total atmospheric level."

Demand for Cleaner Air.—The Chief Inspector of Alkali (and other) Works records in his annual report for 1955 (H.M.S.O., price 2s.) an increased number of complaints against registered works. This was not due to deteriorated conditions, he states, "but to a greater public awareness of the desirability for cleaner air due to the publicity this has received." During the year there were 21 occasions when "escapes" in excess of the statutory limits were recorded, and a further 27 "infractions related to failure to 'use best practicable means.'" In every case notification of an infraction was followed by appropriate steps being taken to abate the nuisance. Inspectors carried out 3,894 visits and inspections during the year. The report includes a section by the chief inspector for Scotland. Among the industrial processes discussed in the report are coke and gas production, metallurgical processes, lime burning, alkali production, cement making, smelting, production of sulphuric and nitric acids, manufacture of chemical manures, and processes involving lead.

Local Authorities and B.C.G.—Not all local authorities have yet taken power to offer B.C.G. vaccination to 13-year-old schoolchildren, it is stated in a circular letter from the Ministry of Health to local authorities, dated July 27. The letter draws attention to the fact that the first report of the Medical Research Council's committee on tuberculosis vaccines (see *Journal*, February 25, p. 413) "shows that vaccination offers a substantial degree of protection when given to children of this age," and goes on to recommend those authorities which have not already done so to take the necessary powers to vaccinate school-leavers. Those authorities which have not so far used these powers to the full are urged to intensify their efforts. A model form of proposal which would provide for the extension of B.C.G. vaccination to others besides the school-leavers is suggested to authorities in the circular. It reads: "The council will also make arrangements to offer B.C.G. vaccination to any other classes of person as may be approved from time to time by the Minister of Health."

Admission of the Press.—Among the public bodies included in the schedule of the Public Bodies (Admission of the Press to Meetings) Bill are regional hospital boards and executive councils. The Bill, which was introduced in the House of Commons on August 1 under the 10-minute rule by Mr. J. E. S. SIMON, Conservative M.P. for Middlesbrough West, provides for the admission of the press to the meetings of certain bodies exercising public functions. It retains the right of such bodies, on a majority vote, to exclude the press temporarily if the public discussion of an item of business is deemed not to be in the public interest. The Bill also provides for the supply to the press of documents concerning meetings "not later than the document is sent to the members of such public body," with again a saving clause in the case of documents whose public disclosure is considered inadvisable. Another section empowers the Government, after consultation with the interested parties, to extend the provisions of the Bill to bodies not already scheduled. Apart from Mr. Simon, the sponsors of the Bill include six Conservatives, four Labour members, and one Liberal.

British Team for Latin America.—A British cardiac surgery team, consisting of a surgeon, a cardiologist, and an anaesthetist, left for Latin America on August 8 under the auspices of the British Council, where they will give demonstrations and lectures to medical audiences in Brazil, Uruguay, Chile, and Colombia. The members of the team are Mr. T. HOLMES SELLORS (Middlesex Hospital),

To answer the specific questions: (1) A routine chest radiograph will detect at a very early stage a carcinoma starting peripherally in the lung, especially if there is a previous radiograph available for comparison. Rare exceptions to this rule may be encountered, if the growth starts in a part of the lung not visible in the commonly used radiological projections—for example, in the posterior costophrenic sulcus, behind the hilar shadows, and in the medial part of the left lower lobe behind the heart shadow. Carcinomata starting in the main bronchi give rise to no radiological shadows until they cause sufficient bronchial obstruction to lead to changes in the lung beyond the obstruction. These may take the form of atelectasis if the obstruction is complete, or of inflammatory consolidation, either massive or patchy, if the obstruction is partial. In order to detect a carcinoma of a large bronchus, not yet causing complete obstruction, bronchoscopy is necessary; and even this can give no information about certain inaccessible bronchi. In the left upper lobe, only its division into upper and lower divisions can be seen and none of the segmental orifices of the upper division are visible in any circumstances; and in the right upper lobe only the actual

orifices of the segmental bronchi are visible. It is difficult to assess the probable value of routine chest radiographs. Certainly symptoms may appear before x-ray shadows are evident, and in many cases where the disease has come to light as the result of routine radiography careful inquiry will show that there have in fact been some suspicious symptoms.

(2) If routine radiography is to be relied upon for a really early diagnosis of bronchial carcinoma, frequent examinations will be necessary. It would be futile to suggest examinations at intervals of more than three months, for in three months a rapidly growing carcinoma can become inoperable. For a complete survey, right and left oblique and lateral views would be desirable.

(3) The only other way of detecting early lung cancer is bronchoscopy; and this should be regarded as complementary, rather than alternative, to radiography. Perhaps the prospect of three-monthly bronchoscopy might be used to discourage the desire to continue smoking.

REFERENCE

¹ *British Medical Journal*, 1956, 1, 504.

Diaphoretics in Paediatrics

Q.—What place have diaphoretics in the treatment of infants and small children? Are they ever indicated in the ordinary febrile complaints of infancy and childhood? What preparations are advised for those infants and children who vomit preparations containing aspirin?

A.—Diaphoretics seem to have disappeared entirely from use in the modern treatment of children's diseases, as a result presumably of the effectiveness of antibiotic and chemotherapeutic drugs in those conditions where prolonged high fever used to occur. It may safely be said that diaphoretics are never required in the treatment of ordinary febrile complaints, but that if some drug is required to lower the temperature then aspirin is the first choice. It is now available as calcium aspirin in so many non-irritating preparations that it is worth trying a different preparation if a child vomits ordinary aspirin.

Strangulated Hernia on Board Ship

Q.—How should a ship surgeon, with limited equipment and surgical experience and no skilled assistance, treat a case of strangulated hernia?

A.—If the hernia has been strangulated for less than six hours an attempt at reduction by taxis should be made. The patient should be laid down with the feet raised and after half an hour reduction should be attempted. If reduction is impossible operation must be undertaken. This would best be done under local analgesia, the essential point being to relieve the strangulation.

In an inguinal hernia the constriction may be at the external inguinal ring or at the neck of the sac. In the former instance reduction will occur as soon as the external oblique is incised from the external abdominal ring and the sac need not be opened. If the constriction is higher, the whole length of the inguinal canal must be opened up, the sac opened, and the constricting neck incised by a pair of scissors, the operator making sure that the vessels of the spermatic cord are pushed aside. The external oblique should be repaired and the skin wound closed.

In the case of a femoral hernia the strangulation is nearly always caused by the rigid margins of the femoral ring. By blunt dissection the medial margin of the sac should be followed up until the reflected portion of the inguinal ligament (Gimbernat's ligament) can be felt. With a small scalpel this can be nicked, care being taken to avoid the sac. The sac should then be opened and its contents reduced. Occasionally a tight neck of the sac requires cutting with scissors. After reduction the sac should be ligated at its base and cut off, and the skin sutured.

A short course of penicillin should be given, and the patient advised to have a radical repair when circumstances permit.

NOTES AND COMMENTS

Prolonged Constipation in Children.—Mr. H. REID, F.R.C.S. (Liverpool), writes: Your expert gave a very clear and adequate account of the treatment of constipation in children ("Any Questions?" May 19, p. 1187). His opinion on the use of the proprietary form of standardized senna which he mentioned is in conformity with an increasing number of members of the medical profession. When, however, liquid paraffin is recommended, we are uneasy. As long ago as 1942, a leading article in the *Lancet*¹ made four important points: (1) A considerable amount of liquid paraffin finds its way from the intestine to the liver and viscera. (2) Liquid paraffin renders the recto-sigmoidal "valve" incompetent, and permits continual leakage of a mixture of oil and faeces into the rectum. (3) In patients with rectal lesions... healing is more rapid when liquid paraffin is avoided. (4) Liquid paraffin in the bowel may interfere with absorption in the small intestine both by hurrying the food along and by coating the mucosa. Since then other writers of eminence have written about the way in which liquid paraffin interferes with absorption of vitamins. A recent annotation in the *Journal*,² on the treatment of constipation, incriminates liquid paraffin as a cause of lipid pneumonia and as an obstacle to the absorption of fat-soluble substances such as carotene and to the healing of wounds. In these days of economy in prescribing, I should like to make one other point—namely, that the biologically standardized form of senna which you mention is cheaper by half than paraffin, is far easier to dispense, and there is no wastage of storage space.

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- ¹ *Lancet*, 1942, 1, 656.
² *British Medical Journal*, 1956, 2, 36.

OUR EXPERT replies: Liquid paraffin is certainly feeling the swing of the pendulum, and, like many useful and comparatively harmless drugs, is being brought into disfavour by being prescribed too frequently and in too large a dosage. Mr. Reid's comments certainly apply to paraffin when given in excessive amounts and in surgical conditions; but, if prescribed with discrimination and in small quantities, it seems completely harmless and to be of value. The neostigmine mixture recommended in my answer has been in use for many years, and over long periods, with no ill effects. The actual cost of two drams (7 ml.) of liquid paraffin daily, and of a tablet of the biologically standardized preparation of senna ("senokot") daily, is about one penny a week in either case.

Intragastric Oxygen for Asphyxia Neonatorum.—Dr. D. MORRIS (London) writes: Could I bring to your notice an omission in your answer to the use of intragastric oxygen for asphyxia neonatorum ("Any Questions?" July 7, p. 55)? In answer to the specific question, "What apparatus is advised for use in general practice?" we have designed and described¹ a small portable apparatus for use in general practice, and it is now being used by district midwives and general practitioners.

REFERENCE

- ¹ Waller H. K., and Morris, D., *Lancet*, 1953, 2, 951.

OUR EXPERT replies: I owe Dr. David Morris an apology for forgetting his adaptation of the Sparklet apparatus, made by Messrs. Sparklets, at a price of six guineas, for supplying intragastric oxygen. It sounds as if this should be a very handy apparatus for giving intragastric oxygen. The apparatus is one that is now used by many general practitioners and midwives for supplying oxygen to the mother or baby through a face mask. To adapt it for giving intragastric oxygen, all that is required is a special connecting piece, costing 2s., the catheters, and tubing.

Correction.—In a news paragraph (July 21, p. 185) which mentioned a forthcoming conference at the National Physical Laboratory on the "Direction of Research Establishments" it was wrongly stated that Sir Harold Himsworth, F.R.S., would be among the speakers.

All communications with regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, LONDON, W.C.1. TELEPHONE: EUSTON 4499. TELEGRAMS: *Attitology, Westcent, London.* ORIGINAL ARTICLES AND LETTERS forwarded for publication are understood to be offered to the *British Medical Journal* alone unless the contrary be stated. Authors desiring REPRINTS should communicate with the Publishing Manager, B.M.A. House, Tavistock Square, W.C.1, on receipt of proofs. ADVERTISEMENTS should be addressed to the Advertisement Director, B.M.A. House, Tavistock Square, London, W.C.1 (hours 9 a.m. to 5 p.m.). TELEPHONE: EUSTON 4499. TELEGRAMS: *Brimedads, Westcent, London.* MEMBERS' SUBSCRIPTIONS should be sent to the SECRETARY of the Association, TELEPHONE: EUSTON 4499. TELEGRAMS: *Medisecra, Westcent, London.* B.M.A. SCOTTISH OFFICE: 7, Drumsheugh Gardens, Edinburgh.

BRITISH MEDICAL JOURNAL

LONDON SATURDAY AUGUST 18 1956

HYPOTHALAMIC SYNDROMES*

BY

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My interest in clinical manifestations of coma dates back to the epidemics of encephalitis, then called lethargic, which accompanied and followed the world-wide epidemic of influenza after the first world war. Among the varied clinical expressions of the encephalitides was a peculiar type of coma then called vigil. It usually set in fairly acutely and persisted unaltered for days or weeks and even months, sometimes ending in death, at others in seeming recovery only to be followed in certain instances months or years later by a Parkinson syndrome. The coma differed from the usual type. The eyes were frequently open, the eyeballs wandered and gave the erroneous impression that the individual was in contact with his environment. He might turn his head from side to side as if in response to sounds which he evidently did not hear. There were no signs of paralysis of the limbs. Characteristic in many cases was such profuse perspiration, often oily, as to require frequent change of bedclothes. Calling the coma vigil was the usual way of giving classical names to conditions which escaped explanation, in the vain belief that to coin a word or phrase is to create a scientific fact.

Case 1.—A few years after the acute epidemics had spent themselves a girl of 18 was admitted to the Montefiore Hospital with the complaint of obesity, of inversion of the sleep mechanism, and of grave sexual moral lapses. There was a history of acute encephalitis. Previously normal in her behaviour, she now began to show symptoms of nymphomania. She would immodestly accost men and overtly express uncontrollable sexual urge, entirely out of keeping with her previous moral and ethical behaviour. The diagnosis of pituitary obesity was made but never proved. The suspicion of a hypothalamic syndrome, which could now be entertained in retrospect, was not even considered at that time. All we knew then was that in the diencephalon there was a corpus Luysi and a mammillo-thalamic bundle of Vicq d'Azyr.

Case 2.—Also in the early 1920's a man was admitted to the hospital with the main complaint of hypothermia. His temperature fell as low as 94° F. (34.4° C.) and persisted unchanged for several weeks. One day it rose to 99° F. (37.2° C.). The acute rise of 5° F. (2.8° C.), the local signs, and the leucocytosis led to the diagnosis of acute mastoiditis. A mastoidectomy was done, and the temperature fell back to 94° F. (34.4° C.) as he made a comparatively rapid recovery. He died some time afterwards. At post-mortem examination a middle-fossa tumour was found impinging on the interbrain area.

Case 3.—At about the same time I saw a man at the Mount Sinai Hospital in the terminal stages of general

*Lecture delivered at the National Hospital, Queen Square, London, on May 31, 1956.

paresis. Several weeks before his death he developed severe polydipsia and polyuria, taking in and putting out many litres of water daily. Obviously an intercurrent diabetes insipidus. At post-mortem examination, in addition to the typical pathology of paresis, a discrete gumma was found perching on the tuber cinereum. The diabetes insipidus apparently was the result of the gumma.

Case 4.—Some years later I saw in the hospital a young woman with diabetes insipidus who was taking in six litres of water daily and putting out as many. She responded neither to pitressin nor to other treatment. A review of the history showed that for some time before the onset of the polydipsia she was treated for severe ethmoiditis and sphenoiditis. The question arose whether she might not have had secondary to the infection of the sinuses a basilar pachymeningitis which impinged on the interbrain region and pressed on the tuber cinereum. This was a purely clinical impression or guess based on the observation of the diabetes insipidus in the paretic and the gumma found on the tuber cinereum. Since it is known that radiation by means of deep x rays can have a beneficial effect on chronic inflammatory tissue, the radiation was directed from both sides of the skull to the interbrain area. After a few treatments, and no medication, the diabetes began to lessen and finally cleared completely.

On rare occasions a comatose patient would be seen with the diagnosis of a cerebral ictus the result of vascular thrombosis or haemorrhage. The history was generally of an acute onset in an individual with marked hypertension and evidence of arteriosclerosis. The coma was not like the usual type. There would be striking pallor, unexplained rise in temperature, and frequent perspiration. The patient would lie quietly, sometimes with eyes open, but there was no hemiplegia or other sign of regional involvement of the brain. There was no difference in response to pin-prick on the two sides. The fundi would be normal, except for evidence of sclerosis of the retinal arteries. The rise in temperature would be unaccompanied by the usual parallel rise in pulse rate. Very characteristic would be a sharp drop in the systolic blood pressure from, say, 200 systolic or higher to as low as 100, the pressure remaining low throughout the course of the illness. Generally the coma would deepen and the patient would die within days or weeks. The fever would be unaccompanied by leucocytosis and heightened sedimentation rate. If, as occasionally happened, the patient recovered there would remain no residual paralysis, sensory disturbances, visual field defects, or aphasia.

It is of interest that a sharp drop in blood pressure is often seen in apoplexies obviously the result of closure or rupture of a large cerebral vessel. The pressure

might continue low for a considerable period of time or rapidly return to the pre-ictal level. As time went on the conjecture approached conviction that the type of coma, the variation in blood pressure, the pallor, the sweating, the unexplained fever, and the absence of signs of paralysis all pointed to the hypothalamic region.

Case 5.—In 1938 I reported two cases diagnosed as epilepsy (a word which I should like to see discarded or very strictly limited) with grand-mal and petit-mal seizures (Wechsler, 1938). One was that of a middle-aged woman who sustained a fracture of the base of the skull when thrown from a speeding automobile. She recovered from the acute injury in a comparatively short time but then began to have typical grand-mal seizures. These were controlled by phenobarbitone. At the same time minor seizures, occurring twenty and more times daily, and showing the following characteristics, began to appear. They set in with a feeling of apprehension and a fleeting loss or orientation; she became extremely pale and complained of palpitation; her blood pressure dropped from 150 systolic to 90, and the pulse rose from 80 to 120 and as high as 150 beats a minute. Every seizure was marked by very slight impairment of consciousness, the pallor, the drop in pressure and increase in pulse rate, and would last one to three minutes. They failed to respond to treatment. Based on Penfield's description in 1929 of diencephalic autonomic epilepsy, the thought occurred that the woman's seizures reflected diencephalic features. In Penfield's case there was suffusion and rise in pressure as opposed to the pallor and fall in pressure, also with little impairment of consciousness. Reasoning that pallor and suffusion and rise and fall in pressure and variation in pulse rate are opposite manifestations of the regulatory mechanisms, the conclusion seemed justified that the woman also suffered from diencephalic seizures. Recalling too that catalepsy, which probably is hypothalamic in nature, responds favourably to ephedrine or amphetamine, the former was prescribed. She promptly ceased to have the seizures and remained free till her death several years later from an unrelated cause. Of interest is the fact that a stimulating drug was effective where the depressant drugs usually prescribed in convulsive states had no effect. This observation of both clinical and pharmacological importance in the treatment of certain petit-mal seizures was confirmed by Lennox in 1945.

Case 6.—The other case, in brief, was that of a woman of 24 who suffered from grand-mal seizures and from bizarre minor seizures up to twenty times by day and night. The minor spells were characterized by a sudden cry, waxy pallor, a drop in blood pressure, a rise in pulse rate, and loss of consciousness. Each seizure lasted one to two minutes. They set in one year before she came under observation in 1937 with irregularity of menstruation and loss of libido. Occasionally a spell would begin with sudden rigidity, momentary fall, and no loss of consciousness, reminiscent somewhat of catalepsy and cataplexy. There was a history of loss of consciousness sustained in an automobile accident at the age of 6 and of influenza (possibly encephalitis) the year before the onset of the present illness. She failed to respond to all the usual sedative drugs. Ephedrine promptly brought about marked improvement. The attacks did not cease altogether, but were reduced in intensity and in number from twenty a day to three or four. Interestingly, the libido returned.

Before proceeding with further description of cases, some of which have been previously reported, and cautiously correlating the clinical manifestations with hypothalamic dysfunction, it may be well to discuss briefly the anatomy, physiology, and pathology of the diencephalon.

Anatomical Considerations (Wechsler, 1953)

The very small hypothalamus, estimated by LeGros Clark (1938) to weigh about 4 g., presumably integrates directly and

indirectly a great many vital functions: pulse and respiratory rate, temperature and blood-pressure regulation, vasomotor control, water and possibly sugar and fat metabolism, sleep and abnormal states of consciousness, sex function, and states of elation and depression. The following, taken from Ingram, is a brief description of the nuclear organization and chief connexions of the primate hypothalamus:

I. Afferent Connexions.—(1) The median forebrain bundle probably from the frontal lobe. (2) Thalamo-hypothalamic fibres: (a) thalamo-mammillary fibres, (b) relay of somatic and visceral sensory impulses of the hypothalamus. (3) The fornix, from the hippocampus to the mammillary and other nuclei. (4) The stria terminalis from the amygdala. (5) The supraoptic commissure. (6) Pallido-hypothalamic fibres. (7) Subthalamo-hypothalamic connexions, including presumed cortical fibres of undetermined pathways via the thalamus.

II. Efferent Connexions.—(1) Hypothalamo-thalamic fibres, including the mammillo-thalamic tract. (2) Mammillo-tegmental. (3) Paraventricular system. (4) Hypothalamo-hypophyseal connexions: (a) supraoptic hypophyseal, (b) paraventricular-hypophyseal, and (c) tubero-hypophyseal.

III. Intrathalamic Connexions.—There is considerable evidence, some of it inferential and some direct, that just as the hypothalamus activates other parts of the brain so do brain and brain-stem regions activate the diencephalon, among them the ascending activating reticular system described by Magoun (1952), the centrifugal projections to the brain stem (Jasper, Ajmone-Marsan, and Stoll, 1952), and the centrencephalic system of Penfield (1952).

IV. Arterial Supply of the Hypothalamus.—Small branches from the anterior cerebral artery as it comes off the internal carotid at its junction with the anterior communicating artery go to the paraventricular nuclei and the preoptic and supraoptic regions. Branches from these arteries, from the internal carotid, and from the posterior communicating artery supply the tuber cinereum. Small branches from the posterior cerebral arteries supply the mammillary bodies.

Physiological Considerations

That the hypothalamus integrates or correlates or possibly controls so many metabolic and visceral functions and has to do with sleep, with emotional expressions, and with states of consciousness is one of the most interesting aspects of cerebral physiology. That such a small structure directly or indirectly regulates water, fat, and sugar metabolism, vasomotor activity, blood pressure, pulse and respiratory rate, and sex function is of great clinical importance. In this region apparently are locked secrets which when fully revealed will help to solve many as yet obscure problems in clinical medicine.

Ranson and Magoun have shown that the hypothalamus influences *cardiovascular activity*. Electrical stimulation caused rise in blood pressure, depending on the location of the electrode and the frequency of stimuli. The hypothalamus, it seems, does not control or regulate the circulatory system but can modify it, as can a chemical agent, an emotional reaction, and environmental stimulus, or a temperature variation.

There is ample evidence, both clinical and experimental, that the hypothalamus has to do with *temperature regulation*. In the cat, the monkey, and man, lesions in the neighbourhood of the anterior commissure are likely to produce transient hyperthermia, while lesions in the caudal part of the hypothalamus are apt to cause hypothermia. It has been shown that all of the brain in front of the hypothalamus can be removed without seriously affecting the nervous regulation of temperature. *Sweating*, too, appears to be regulated by the hypothalamus. It apparently influences *pilomotor* activity with other manifestations of fear, rage, and sexual excitement, all also under the control of the

cerebral cortex. Barbour concluded that injury to cats by transection of the posterior hypothalamus, caudal to the tuber cinereum, deprives them of the power of regulating body temperature against cold. Destruction of the mammillary bodies and the mammillo-thalamic tracts results in hypothermia and bradycardia, whereas lesions in the mid-portion of the upper mammillary tract result in hyperthermia, tachycardia, and pilo-erection. Davison, Zimmerman, and Alpers have adduced clinico-pathological evidence of disturbance of temperature regulation by lesions in or near the hypothalamus. In 1943 Beaton and his co-workers discussed neurogenic hyperthermia, often euphemistically labelled as fever of unknown origin. This fever is not accompanied by signs of infection, is not characterized by sweating, leucocytosis, or heightened sedimentation rate and rapid pulse, and does not respond to antipyretics but may to barbiturates, particularly sodium thiopentone, which presumably have effect on the hypothalamus. This type of fever, often very high, is occasionally seen post-operatively in brain tumours and may lead to a fatal termination.

While regulation of *carbohydrate metabolism* is essentially the result of the activity of the anterior pituitary, the result of the activity of the pancreas, there is evidence of hypothalamic control. Indeed, the paraventricular nuclei have been considered as "centres" of carbohydrate metabolism. Ingram (1946) found hypoglycaemia as the result of lesions in the anterior hypothalamus and destruction of the paraventricular nuclei. The hypothalamus has been related functionally to the thyrotropic and gonadotropic activities of the adenohypophysis.

Water and Fat Metabolism and Sex Regulation as Functions of the Hypothalamus

Diabetes insipidus has been produced by destruction of the supraoptic hypophyseal system. While polydipsia is a consequence of polyuria, which is dependent on the absence of diuretic substance, puncture of the hypothalamus has been shown to cause polyuria. Obesity (and genital atrophy) have been reported as the result of trauma to the diencephalon. An adiposo-genital syndrome has been produced in a dog by a lesion in the hypothalamic area. There is clinical and experimental evidence that bilateral lesions in the hypothalamus and the tuber cinereum, without injury to the hypophysis, may result either in obesity or in emaciation. The two recorded clinical cases of diabetes insipidus were, in retrospect, correctly attributed to involvement of the tuber cinereum.

Though sex function is regulated essentially by hormonal activity, there is evidence of influence on gonadotropic hormones via cortico-thalamic-hypothalamic pathways. There is also some evidence that section of the diencephalon may exert influence on the capacity of female cats to display sexual excitement. However, full pattern of oestral behaviour can be obtained in cats after complete destruction of the middle or caudal portions of the hypothalamus. The nymphomania of the girl with obesity previously described becomes understandable in the light of present knowledge. As for other regions, there is the report of uncontrollable sexual desire in a woman of 60 as one of the symptoms of a paracentral lobe meningioma, and that of a religious young woman who displayed uninhibited ardent sexual urge as one manifestation of a large frontal meningioma. Both were relieved of their ardour after successful removal of the brain tumours.

Gastro-intestinal activity apparently is in part a function of the lateral and mammillary regions of the hypothalamus. Stimulation of those regions can inhibit peristalsis. In 1934 Watts and Fulton reported the occurrence of intussusception on ablation of the cortex in monkeys. They thought that the impulses travelled via the hypothalamus may cause gastro-tumours injuring the hypothalamus may cause gastro-intestinal haemorrhages and perforating ulcers. I have observed abdominal syndromes simulating appendicitis, renal colic, and duodenal ulcer as manifestations of brain tumours (Wechsler, 1935).

Sleep

Sleep and its relation to the hypothalamus has been the subject of numerous investigations which brought understanding as well as confusion. The impression has gained currency that the diencephalon is the centre of sleep and the seat of consciousness. One may seriously question the first and successfully contest the second (Wechsler, 1952). At best the diencephalon is one important relay station where states of consciousness are integrated and lesions of which can bring about in varying degrees alterations of a negative state called unconsciousness. Sleep is a negative not a positive state; it is absence of consciousness. We are not dealing with entities or faculties or specific localizations, but with relative states expressive of varying degrees of impairment of integration.

Normal sleep is believed to be the result of decreased activity of the hypothalamus, hypersomnia of depression of function, and insomnia and excitement of increased activity. The regions implicated are the paraventricular nuclei, the floor of the third ventricle, and the tuber cinereum. Apathy and unresponsiveness, akinesia, and catalepsy have been attributed to lesions of the mammillary bodies and the hypothalamic portions of the mammillo-thalamic tracts. Rasmussen and his co-workers have produced catalepsy and somnolence by damaging structures in the neighbourhood of the mammillary bodies. Ranson observed that bilateral destruction of the lateral hypothalamic areas in monkeys caused somnolence. Hess (1944, 1947) described adynamia on stimulation of the lateral and anterior regions of the hypothalamus. Patton, Ruch, and Walker (1944) found that lesions in the ventral postero-medial nucleus of the thalamus resulted in immobility, catalepsy, and somnolence. The electroencephalographic changes induced by lesions in the upper mammillo-thalamic tract paralleled sleep records.

Whereas the posterior portion of the human hypothalamus causes somnolence, stimulation of the anterior portion causes restlessness, euphoria, excitement, and mania. Penfield induced manic excitement during operation for tumours in the region of the hypothalamus. While tumours of the third ventricle frequently cause somnolence and stupor, psychotic manifestations can also occur. I once saw a young patient with conduct and behaviour disorders as the outstanding manifestation of a craniopharyngioma, and complete recovery following its removal. Akinetic mutism, a state of inertia with the eyes open, has been described by Cairns, Oldfield, Pennybacker, and Whitteridge (1941).

Manifestations of the Syndromes

Before summarizing the clinical hypothalamic syndromes a brief description of a few cases showing the variety of manifestations may be of interest.

Case 7.—A man in the early fifties who suffered from hypertension suddenly complained of loss of vision in that he could not recognize what he saw. Within a few minutes he lost consciousness and was promptly admitted to hospital. There he lay quietly, pale, eyes open, the eyeballs wandering. There was no evidence of paralysis of the limbs; the cranial nerves appeared normal, and so were the fundi and the spinal fluid. He lingered practically unchanged for weeks, life being maintained first by tube then by intravenous feeding. Death resulted from starvation. The onset of cortical blindness pointed to basilar artery thrombosis at its bifurcation into the posterior cerebrals, the coma vigil to hypothalamic involvement by occlusion of the branches from the posterior cerebrals to the hypothalamus.

Case 8.—A man aged 61, a known hypertensive, suddenly went into coma in March, 1944. Seen three days after the ictus, he lay quietly, pale, eyes open, pulse normal, temperature elevated; he gave no responses, showed no hemiplegia or other signs of focal involvement; the spinal fluid was normal, and the blood pressure had dropped to normal from 180 systolic and 110 diastolic. He regained consciousness in a few days and rapidly recovered without residual

signs and symptoms. Except for the return of his hypertension he was well and working up to the time of his death in 1946 from acute coronary occlusion. The type of coma, the absence of focal signs, the drop in blood pressure, the rise in temperature without corresponding rise in pulse rate, the pallor, and the complete recovery without residua, suggested hypothalamic involvement on a vascular basis.

Case 9.—A woman of 62 with a history of controlled diabetes and moderate hypertension rapidly went into coma without premonitory symptoms. She lay with eyes open, was restless, looked very pale, and perspired profusely; the blood pressure was low, the pulse 120 a minute, the temperature 98° F. (36.7° C.). There were no signs of paralysis. She died two weeks after the acute onset. The type of coma, the marked pallor, the subnormal temperature, the drop in blood pressure, the rise in pulse, the profuse perspiration, the restlessness, and the total absence of paralysis all pointed to hypothalamic localization.

Case 10.—A man aged 50 developed, quite rapidly, fever which ranged from 103.6 to 104.8° F. (39.8 to 40.5° C.). He became disoriented, then comatose, restless, and incontinent. He was extremely pale; the blood pressure dropped from 138 systolic and 70 diastolic to 116 and 50 respectively; the spinal fluid showed 50 mononuclear cells. On one occasion the urine contained 3% sugar and the blood 158 mg. per 100 ml. He showed marked variation in temperature uncorrelated with equally marked variations in pulse and respiration, and perspired so profusely as to require frequent daily changes of pyjamas and bed sheets. There were no gross signs of regional involvement of the brain or brain stem, and he recovered in four weeks. The high fever, the variations in pulse rate and respiration without parallelism, the type of coma, the restlessness, the pallor, the temporary glycosuria and hyperglycaemia, the profuse sweating, the absence of paralysis, and the recovery without residua pointed to hypothalamic involvement in the course of encephalitis.

Case 11.—In 1946 Gross and I reported the case of a boy of 10, first seen in 1944, who showed repeated paroxysmal attacks of hypothalamic dysfunction, with intervals of comparative well-being, since the age of 2 (Wechsler and Gross, 1946). They were generally ushered in by loss of appetite, vomiting, rise in blood pressure to as high as 170 systolic and 130 diastolic, rise in temperature to 104° F. (40° C.) and fall to 94° F. (34.4° C.), lethargy, excessive salivation, vasomotor imbalance, profuse perspiration, and absence of lacrimation. The attacks generally lasted several days. During an interval of comparative well-being he suddenly died at home and permission for necropsy was not obtained. Engel and Aring (1945) reported a very similar case with necropsy findings showing hypothalamic involvement.

Summary

In summarizing the conclusions a word of warning against hasty interpretation is necessary because much of our present knowledge of the structure and function of the hypothalamic region is derived from experimentally induced lesions. The various structures and their connexions are not yet precisely defined. While experimental lesions can be more or less accurately placed, pathological lesions the result of brain tumours, vascular disease, or inflammatory processes are rarely sufficiently circumscribed to permit accurate correlation. Too many contiguous structures may be affected and distant connexions impaired to warrant positive conclusions. Furthermore, most of the physiological experiments and the anatomical studies deal with lower animals, and it is a little hazardous to apply the conclusions, however carefully drawn, to more complex human structures and human functions. Some of the objections have been met by experiments on primates and more recently by accurate studies and direct observations on humans.

There is also the pressing need to bear in mind the injunction of Hughlings Jackson, so often violated, not to draw false conclusions from negative evidence or from symptoms attributed to destroyed structures. A word of avowal of ignorance, really a defensive confession and apology, is in place to meet the just criticism of drawing clinical conclusions in the absence of positive evidence furnished by careful studies of pathological lesions. This communication is merely an attempt to suggest the correlation of clinical symptoms with disturbance of function with such anatomy and physiology of the hypothalamus as we know to-day.

In summary, the hypothalamic coma differs from the usual coma in that there is no evidence of paralysis or of other signs of regional involvement of the brain and brain stem. It may rapidly end fatally or persist unchanged for long periods of time. Generally it terminates in death, but if recovery takes place no residua are present. Among the symptoms observed may be mentioned a sharp drop in blood pressure in known hypertensives and temporary fluctuation in either direction where no previous hypertension existed. With the coma may alternate restlessness, excitement, and unconscious sexual manifestations. Excessive perspiration may occur in the absence of fever. There may be quickening or slowing of the pulse for no apparent reason. Fever, often high, of cerebral origin, may be seen in the absence of infection and without parallel rise of pulse rate. In other words, there is dissociation between fever, pulse rate, and blood pressure. The fever is not accompanied by its usual manifestations of leucocytosis, sweating, and heightened sedimentation rate, and does not respond to the usual antipyretics. It may respond to barbiturates, especially sodium thiopentone, which appear to have some selective affinity for the diencephalon. Polydipsia and polyuria—that is, transient or persistent diabetes insipidus—may occur from involvement of the tuber cinereum. Transient glycosuria or hyperglycaemia may occur in non-diabetics. Occasional petit-mal autonomic diencephalic seizures and, more rarely, grand-mal attacks may also occur.

The prognosis varies with the underlying cause. Generally it is very grave. In vascular disease it is poor, but recovery may take place. In tumours in or near the interbrain the outlook depends on the possibility of surgical removal; generally it is hopeless. In inflammatory conditions—namely, encephalitis—recovery may take place after weeks and weeks provided excitement can be controlled and nutrition maintained.

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COARCTATION OF THE AORTA

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Since the introduction of radical surgical treatment for coarctation of the aortic arch by Crafoord and Nylin (1945) and by Gross (1945), the operation has been widely performed and in experienced hands the mortality of the operation has been reduced to below 10%.

We have carried out a survey of 52 patients (34 males, 18 female) with coarctation who have been under the care of one or other of us, paying particular attention to the natural history of the disease and to the effect of resection upon its various features in 40 of them.

The Clinical Series

The patients' ages ranged from 1 to 55 years (Tables I and II). Of the 40 patients who had resection (see also Diagram) all were aged under 40, and no fewer than 25 were 15 years or older. Of the 12 patients who did not have surgery, 6 were aged over 40 when last seen, but 3 of these have died, the oldest at the age of 55 (Table I).

Mode of Discovery

It is well known that coarctation is often remarkably symptomless (Lewis, 1933; Bramwell, 1947), and 43 of our cases were diagnosed during medical examinations carried out for reasons unrelated to the coarctation. Nine patients presented with symptoms referable to the coarctation. In two of these symptoms were due to dissecting aneurysm of the aorta. Two others had general symptoms due to subacute bacterial infection, and another presented with nephritis (probably focal-embolic, as vegetations were later found at the site of

TABLE I.—Twelve Patients with Coarctation of the Aorta who did not Come to Resection

Case	Sex	When Last Seen			Death	
		Age	B.P.	State	Age	Cause
A	F	10	145/80	Well	41	Congestive heart failure. No P.M.
B	M	31	180/100	Blackouts. Physically fit		
C	M	31	168/80	Well	41	Congestive heart failure. No P.M.
D	F	46	255/140	5-para. Slight dyspnoea		
E	F	46	200/100	4-para. Well	41	Congestive heart failure. No P.M.
F	M	40	160/100	Congestive failure. Auricular fibrillation. Aortic stenosis and incompetence. Mitral stenosis		
G	F	30	220/130	2-para. Well	55	Congestive heart failure. No P.M.
H	M	25	160/90	Heavy manual work. Well		
I	M	42	205/100	Easily fatigued. Physically fit	47	Dissecting aneurysm of aorta
J	M	32	190/110	Aortic incompetence and stenosis		
K	M	55	170/60			
L	M	47	(80/40, in shock)			

TABLE II.—40 Patients with Coarctation of the Aorta who Came to Resection (see also Diagram)

Case No.	Sex and Age	Date of Operation	Average B.P. before Operation	Diameter of Anastomosis Relative to Aorta Above	Average B.P. after Operation	Femoral B.P. after Operation (Not Average)
1	M 17	1948	144/104		138/82	140/100
2	M 30	1949	237/109		180/103	200/120
3	F 27	1949	210/128		163/95	150/120
4	F 19	1949	187/97		168/90	—
5	F 30	1949	190/133		—	—
6	F 18	1949	190/120		—	—
7	F 14	1950	190/130		175/100	170/120
8	M 13	1951	165/105		138/75	160/100
9	M 6	1951	165/95		115/83	120/7
10	F 33	1952	203/121	45%	170/90	190/7
11	M 25	1952	183/110		162/98	200/130
12	M 20	1952	200/81	60%	177/78	—
13*	M 7	1952	140/90		118/76	120/90
14	M 20	1953	181/90	90%	165/75	150/110
15	M 6	1953	152/93	75%	138/95	115/7
16	M 20	1953	172/105		150/90	140/7
17	M 5	1953	134/98	86%	133/90	140/7
18	M 10	1953	177/100		125/80	155/100
19*	F 36	1953	170/105		—	—
20	F 18	1953	200/90		166/70	160/90
21	M 20	1954	180/90	86%	145/85	145/110
22	M 17	1953	203/111	100%	145/82	—
23	M 5	1954	180/110	84%	155/92	—
24	M 9	1954	208/125	80%	130/72	130/80
25	F 25	1954	186/118	72%	141/86	160/115
26*	M 20	1954	160/95	100%	136/90	160/85
27	F 1	1954	125/80	84%	118/88	115/90
28	M 31	1954	200/100	80%	180/100	—
29	F 7	1954	155/88	100%	140/84	150/90
30	F 3	1954	170/108	100%	112/83	135/75
31	M 5	1954	158/64	100%	108/65	100/60
32	M 7	1954	173/105	92%	124/80	120/85
33	M 35	1954	195/105	85%	165/100	170/140?
34	M 31	1955	170/124	85%	135/90	—
35	M 18	1955	185/120	92%	175/100	180/120
36	F 32	1955	205/105	100%	145/90	—
37	F 32	1955	189/98	100%	176/100	180/110
38	M 19	1955	150/108	100%	135/105	135/100
39	M 6	1955	135/80	95%	110/75	120/70
40	M 23	1955	155/70	100%	147/86	160/110

In all cases the operative procedure was excision with end-to-end anastomosis, except where grafts are indicated.
Average reduction of blood pressure = 32/16 (excluding Case 40—too recent).
* Freeze-dried aortic homograft inserted.
Note.—(1) The brachial blood-pressure figures are average values. The femorals are simple measurements, usually at last visit. (2) The size of the anastomosis is compared with that of the aorta between the anastomosis and the subclavian artery and presented as a percentage of the latter. No figure is given in cases in which detailed measurements were not made.

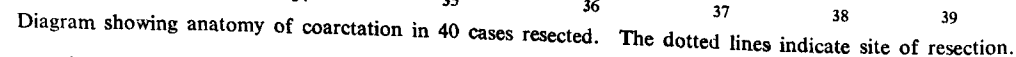
coarctation). Three developed cerebrovascular accidents; and, finally, one patient with auricular fibrillation, mitral stenosis, and aortic incompetence was admitted in congestive cardiac failure.

The presenting symptoms of these nine patients, who had been previously well, were manifestly due to serious complications. Equally important complications, however, occurred silently in other cases and were unexpectedly found at operation. The dramatic onset of these complications is illustrated particularly by those who suffered vascular accidents. A labourer aged 47, for example, enjoyed perfect health until his sudden collapse at work from a dissecting aneurysm, which proved fatal in a few days.

Discovery of Symptomless Cases

In several instances the cardiovascular system became suspect many years before the correct diagnosis was reached. Four patients, for example, had been diagnosed in childhood as having rheumatic heart disease on discovery of a cardiac murmur. In fact, an unexpectedly high incidence of rheumatic fever has been reported in patients with coarctation, and three of our cases gave histories of it. One further patient had the signs of valvular disease, possibly rheumatic, with mitral stenosis, aortic incompetence, and auricular fibrillation, in addition to coarctation.

The initial findings that eventually led to the diagnosis of coarctation in these 43 patients were heart murmurs



Acellular fibrin deposits on the intima were recognized in several other cases, but their macroscopic and histo-

logical appearances were distinctly different. These are the so-called "jet lesions" described by Edwards *et al.* (1948).

Among Abbott's (1928) 200 cases of coarctation were 14 instances of infective endoaortitis. Four of these had resulted in rupture of the aorta. The silence of the infection is sinister, therefore, in that disaster may happen before the complication is recognized and before antibiotic therapy is indicated.

Dissecting Aneurysm of the Aorta

The calamity of dissecting aneurysm of the aorta was encountered twice. The sudden onset and the rapidly fatal issue in one case have been mentioned:

Case L.—A labourer (Table I) aged 47, previously in excellent health, collapsed at his work. Comatose on admission to hospital, he remained in coma until he died on the fourth day. Necropsy showed coarctation with a dissecting aneurysm of the

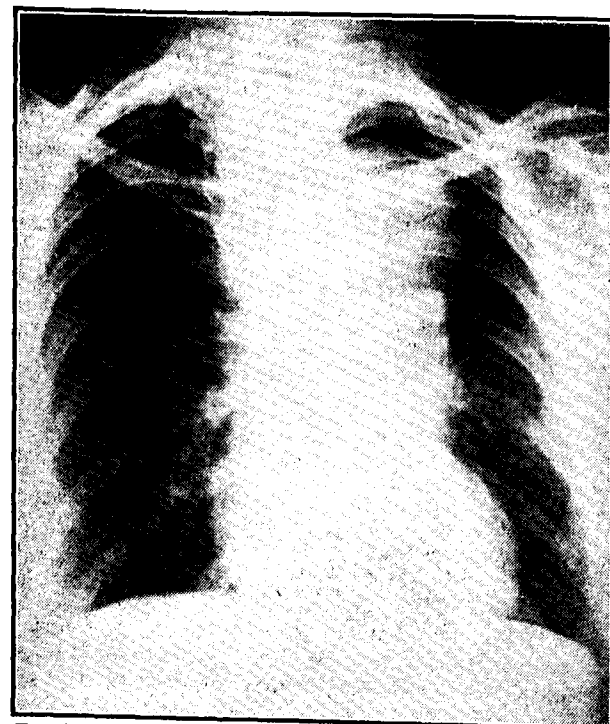


FIG. 2.—Six-foot (1.8 m.) postero-anterior radiograph of chest in Case 19, showing the aneurysm of the arch and descending aorta.

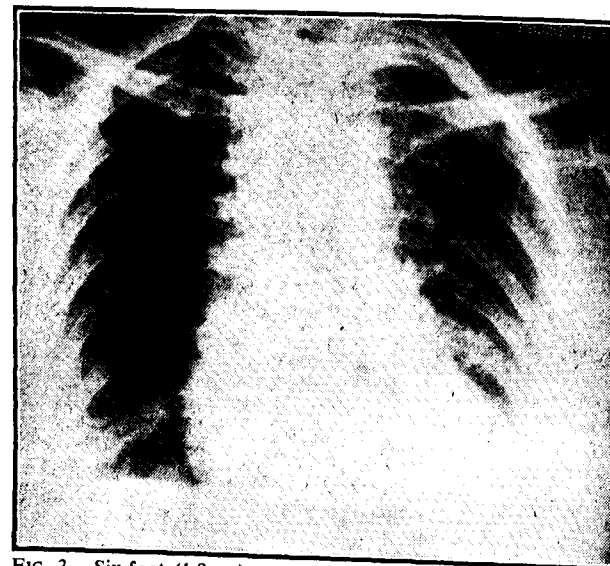


FIG. 3.—Six-foot (1.8 m.) postero-anterior radiograph of chest in Case 19 after resection of the aneurysm and insertion of aortic graft.

aorta. The initial tear was a short distance above the aortic valve, and thrombus formation here had resulted in embolism of the brain and kidneys before final aortic rupture into the pericardial sac caused death from tamponade.

The second was of slower tempo, and an attempt was made to deal with it surgically.

Case 19.—A woman who had led an active life with good health had tonsillitis in September, 1952 (aged 35), followed three weeks later by severe interscapular pain radiating down the back. (B.P. 170/100). The femoral pulses were feeble and delayed. X-ray examination revealed an aortic aneurysm (Figs. 2 and 3) and a retrograde aortogram showed a dilated aorta with a double lumen. In March, 1953, she had a further attack of interscapular pain. A diagnosis of dissecting aneurysm was made. In October, 1953, thoracotomy revealed coarctation below the origin of the left subclavian artery with dissection of the aorta below, giving entrance to a large aneurysm; there was a double lumen down the entire length of the thoracic aorta extending into the abdominal aorta for an undetermined distance (Fig. 4). The thoracic aorta from the subclavian artery to the diaphragm was resected and replaced by a freeze-dried graft. The specimen showed that the initial tear was 2 cm. below the coarctation. There were no vegetations on the excised specimen. The patient made a good recovery, but in the convalescent home, six weeks after operation, a massive fatal haematemesis occurred. Necropsy revealed that the dissecting aneurysm had extended throughout the abdominal aorta to the bifurcation and had ruptured into the stomach. There was gross mucoid change of the media with corresponding loss of muscle in the aorta proximal to the graft and in the subclavian artery.



FIG. 4.—Excised aneurysmal sac in Case 19 viewed from below. The double lumen is well shown, the false channel being the larger, above, and the true lumen the smaller, below.

The operation was a desperate expedient in the hope that success might attend replacement with a graft if the dissection was favourably limited. This type of dissecting aneurysm must be regarded as one of the direct complications of coarctation.

Non-dissecting Aortic Aneurysm

Saccular aortic aneurysms were recognized radiologically and found at thoracotomy in two cases. In each the aneurysm lay immediately beyond the coarctation. One of the patients (Case 26) had subacute bacterial infection and has been described; the other (Case 13) did not have an infective lesion.

Case 13.—The diagnosis of coarctation was made by Dr. W. Brigden in this boy aged 7, who had pains in his limbs, thought at first to be rheumatic. X-ray films showed a large shadow just below the aortic arch, and its aneurysmal nature was confirmed by angiocardiology (Fig. 5). At thoracotomy, a saccular aneurysm, 35 mm. in diameter, began 20 mm. below the left subclavian artery. The main mass of the aneurysm extended deeply behind the hilum of the lung, and the wall was quite firmly attached to the spine and firmly blended with the oesophagus. The muscular layer of the oesophagus had been eroded and only oesophageal mucosa covered the thin wall of the aneurysm at this point. The aneurysm was mobilized, excised, and replaced by a 35-mm. aortic graft. In the specimen a coarctation with a 1-mm. orifice led eccentrically into the aneurysm, which had a large distal opening. During the three years of follow-up the patient had remained very well. The angiocardiology, 20 months after resection, showed a normal aorta (Fig. 6).

Such aneurysms can be resected, although their presence adds to the risks of the operation. But the degree of

erosion and thinning found in Case 13 indicates that its initial manifestation might easily have been fatal rupture into the oesophagus. Although their tempo is slower than that of dissecting aneurysms, their silence makes their timely discovery so much a matter of chance that they are scarcely less hazardous to life.

Post-stenotic dilatations were common. At operation they added to the difficulties of obtaining a uniform calibre of the reconstituted aorta.



FIG. 5.—Angiocardiology, left lateral projection in Case 13. The aneurysm is clearly shown in the upper portion of the descending aorta. There is no filling defect within the sac, and the coarctation is hidden by the aneurysm. (Film reproduced by courtesy of Dr. Wallace Brigden.)



FIG. 6.—Post-operative angiocardiology of Case 13: left lateral projection. No aneurysm is present, and there is good filling of the aorta with minimal constriction of the lumen.

Intercoastal Aneurysms

Small saccular aneurysms occurred even more frequently on the intercoastal arteries just below the coarctation, most commonly close to their origin from the aorta (Fig. 7). They were found at operation in six of our cases (Nos. 10, 20, 25, 34, 36, and 37), and their walls were so delicate that blood could be seen swirling inside them. We were surprised to find no record of their rupture in the literature, but such an event might be mistaken for rupture of the aorta itself. Dr. Norah Schuster (1955, personal communication), who noted them intact in two cases of coarctation at necropsy, was of the opinion that they might very easily be overlooked. Their common incidence at operation and the hazard they constitute are attested by Gross (1953).

These intercoastal aneurysms have all been clinically silent. Furthermore, they were not evident on x-ray examination, except in two of our cases where they indented the barium-filled oesophagus (Fig. 8). Angiocardiology also failed to outline them. In short, they are part of the occult threat of fatal vascular rupture that besets persons with coarctation.

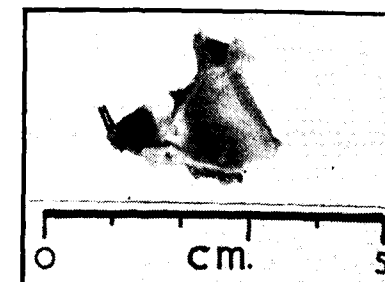


FIG. 7.—Photograph of resected aorta in Case 20. A thin-walled saccular aneurysm can be seen at the junction of an intercoastal artery with the aorta just below the coarctation on the right-hand side of the picture. The coarctation can be seen at the upper end of the specimen.



FIG. 8.—Chest radiograph with barium swallow (left lateral projection) in Case 10. The upper part of the oesophagus is displaced forward by the post-stenotic dilatation of the aorta immediately below the coarctation. Below this is another more sharply localized indentation of the oesophagus produced by an intercoastal aneurysm.

Intracranial Vascular Lesions

Cerebrovascular accidents occurred in three of our patients.

Case 2.—Male. Cardiac abnormality discovered at birth. 1944 (aged 25): complained of frontal headaches. 1947: "stroke" with hemiplegia, with almost complete recovery; coarctation diagnosed. 1949: resection of coarctation; before resection, average brachial blood pressure was 237/109; after resection average brachial pressure, during six years follow-up, was 180/103. No further cerebrovascular accidents.

Case 8.—Male. 1950 (aged 12): sudden onset of headache when diving into swimming-pool; meningism and impaired consciousness followed; brachial blood pressure 168/104; subarachnoid haemorrhage confirmed by lumbar puncture; good recovery. 1951: resection of coarctation. Followed up for five years—remained very well. Average brachial blood pressure: pre-operative, 165/105; post-operative, 138/75.

Case 22.—Male. 1953 (aged 17): classical spontaneous subarachnoid haemorrhage; slow recovery; resection of coarctation. During two years' post-operative observation remained well. Average brachial blood pressure: pre-operative, 203/111; post-operative, 145/82.

The brachial blood pressure in these three patients was higher relative to their age than in most of our cases, and doubtless was a factor in the aetiology of the intracranial lesions.

Hypertension

In all our cases the brachial blood pressure was elevated for the individual's age and sex above the average value expected in the general population (Stocks and Karn, 1924; Hamilton *et al.*, 1954). The elevation affected both the systolic and the diastolic pressure, except where the latter was lowered by aortic incompetence. The hypertension was usually moderate in degree, and it increased with age after the fashion of the blood pressure in the population generally (Hamilton *et al.*, 1954), but at a somewhat accelerated pace. Rapid rises in pressure or rapid deterioration of the patient from increasing hypertension were observed in only one patient (Case 7), a girl who, whilst under observation, developed papilloedema in association with unusually high levels of blood pressure.

Case 7.—In 1948, when aged 12, this girl was suspected of having rheumatic fever with carditis. Coarctation was discovered, but it was possible that active rheumatism was also present. Later, tuberculous gingivitis and cervical adenitis developed. In November, 1949, she could not see the blackboard at school. Bilateral papilloedema and one superficial retinal haemorrhage were present with arteriovenous nipping. Brachial blood pressure 200/125. Femoral pulses barely palpable, and femoral blood pressure not obtainable. September, 1950, retinopathy had not progressed. Blood pressure 190/130. Clinical urine tests normal. Effective renal plasma flow 278 and 415, and glomerular filtration rate 132 and 157 ml. a minute (duplicate measurements). Resection of coarctation with direct anastomosis carried out. Papilloedema subsided. Remained well during five and a half years' post-operative observation. Albuminuria noted in October, 1953, but not subsequently. **Present assessment:** Condition of optic disks consistent with healed papilloedema; no retinopathy; no albuminuria; renal plasma flow 268 and 344, and glomerular filtration rate 41 and 60 ml. a minute; no delay in femoral pulse peak; no palpable collateral vessels; average brachial blood pressure after operation 175/100 (before operation 190/130). The change in renal clearances suggests deterioration of renal function.

So far as we know, papilloedema has not previously been described in coarctation, and the hypertension existing in the upper parts of the body has not been reported to enter a malignant phase. Case 7 seems to be a unique exception.

The probable part played by hypertension in the production of intracranial vascular lesions in three of our patients has been mentioned, and this point and the aetiological role of hypertension in dissecting aneurysms are more fully discussed below. Apart from this, the hypertension of coarctation was remarkably well tolerated. Uraemia did not occur, and heart failure was found only in association with valvular defects of the heart.

Heart Failure

Congestive heart failure occurred in only two patients, but caused death in both.

Case F.—Male (Table I). Congenital heart disease was diagnosed at school, but he lived an active life until the age of 33, when dyspnoea and recurrent bronchitis began. He continued to work intermittently until aged 40, when nocturnal dyspnoea and oedema of the legs set in. Auricular fibrillation was then present and the heart was enlarged. The first heart sound was accentuated and there was an apical diastolic rumble; a systolic murmur with thrill was present at the base of the heart and an early diastolic murmur along the left sternal border. Blood pressure was 160/100, and the usual signs of coarctation were present. E.C.G. showed left bundle-branch block. He died at home (aged 41) a year later. No necropsy was performed. Clinical diagnosis: coarctation of aorta; aortic incompetence and probably aortic and mitral stenosis.

Case K.—Male. Heart disease known since childhood. There had always been some dyspnoea of effort. Pneumonia 1949 and 1952. On examination (1952, aged 55) gross cardiac enlargement, chiefly left ventricle. Loud systolic murmur at base; early diastolic murmur at left sternal edge; apical mid-diastolic murmur. Blood pressure 170/60. X-ray film showed calcified aortic valve and dilated ascending aorta. E.C.G. left ventricular hypertrophy. Heart failure imminent. Died at home

two months later. No necropsy. Clinical diagnosis—coarctation of aorta; aortic stenosis and incompetence.

Severe valvular lesions were present in both these patients, and presumably accounted for failure of the heart. Hypertension was not severe in either at the time of observation.

Natural History of Coarctation

The high incidence of serious events and ominous operative findings in our patients is in line with what is known of the natural history of coarctation. Necropsy series indicate that the majority of patients with the "adult type" of coarctation die before the fifth decade of life. Seventy-four per cent. of Abbott's (1928) collected cases (200 cases, including none under 3 years of age) and 61% of 104 additional cases collected by Reifstein *et al.* (1947) had not survived the 40th year of life. Such statistics, being derived from necropsies, may give an unduly gloomy impression; but, unfortunately, available clinical studies which should give a truer perspective are much less extensive.

Lewis (1933), Bramwell (1947), Campbell and Suzman (1947), Newman (1948), and Shapiro (1949) give clinical accounts of a total of 94 cases of coarctation, of which 27 were fatal. When death was from cardiovascular causes (excluding two patients who died after surgical operation), the average age at death was 33 years, and only seven had passed the 40th year. Where the ages of the remaining subjects were given, only six were recorded to have passed the 40th year of life.

The evidence is clear that many if not most patients with coarctation die before middle age.

Causes of Death

Although they may have no symptoms persons with coarctation live in danger. Vascular complications are often sudden and overwhelming, and may preclude effective treatment when they have set in; they challenge resection to prove itself prophylactic as well as anatomically corrective. The vascular complications are sometimes remote from the coarctation, and analysis of the mode of death, in its relationship to coarctation as the basic lesion, is of great importance.

The region of the coarctation itself is sometimes the seat of fatal lesions. In our cases, actually or potentially infective vegetations were found eight times. Excision of the coarctation should abolish the risks from this complication. However, infective endocarditis is more common than infective endoaortitis in coarctation. Of the 23 cases of one or other in the series of Reifstein *et al.* (1947), only six had endoaortitis without endocarditis, and the large majority of cases of the latter lesion had infection of bicuspid aortic valves. Since the same authors found bicuspid aortic valves in 42% of all cases of coarctation, it is obvious that a considerable part of the hazard from infection resides in this lesion alone, which would not be expected to be diminished by resection of the coarctation.

The other local lesion in reference to coarctation is aneurysm formation, which was found twice in the post-stenotic aorta and six times in the intercostals entering below the stenosis in our cases. One further case had a dissecting aneurysm with the initial tear just below the coarctation. In 5 of the 104 cases of Reifstein *et al.* (1947) rupture of the aorta had taken place beyond the coarctation. Abbott (1928) also found rupture in direct relation to the stricture in 5 of her 200 cases. Prevention of this complication may also reasonably be expected from resection and reconstitution of a full lumen.

Other vascular lesions are more remote from the coarctation. The initial tear in our other patient with dissecting aneurysm was located just above the aortic valve. It was situated in the ascending aorta in 19 of the cases of Reifstein *et al.* and in 33 of those of Abbott. The aortic valve was bicuspid in no fewer than 17 of the 33 cases reported by Abbott, and it is noteworthy that Gore (1953) found bicuspid aortic valves in 9 out of 32 cases of dissecting aneurysm in persons aged under 40 (in these it was asso-

ciated with coarctation only once). The initial tear was in the ascending aorta in the great majority. By contrast with coarctation Gore found that hypertension was exceptional in cases of dissection under the age of 40 though the rule after that age, and concluded that the elevated blood pressure exploits the weakness of primarily diseased or abnormal vessels, though it might also aggravate the degeneration of the media which underlies dissection.

Intracranial vascular lesions occurred in three of our cases. Subarachnoid haemorrhage was proved in one. The high incidence of intracranial aneurysms of the congenital type is well recognized in coarctation (Abbott, 1928), and rupture of these appears to constitute the main hazard from intracranial lesions, though cerebral thrombosis may also occur. Reifstein *et al.* (1947), reporting 11 cases of intracranial lesions among their 104 necropsied cases, found no instance of cerebral haemorrhage that had not originated in an aneurysm, either "congenital" or mycotic. Hypertension is provocative of rupture of these aneurysms, but rupture may occur also in normotensive persons (Taylor and Whitfield, 1936; Magee, 1943; Walton, 1952; Stehbens, 1954).

Hypertensive heart failure did not occur in our cases, although hypertension, by adding to the load placed on the left ventricle by aortic valve disease, may well aggravate failure. The great majority of the patients of Reifstein *et al.* and of Abbott who had heart failure also had other cardiac lesions, but Abbott remarked that there was a relatively small group in which coarctation and the relatively small changes in the circulation that arise from it had secondary changes in the circulation that arise from it had apparently been the essential factors in the cardiac strain. It is in early childhood, possibly before the collateral circulation is well developed, that the heart most often fails from the hypertension of coarctation (Mustard *et al.*, 1955), although even at this time there are often associated lesions such as persistent ductus arteriosus and endocardial fibrosis. Reduction of the blood pressure can be expected to prevent some of the complications that occur at a distance from the coarctation, and this reduction is one of the chief aims of resection.

Pregnancy

The risk of rupture of the aorta in patients with coarctation is commonly believed to be increased by pregnancy. Mendelson (1940), reviewing the literature, cited 31 cases of pregnancy in patients with coarctation; dissecting aneurysm had occurred in two patients. Ten of our patients had one or more pregnancies, and their obstetrical histories were of interest. Three of these patients did not have surgical treatment; one had had five and another had had four full-term deliveries without incident; the third patient had two pregnancies, both terminated at term by elective caesarean section. Six patients had had pregnancies before being referred for surgery—two had had one pregnancy; three had had two pregnancies, and one had had three full-term normal deliveries before resection.

The indications for therapeutic abortion were the fear of rupture of the aorta rather than actual deterioration of the patient. Blood-pressure measurements showed a lowering of the pressures in the middle trimester; there was usually a rise of pressure in late pregnancy and during parturition. This corresponds with the findings of Dixon and Hartley (1955).

Our experience of pregnancy in coarctation is too slight to permit conclusions of a general character; but clearly, while great care in management is required, pregnancy can be brought to a successful conclusion in many cases. Two of our patients have had normal pregnancies and deliveries following resection of the aorta.

Physical Signs

Some of the most important signs in the assessment of patients may be mentioned.

Habitus.—The development of stature was retarded in many cases. The lower limbs were underdeveloped, the

pubis-to-ground measurement was short, whilst the upper parts of the body were particularly well developed and sturdy, and span exceeded height—in one case by as much as 5 in. (12.5 cm.). Disproportion was most pronounced in two patients in whom the aorta was completely interrupted by an imperforate diaphragm.

"Carotid Swell."—The augmented carotid pulsation was very characteristic, and of itself suggested the diagnosis. A sustained systolic arterial wave or "swell" appears in the suprasternal fossa and travels outwards along the subclavian arteries and up the carotids, where it is best observed.

Collateral Arteries.—These were most often found around the scapulae, but examination of the intercostal spaces, the axillae, and the posterior triangle of the neck sometimes revealed them. Such enlarged anastomotic arteries were found in 42 of our cases. They were absent in 10 patients, whose ages were 3, 5 (two cases), 7, 10, 18, 19, 25, 30, and 36 years. Thus their absence was not explicable by youth of the patients, nor did it correlate with the disproportion in habitus.

Murmurs

Systolic murmurs are a feature of coarctation. The precordial systolic murmur was often nondescript, but a characteristic murmur occurred in many cases: loudest at the sternal borders, its onset separated from the first heart sound by a brief silent interval, it slowly reached maximum intensity and declined through the second heart sound into early diastole. Distinct from this, in nine cases which came to surgery there was a loud rough systolic murmur at the base, accompanied by a basal systolic thrill in six. In the other three, a thrill was not palpable over the praecordium but only over the carotid arteries. These murmurs suggested aortic stenosis, but for lack of corroboratory signs in the other seven this diagnosis was made in only two cases. The systolic gradient across the aortic valve was measured in these two cases; in one it was 20 mm. and in the other 10 mm. These gradients suggested mild stenosis, and aortic valvotomy was not attempted. Post-operatively, their murmurs were unchanged. Of the remaining seven cases, one came to necropsy and the aortic valve was bicuspid with somewhat thickened leaflets; three others had no murmurs at the base of the heart after operation, and three had fainter murmurs without thrills. It will be recalled that in one patient, who did not have surgery, a clinical diagnosis of aortic stenosis was made and calcification of the aortic valve was seen on x-ray examination.

Subaortic stenosis is known to occur in association with coarctation (6% of Abbott's cases), but our experience here indicates caution in making this diagnosis from the precordial signs alone. From the post-mortem findings in one case it is tempting to ascribe these rough basal systolic murmurs to bicuspid aortic valves, but their diminution after operation seems to indicate that they had included a component from the coarctation or the collateral arteries. We would therefore prefer to underline the difficulty of their interpretation (Smith and Matthews, 1955). One patient (Case 27) had a loud pansystolic murmur maximal in the third left intercostal space, thought to be due to a ventricular septal defect.

Over the upper dorsal spine, and sometimes widely conducted up and down, there was a prolonged murmur, again of late onset with reference to the first heart sound and continuing well into cardiac diastole. A murmur of similar character and timing could occasionally be traced to its origin in a superficial anastomotic artery and be caused to disappear by digital occlusion of this vessel.

The delayed dorsal interscapular systolic murmur may arise in the coarctation itself or in dilated and tortuous intercostal and anastomotic vessels. In one instance a thrill felt at operation on a patient with a complete stenosis appeared to be caused by blood entering the distal aorta from the intercostal arteries. These murmurs are heard in the majority, and their site is a rough guide to the site of the coarctation. When the coarctation is at the usual site the murmur is loudest between the scapulae in the

Operative Findings

In all cases the coarctation was of the classical "adult" type. Dissecting aneurysm of the aorta was present in one case, non-dissecting post-stenotic aneurysm of the aorta in two cases, and berry aneurysms of the intercostals in six cases. These last usually lay at the origin of the first or second pair of intercostal arteries beyond the coarctation, but occasionally were seen more peripherally. They were very thin-walled and easily damaged. Their origin from the aorta was often unusually large, in some cases measuring 2-3 mm. in diameter. Histologically the walls of these dilated intercostals were often deficient in muscle and elastic tissue, and in places were composed solely of intima and adventitia. They were dealt with either by ligation or by suture at their point of origin from the aorta. The ductus arteriosus was patent in five cases (Nos. 1, 17, 26, 29, and 31), widely in two and admitting only a fine probe in the others; in all it entered just above the coarctation. The left subclavian artery entered the narrow segment in one patient; at its point of entry its lumen measured 4 mm. and the artery was narrow from aorta to its first branch, where it abruptly widened to normal size. (The pre-operative brachial blood pressure was 210/105 in the right arm and 170/115 in the left arm.) In one patient the left subclavian artery arose so close to the coarctation that the origin of the artery was included in the anastomosis (see diagram, page 380). Vegetations as previously described were found on the interior of the resected aorta in eight cases.

Post-operative Course

The immediate post-operative course was uneventful in most cases. The death of one patient six hours after operation from rupture of a suture has been mentioned. Post-operative haemorrhage of severe degree occurred in two other cases but stopped spontaneously after transfusion.

In the majority of cases the blood pressure in the arms was near pre-operative levels in the immediate post-operative period for about 24 hours; it showed marked fluctuations, but gradually fell during the subsequent week or so to a lower and more stable level. Hypertensive crises have not been encountered. Cases with aortic valve lesions did not behave differently from the others.

In five cases abdominal pain in the post-operative period was severe enough to cause concern. In two cases it began on the fifth and in two others on the eighth post-operative day, was severe and colicky, and referred to the mid-abdomen but without localizing signs. In all four the pain subsided after several days. In the fifth case the pain was accompanied by a massive ascitic effusion. Resolution rapidly followed the removal of 2 litres of clear fluid. Price Thomas (1955, personal communication) has had similar experiences, and the signs demanded a laparotomy in an early case; the only abnormality seen was a little free fluid, mesenteric adenitis, and marked engorgement of the mesenteric vessels. Bowel function had not been disturbed in any of our patients, nor has there been any evidence of intestinal haemorrhage. There has been no evidence to suggest that the condition is due to mesenteric embolism.

Chylous fluid continued to drain from the left chest in one patient for several days after operation. The thoracic duct bears a close anatomical relationship to the aorta, and was doubtless damaged in the dissection. Cardiac tamponade occurred about a week after operation in one case in which the pericardium had been opened and pressure readings recorded from the left ventricle. Repeated aspiration of the pericardium was necessary for a few days, but the condition then subsided.

There have been no late complications in this series, but it has been our practice to delay ambulation for three weeks after operation and to restrict activities generally during the first six months.

Results of Operation

Mortality.—Three patients died. Two of these have already been noted: Case 19 had a dissecting aneurysm of the aorta, and the operation was advised as a desperate resort. In Case 6 death occurred six hours after operation from haemorrhage from the aorta due to rupture of the suture line. The third death, that of a woman aged 30 (Case 5), occurred suddenly five weeks after operation while she was in a convalescent home. At necropsy it was found that the suture line had parted and haemorrhage had taken place through the aperture in the aorta. Histologically, the aorta showed a cellular infiltration which suggested a low-grade infective process. These last-mentioned cases were the fifth and sixth of our series. It is well known that the mortality rates in any one clinic decrease with experience, and a mortality rate of less than 10% may now be anticipated in practised hands.

Follow-up.—The remaining 37 cases have been followed up after operation for periods ranging from three months to eight years, and all have remained in good physical health. Those patients who had symptoms from organic complications before operation have had no recurrences. Symptoms of cardiac anxiety states were alleviated in most of the cases in which they had been present pre-operatively, but were unchanged in three cases and worse in two. Both the latter had long-established neuroses, and one was a long-standing case of hysteria. Those patients who had syncopal attacks before operation had no recurrences after, but one patient developed occasional episodes for the first time post-operatively. No organic cause for them could be found.

Physical Findings During Follow-up.—The arterial pulsation in the neck always diminished. The femoral pulse increased in volume to within normal limits in all cases. The peak of the femoral pulse wave was reached either before or synchronously with the peak of the radial pulse in all but two cases. These findings were checked by arterial pulse records in 10 cases. Collateral arteries were no longer palpable. The murmurs were altered in all patients. The systolic murmur over the upper dorsal spine became fainter, but in only one case did it disappear completely. Its genesis and the significance of its persistence have been discussed above; it continued to be heard in cases that gave eminently satisfactory results on all other counts, and it could not therefore be used to assess the adequacy of aortic reconstruction. Otherwise the alterations in murmurs were as would be expected: the precordial systolic murmurs became faint, the early diastolic murmurs of aortic incompetence generally did not alter, and the mid-diastolic murmurs were less frequent. Only the apparent evolution *de novo* of aortic diastolic murmurs after operation in two cases was noteworthy.

Blood Pressure

The brachial blood pressure was reduced by the operation. The change was studied in detail in the first 20 patients in our hospital series, who were followed for three months or more after operation, and has been separately reported (Counihan, 1956). Both pre-operatively and post-operatively the brachial blood pressure fluctuated considerably, but the average of the post-operative pressures was lower by 32 mm. systolic and 16 mm. diastolic than the average of the pre-operative ones for the group. Statistically this fall is highly significant, the probability of its occurrence by chance being less than 1 in 1,000. However, the post-operative average brachial pressures were higher than the expected average pressures for the age and sex—that is, the pressures remained higher than normal.

No relationship was found directly between the amount of fall of pressure and the diameter of the aorta measured at the site of anastomosis. However, the amount by which the post-operative brachial pressure exceeded the expected average for the normal individual was apparently related

to the degree of deviation from uniformity in calibre of the reconstructed aorta, so far as systolic pressure was concerned, but not diastolic. The greater the restriction of the aortic diameter the more abnormal the systolic pressure. But even when uniformity was attained in the diameters of the reconstructed aorta the blood pressure remained higher than the expected normal.

The evidence that the residual hypertension was not due to the incomplete restoration of the aortic lumen in the cases studied is, first, all collateral vessels disappeared; secondly, the delay in the femoral pulse peak was abolished; and, finally, the femoral systolic blood pressure was at least as high as the brachial. The measurement of the femoral as high as the brachial. The measurement of the femoral blood pressure by auscultation may be open to some inaccuracy, but from our figures after operation the femoral pressure, like the brachial, was above normal.

Many authors have found a generalized increase in the peripheral vascular resistance in coarctation. Furthermore, the fact that post-operative brachial pressures remained above the expected average for age is in harmony with the persistence of long-established hypertension after removal of a phaeochromocytoma or a diseased kidney. When a hypertensive agent has been acting for a sufficiently long time it appears that the blood pressure may become permanently set at high levels. We noted a tendency to a greater fall in the younger subjects than in the older; and, of course, the percentage fall has been greater in young subjects because their initial pressures were lower.

The three patients who had cerebrovascular accidents have had no recurrence and are in excellent health after a post-operative follow-up of 6½, 4½, and 2 years. The average post-operative blood pressure was in each case lower than the average pressure before operation. The reductions in the average pressure were 54 mm. systolic and 5 mm. diastolic in one case, 20 systolic and 25 diastolic in another, and in one case, 20 systolic and 29 diastolic in the third, leaving these subjects with average pressures close to but somewhat above the expected average for their respective ages. In the one patient in whom papilloedema had been present it regressed after resection.

The Cardiogram.—When the cardiogram had shown evidence of left ventricular hypertrophy it was exceptional for it to return to normal; it did so in only three cases and showed a change towards normal in one other.

X-ray Appearances

The size of the left ventricle was unaltered in almost all cases. It appeared smaller in four but larger in one. The aortic arch retained a double contour in four, but was smaller in one of these. Aortic dilatation regressed except in one case in which the arch remained prominent. Where noted before operation, posterior oesophageal displacement disappeared except in two cases in which it remained substantially unchanged.

Rib-notching usually remained unchanged, although in one youth (Case 22) there has been marked regression.

Angiocardiography has been carried out post-operatively in only two cases, 9 and 20 months respectively after operation. One patient (Case 13) had an eroding post-stenotic aneurysm excised and grafted. The pre- and post-operative angiograms are shown in Figs. 5 and 6. In both of them the appearances of the aorta were satisfactory. The angiograms of these two patients indicate that the reconstructed aortic lumen remains fully patent.

Discussion

Full assessment of the place of resection awaits a longer follow-up than is possible at present, but the encouraging results, so far, make a discussion of policy fruitful.

It has been shown that when organic symptoms occur in a person with coarctation serious complications have probably already developed. These may be remote from the coarctation (such as subarachnoid haemorrhage) or they

may occur locally (post-stenotic or intercostal aneurysms) and clearly indicate resection.

More often, however, the coarctation is accidentally discovered in a symptomless person, in whom the indications for surgery are less clearly defined. Investigations may reveal that trouble is afoot and that resection is desirable. But the finding of unsuspected vegetations and of thin-walled intercostal aneurysms at operation forbids complacency when investigations have been negative. Watching and waiting may end in disaster, with the occurrence of a vascular catastrophe. Alternatively, anxiety states are prone to develop during the waiting period. We believe that it is advisable to come to a decision without undue delay.

The menace from lesions in the neighbourhood of the coarctation has been successfully dealt with by resection in our cases. The occurrence of some of the more distant complications has been shown in this paper to depend, at least in part, on the hypertension. The reduction of this by resection has been demonstrated by detailed analysis of our first consecutive 20 cases that have been followed up for three months or more after operation. Our cases suggest that closest approximation to normal pressures is obtained in those patients in whom a uniform aortic lumen has been achieved, even though these pressures still remain above normal levels. It must be the surgical aim, therefore, to reconstruct the aorta with the maximum possible diameter. Marked residual constriction should be avoided by the use of grafts. The demonstrated fall in pressure does not seem to be large, but it should be noted that the figures refer to the average values of many pressure measurements taken at rest. They both reflect a constant lowering of the pressures and reveal the possibility that greater reductions have occurred in the blood pressure during daily activity as compared with levels obtaining before operation, since the blood pressure is said to rise excessively on effort in unresected coarctation (Gross, 1953).

Our three patients who had suffered from intracranial vascular accidents before resection had no recurrences afterwards. In the one in whom hypertensive neuroretinopathy had appeared, it regressed after operation.

Conclusion

The mortality of the operation is now small and the results have been satisfactory. The brachial blood pressure has been lowered towards normal. Post-operative cerebrovascular accidents, bacterial infection, aortic aneurysm, and heart failure have neither occurred nor recurred.

These are reasons for confidence that the bad prognosis for life carried by coarctations has been improved by operation, though this will be proved only by long follow-up.

The pros and cons of operation may be summarized as follows:—In favour: (1) the improbability of surviving past middle age; (2) the insidious or sudden nature of serious or fatal complications, such as aneurysms, endoarteritis, and cerebrovascular accident; (3) the reduction of blood pressure after operation; and (4) the low operative mortality. Against: (1) the difficulty of judging the risks to life in any individual patient; (2) the uncertainty that resection will prevent the onset of serious complications; and (3) the reluctance to submit a symptomless individual to a major operation of a prophylactic nature.

Serious consideration of this difficult problem has led us to believe that the pros outweigh the cons. Consequently we have recommended resection in all our cases below the age of 40 unless contraindicated by the presence of severe associated cardiovascular anomalies unlikely to be affected by the resection.

The ideal time for operation is before adolescence, because then the vessels are healthier and local vascular complications are less common. In addition, the likelihood of obtaining normal post-operative blood pressures is probably greater in the younger individual. Also, thoracotomy is

tolerated better by the young and anxiety states are unusual at this age. We believe, too, that a relatively serious operation of election should be carried out before the individual has acquired responsibilities and dependants.

Summary

Fifty-two cases of aortic coarctation have been studied.

A review of the literature and of our 12 unoperated cases emphasizes the poor prognosis in the untreated case.

Forty patients were submitted to operation.

Symptoms and physical and radiological signs have been evaluated before and after operation.

A surprisingly high incidence of unexpected local complications was encountered at operation, owing possibly to the preponderance of adults.

Three deaths occurred in the surgical series.

Satisfactory clinical results were obtained in the surviving patients, who have been followed up for from three months to eight years.

The brachial blood pressures have been reduced in all cases.

The factors influencing the post-operative blood-pressure levels have been discussed.

The indications for operation have been evaluated.

We are grateful to the many physicians who have so kindly referred cases to us, and especially to Dr. Paul Wood and Dr. Terence East for allowing us to quote patients who have been under their care before and after operation; to Dr. Wallace Bridgen, who most kindly allowed us to reproduce the pre-operative angiogram of Case 13; and to Professor J. McMichael, who gave valuable advice and criticism. We are also indebted to Mr. L. L. Bromley for permission to quote his operative findings in three patients. Finally, we must record our indebtedness to Sisters Anderson, Bowtle, and Prior for their invaluable and unstinted work in the wards and theatre.

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SURGICAL TREATMENT OF CHILDREN WITH COARCTATION OF THE AORTA

BY

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Each advance in cardiovascular surgery increases the need for careful selection of patients suitable for operation. It is particularly difficult to come to a correct decision about cases of aortic coarctation because the disorder is compatible with a long and active life. Moreover, operation is not without risk, it does not always relieve hypertension, and even when the result seems at first to be successful an aneurysm may form at the line of anastomosis.

The difficulty is aggravated because when coarctation is first diagnosed it is usually impossible to predict the course of the disease, and, although undoubtedly some patients may be destined to attain a ripe old age, others will die before their due time. Sometimes death is sudden and without warning when the aorta or some smaller artery, such as one of those at the base of the brain, bursts under the strain; at other times death comes slowly when the heart fails or superimposed subacute bacterial infection proves resistant to treatment.

It might be possible to get a better idea of the likely outcome for the individual if the natural course of the untreated condition could be studied in a sufficiently large group of patients. But this again presents a problem, for during life the disorder must sometimes elude discovery, and after death, unless this occurs in hospital or is reported to the coroner, the body is unlikely to be examined by a pathologist. Probably many people with aortic coarctation die at home and are certified as having had hypertensive heart disease, myocardial infarction, or apoplexy. We recognize that these factors must make figures inaccurate and may lead to false conclusions. Nevertheless the selection of patients for operation will depend on criteria determined by experience, and we therefore record our experience of coarctation at the Birmingham Children's Hospital between July, 1950, and July, 1955.

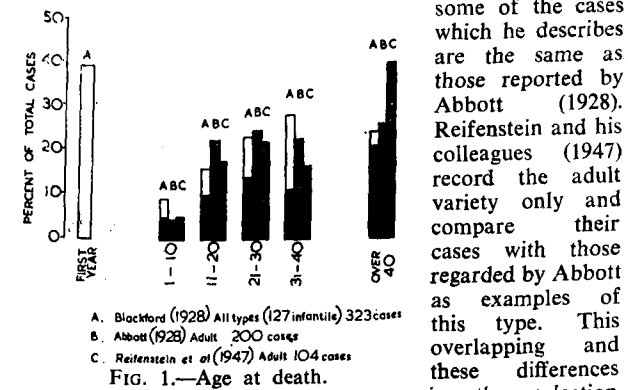
Mortality

During these five years 30 infants (16 girls, 14 boys) died more or less directly as a result of coarctation, 17 within a week of birth, 8 within a month, and 5 within six months. Cases grossly complicated by associated defects have been excluded from this series. There was no record of a death from coarctation in an older child up to the age of 14, but we know of two deaths amongst adolescents with the disease. In this same period we saw at the hospital 22 children (14 boys, 8 girls) with coarctation, 21 of whom still survive.

It is impossible not to be impressed by the proportion of deaths occurring in infancy, especially in the first month. Fig. 1 (left-hand open column and solid columns marked A) shows that more than a third of Blackford's (1928) series of 323 cases of coarctation died in infancy. Most of these early deaths are associated with the infantile type of coarctation, but this is by no means invariable, and in our series one of the infants who died and one of the babies who have been operated on had the adult type of disease. Further, the infantile type of coarctation does not necessarily cause early death: four of the older children had a long narrow segment of aorta proximal to the origin of the ductus

arteriosus, and in three of these the ductus remained patent. Moreover, it is quite possible to operate successfully in these cases. For these reasons we shall not regard our patients as belonging to two entirely different anatomical groups.

There are reports of three large series of cases in which coarctation was found at necropsy. Blackford (1928) includes both the infantile and the adult varieties in his review;



of material make it difficult to compare the three series. However, if infant deaths are excluded from Blackford's series it can be assumed that almost all the remainder are examples of the adult type of coarctation. In Fig. 1 deaths in each decade are recorded as a percentage of all cases in the particular series—A, B, or C. Deaths occurring in infancy are represented in the single open column on the left of the figure. The remaining five triple columns form a pattern which gives an impression of the outlook for older individuals with coarctation.

If columns A and B are compared with columns C the figure shows that the prognosis has improved since antibiotics reduced the mortality of endocarditis and pneumonia. Nevertheless the general trend remains much the same now as it was in 1928. If a child with coarctation survives the perils of the first 12 months he is unlikely to die before he is 10, but he has a poor (1:3) chance of reaching his forties; indeed, he cannot lightly dismiss the possibility of dying before the age of 20. The figure does not show that only about 25% of these patients succumb to incidental illnesses, of which the most important is pneumonia, a condition to which these patients seem to be particularly susceptible. For most of the remaining 75% death, no matter when it comes, is likely to be the result, directly or indirectly, of hypertension.

Diagnosis

Uncomplicated hypertension is usually regarded as a disease without symptoms, and it is not surprising that children with coarctation should be unaware of a handicap. Yet parents are unanimous about the change wrought by successful operation. This may be because a patient who has gone through a serious operation does not like to admit that he has failed to benefit, or it may be that symptoms are recognized only after they have disappeared. Five children spoke of relief from headache, and this had been severe enough to prevent one athletic boy from playing rugby. Eight children found that they were not so easily exhausted, and this increase of energy was readily measured in two children who before operation had been regarded as lazy because they so easily gave up trying, but afterwards were able to compete successfully with an unaffected twin. In three children chest pain disappeared. The presenting symptom in 7 of the 22 children was pulmonary, and 14 had had repeated attacks of really severe bronchitis or pneumonia.

The diagnosis was seldom in doubt. A small, absent, or delayed femoral pulse was the most valuable sign of coarctation; there was great difficulty in recording the leg pressure by auscultation. The collateral circulation was

less obvious in children, and rib notching, though once doubtfully present in an infant, could not usually be recognized with certainty until about the age of 6. Murmurs could always be heard, and it was this which first brought nine of the children under observation. Most commonly, murmurs were systolic and loudest high in the chest; sometimes an aortic diastolic murmur could be heard. Murmurs could often be heard close to the spine, and no fewer than six children had systolic and mid-diastolic murmurs at the apex of the heart. These apical murmurs tended to persist after operation, and, as most of the children were too young to have acquired mitral stenosis, the sign may have been evidence of associated endocardial fibrosis of the mitral valve. There was no recognizable enlargement of the left atrium. All showed arterial pulsation in the suprasternal area.

Electrocardiographic findings varied considerably. Minor degrees of left ventricular preponderance were seen, but more usually were absent, and one child of 10, with an adult type of coarctation, had right ventricular preponderance. Several children had an increased pulmonary artery pressure, possibly secondary to bronchitis.

X-ray screening often provided confirmatory evidence of coarctation, but without doubt angiocardiology provided the most valuable information. In children good results are obtained from both intravenous and retrograde aortic injections, making it possible to study not only the position and nature of the coarctation but also the anatomy of the aortic branches and the collateral circulation, as well of the ductus arteriosus if it is patent.

From the technical point of view only one case was unsuitable for operation—a 6-year-old boy whose coarctation lay between the innominate and left common carotid arteries. The infantile type of coarctation was not considered unsuitable.

Surgical Considerations

In the period under review most of our experience was with older patients, and the chance to operate on 11 children under the age of 14 provided an opportunity to contrast the technical problems in the two groups. The resection of an adult type of coarctation in children is a far simpler problem than it is in adults; the collateral circulation is less formidable, so that entry into the thorax is easier; the exposure is better because of the ease of rib-spreading and the more elastic nature of young tissue generally. The aortic wall is free of sclerosis, and troublesome berry aneurysms have not yet formed on the intercostal vessels; we have seen these aneurysms in patients as young as 15. Once the coarcted area has been excised there is rarely difficulty in approximating the proximal and distal ends of the aorta prior to suturing. Except in one instance the ease of surgery has been notable.

Type of Anastomosis

Undoubtedly the best operation is an end-to-end anastomosis following an adequate resection of the coarcted area, so that a really wide channel exists, approaching or equalling the calibre of a normal aorta. The technique of the operation has been notably simplified by the invention by Dr. Potts of a multi-toothed, narrow-bladed aortic clamp. Had these clamps been available it is probable that one of the two subclavian aortic anastomoses mentioned below would not have been substituted for an end-to-end anastomosis. In all the patients the lower segment was wider in calibre than the upper segment—the post-stenotic dilatation so well described by Holman. To overcome this disparity in size the upper segment was cut obliquely so that its lumen approximated in calibre to that of the lower one.

Subclavian aortic anastomosis had to be used in two patients; but, clearly, the operation should be regarded only as a substitute for the better end-to-end anastomosis.

In the first case, after a long and difficult dissection and end-to-end anastomosis, the lower aortic segment developed a linear tear an inch (2.5 cm.) in length. This was repaired, but further severe bleeding from the anastomosis required

a rapid suture of both ends. The boy's condition became critical and the operation was abandoned. Three weeks after this disaster the blood pressure was 240/170 and he complained of intractable headache; the chest was reopened and a large subclavian artery was divided, turned down, and anastomosed end-to-end to the lower aortic segment. Recovery was rapid, and five years later he was well, with a normal blood pressure.

In the second case the stenosed area reached so high up to the arch that only an aortic graft or a subclavian aortic anastomosis would have been possible. Grafts were not available at that time and the subclavian artery was therefore used: the result has been perfect.

It may be said here that, though aortic homografts may be essential in adults, their use in children may not be without future danger, because of the risk of calcification and failure to grow with the child.

When there was a persistent ductus arteriosus in addition to aortic coarctation it proved possible to excise the coarctation, to close the ductus opening into the pulmonary artery, and to obtain a good end-to-end aortic anastomosis (Fig. 2).



FIG. 2.—Coarctation and persistent ductus arteriosus. The tapes are round the aorta above and below the ductus. The aorta shows post-stenotic dilatation.

In assessing the results there can be little doubt that the bigger the calibre of the anastomosis the quicker and more outstanding is the effect on the blood pressure in the upper and lower limbs.

Results of Operation

Whilst eight children have benefited from operation, one infant died, another improved only temporarily, and an older boy has deteriorated after operation.

The published figures and our experience agree that if a baby with coarctation develops symptoms of heart failure before the age of 6 months and fails to respond rapidly to treatment he is unlikely to survive more than a few weeks. In view of this we decided to operate on two infants, one of whom died shortly afterwards.

A male infant aged 2 weeks was admitted to hospital with convulsions and found to have pneumonia with coarctation and congestive heart failure. Blood pressure: arms, 150/90; legs, 0. An enlarged heart, a loud systolic murmur, large pulmonary arteries, and congested lungs suggested associated septal defect. The diagnosis was confirmed by venous angiogram and retrograde aortogram. Oedema, hepatic enlargement, and tachycardia persisted after treatment of pneumonia. The condition deteriorated. Operation: Age 7 weeks; adult type of coarctation resected and end-to-end anastomosis performed. Ductus arteriosus found to be closed. Post-operative respiratory failure with pulmonary oedema, attacks of cyanosis, and convulsions. Death occurred during attack of vomiting 36 hours after opera-

tion. Necropsy: Heart large (56 g.); hypertrophy of both ventricles, small ventricular septal defect, dilated pulmonary artery. Aortic anastomosis satisfactory. Trachea and main bronchi contained vomitus.

The second infant also developed symptoms of heart failure.

A baby girl aged 7 months was admitted with bronchitis and with deformities suggestive of Turner's syndrome. Blood pressure: arms, 160/90; legs, 0. Heart enlarged. Faint basal systolic murmur. Coarctation of the aorta of adult type confirmed

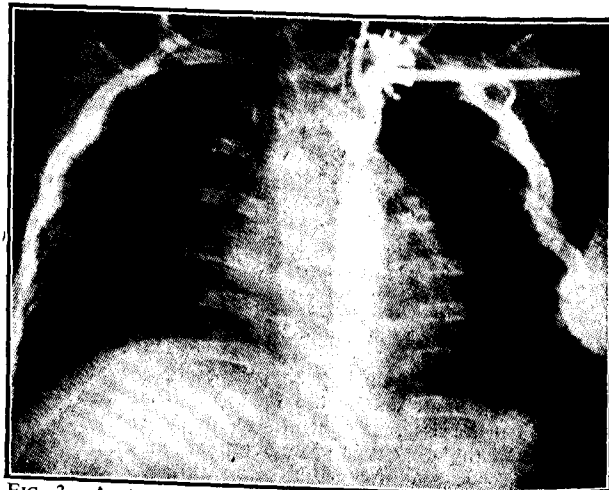


FIG. 3.—Aortogram showing post-operative stricture formation.

by angiography. Operation: Age 9 months; because of increasing oedema and hepatic enlargement. Resection and end-to-end anastomosis. Resected segment showed pin-hole opening and post-stenotic dilatation. Post-operatively, arterial pulse felt at groin, but blood pressure did not fall. In next few weeks femoral pulse gradually faded and disappeared. Retrograde aortography two months after resection showed that stenosis had recurred (Fig. 3). Blood pressure in arm five months after operation, 200/120 (dotted lines, Fig. 4).

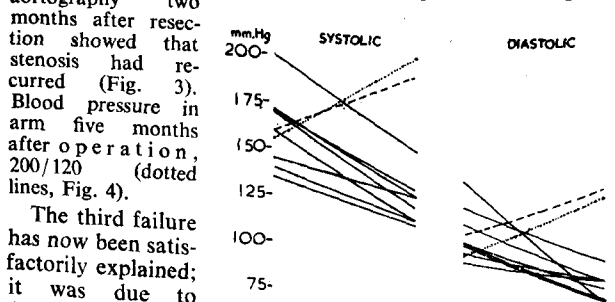


FIG. 4.—Blood-pressure records before operation and at time of discharge from hospital after operation.

A boy aged 10 years. Coarctation of the adult type. Delayed femoral pulse. Blood pressure: arms, 165/100; legs, 140/110. No history of nephritis. Blood urea 80.6 mg. per 100 ml.; renal function—slightly impaired ability to concentrate (1020) and dilute (1004). Urine: no albumin or casts. As blood pressure was rising it was suggested that operative treatment might be followed by at least a partial improvement. Operation: Resection of adult type coarctation; end-to-end anastomosis. Post-operative condition satisfactory with good femoral pulse, but no influence on blood pressure. Follow-up: Blood urea fell to normal, but arm blood pressure rose steadily to 190/128 (dashed lines, Fig. 4).

The renal condition did not appear to be responsible for this failure because, in spite of the pre-operative findings, blood urea and urine became normal. The collateral circulation was well developed, and the femoral pulse was easily felt, though delayed, both before and after operation. An angiogram showed that there was some narrowing of the aorta at the operation site, and direct brachial and femoral artery blood-pressure readings show that the hypertension is confined to the upper part of the body. This boy has been operated upon again using a human graft.

The remaining eight children improved. This was demonstrated by the comments of the parents. Increase in exercise tolerance was pronounced, and one child climbed Snowdon within a year of operation, a feat which she could not previously have attempted. Her greater capacity for exertion was due in part to easier breathing, but more to a greater power in her legs. As her mother put it, "Her legs are twice the size." Four children noticed that their feet were no longer cold, and three of them were relieved of cramps.

The most readily measurable criterion is the effect on blood pressure. Before operation the 11 children showed only slight fluctuations in blood pressure, and 11 controls (identical except that they had not been treated surgically) have shown a slight increase of pressure during the period of observation. The effect of resection is shown in Fig. 4, where immediate pre-operative pressure is compared with the post-operative pressure. The two cases treated by subclavian aortic anastomosis showed improvement in every way comparable to that from an end-to-end aortic junction.

In successful cases the blood pressure not only fell immediately but continued to fall for some weeks after operation. This can be demonstrated by comparing the blood pressure at the time of discharge with that recorded when the patients were last seen (Fig. 5). The finding encourages the hope that improvement may be permanent in most of these children.

What happens at the site of anastomosis is uncertain, but the continued fall of blood pressure is presumptive evidence that in older children the junction usually grows with the child. We have not seen an aneurysm develop, and we imagine that it is less likely to happen in the relatively healthy tissues of a child's aorta than in the degenerated vessels of an adult. On the other hand, post-operative stricture has occurred in two patients. In one of them, an infant, the stenosis formed quickly and completely after an entirely satisfactory re-

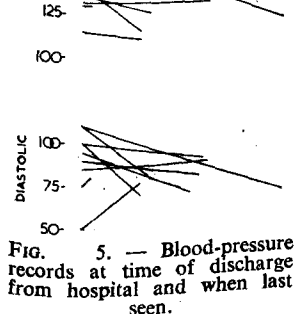


FIG. 5.—Blood-pressure records at time of discharge from hospital and when last seen.

section and a good anastomosis. It is difficult to avoid the impression that some inherent quality of the infant's aortic tissue played a part in the recurrence. In the older child stenosis was less severe and developed less rapidly.

The cause of the hypertension in coarctation remains a matter of controversy. When circumstances made it necessary to occlude the descending aorta for several days in a child who had well-developed collateral channels, the blood pressure in the arms rose from 145/110 to 240/170. It fell again immediately after a successful operation ten days later. The blood pressure remained high in both patients who developed post-operative stenosis. These observations suggest that a purely mechanical factor plays a considerable part in the hypertension, but the progressive, less spectacular, fall of blood pressure which follows the immediate improvement points to a gradual reduction of vascular tone, and perhaps may be due to a falling concentration of pressor substances in the circulating blood.

Impressions

Coarctation seems to be potentially a dangerous disease, and for any individual patient it is difficult to predict the future. When a baby with coarctation has symptoms of heart failure, and when this failure shows no response to a medical treatment, he is unlikely to survive more than a few months unless treated surgically: the only post-operative death in this series occurred in an infant previously in heart failure. During the rest of the first decade a child with coarctation appears to be comparatively safe, but the hazard

to life seems to increase greatly after puberty. Operation has seemed to us to be easier and safer in children than in adult subjects, and has usually been followed by a fall of blood pressure which has been progressive over a period of several weeks. Stricture formation may follow operative treatment; it is likely to have more serious consequences in infancy, and on present evidence, therefore, we feel that the best age for operating on cases of coarctation is the second half of the first decade. Earlier operation may be essential when there have been symptoms of heart failure or of subarachnoid haemorrhage.

Summary

Evidence is presented to show the prognosis of coarctation of the aorta. If a baby has coarctation and symptoms of heart failure, and if the failure is slow to respond to medical treatment, death is probable within the course of a few months unless treated surgically.

During a period of five years at the Children's Hospital, Birmingham, 30 infants died from coarctation within six months of birth. During the rest of the first decade a child with coarctation appears to be comparatively safe, but the hazard to life increases again at puberty and the chances of reaching the age of 40 are poor. Operation has proved easier and safer in children than in adult subjects, and has usually been followed by a fall of blood pressure which has been progressive for a period of several weeks. Stricture formation may follow operative treatment: two examples of this are given. We believe that the second half of the first decade is the best time to operate on cases of coarctation.

We thank our colleagues for referring patients to us, Dr. H. S. Baar for post-mortem reports, and Dr. Roy Astley for his constant help.

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OUTBREAK OF FOOD-POISONING FROM BREAD MADE OF CHEMICALLY CONTAMINATED FLOUR

BY

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The outbreak of food-poisoning here reported upon is characterized by two factors: the widespread nature of the inquiry, and the unusual nature of the contaminant. The extensive inquiry was necessary in that, contamination during transport being suspected, it was essential to establish the full facts in order to prevent recurrence. The unusual nature of the contaminant, endrin, is indicated by the fact that no previous record has been found of endrin-poisoning since the insecticide became generally available in March, 1954. It is of interest, therefore, to report on the means by which the contaminant was identified and to provide clinical details of endrin poisoning.

Description and Location of Area.—The Rural District of Pontardawe is situated in Glamorgan some seven

miles to the north-east of Swansea. It has a population of 32,520 and an acreage of 35,000. The main centre of population is in the Swansea Valley, which runs through the area from south-west to north-east, with the town of Pontardawe at its centre. The principal industries of the area are coal-mining, steel and tinplate manufacture, and nickel refining. The outbreak was entirely confined to the lower portion of the valley, which embraces the six miles between Clydach and Godregraig.

Inquiry into Outbreak

At 4 p.m. on May 2 the public health department was informed by telephone that 10 men at a local works had been taken violently ill during the course of the day. Immediate inquiry showed that their places of work and illness so differed that gas and fume escape could be eliminated; food-poisoning was therefore suspected. Of the 10 men, seven had been sent home, one had remained at work, while two had been admitted to hospital.

Further inquiries were immediately made at the homes of the persons concerned and details taken of the food eaten at the works that day. It was found that in every case the only common factor was white bread rolls, and in most cases such rolls and a cup of tea had provided the only meal before the illness. This fact was established at 7 p.m. the same evening, and a visit was paid at once to the bakery where these rolls had been manufactured. The baker was asked to provide details of his bakings for that day's consumption, and it was found that the works rolls were manufactured from white patent flour while his bread was manufactured from national flour.

He had during the morning of May 2 returned two sacks of national flour to his suppliers because of an indefinable odour. It should be noted that at this time the only commodities implicated were white bread rolls, and the illnesses were confined to persons working in the local works. At 11.30 p.m., however, a medical practitioner telephoned that a person having no connexion with the works and not having consumed rolls from the works supplies but from the same bakery had collapsed in similar circumstances to the other cases. Inquiries were therefore pursued through the night in order to ascertain whether or not there was sufficient prima facie evidence to warrant a B.B.C. warning being given to the public the following morning, May 3.

By 6 a.m. on May 3 it was considered that a broadcast warning was necessary, and the police were asked to transmit a message through the appropriate channels. This message, which was broadcast on the 8 a.m. and 9 a.m. news, instructed all persons who might have purchased white bread rolls in the Pontardawe area on May 2 to destroy them as it was possible that some might have been chemically contaminated. That the warning was justified was apparent during the course of that day, May 3, when 47 cases were notified among the general public. In every case it was established that bread manufactured at the same bakery on May 2 had been consumed by the patients.

It is estimated that the amount of contaminated bread available for consumption in the area placed approximately 1,500 persons under risk. The word "destroyed" was used advisedly in the broadcast, as it was thought that the public might otherwise dispose of the bread in unsatisfactory circumstances. It is known that in one instance the bread was fed to 12 chickens, all of which died.

Inquiries were complicated by the fact that the 10 persons ill on May 2 at the works had eaten white bread rolls made from white patent flour, while the 47 people taken ill on May 3 had eaten bread manufactured from national flour. A number of samples were obtained of the actual bread, and the Welsh Board of Health, with whom the local health department was in close contact, made arrangements for analysis of the bread samples by the Department of the Government Chemist, London. On Monday, May 7, the wooden floor of the bakery storeroom was closely examined and found to be giving off an aromatic odour at a point

where the baker indicated a sack of national flour to have rested. This section of the floor, some six inches (15 cm.) square, was thoroughly scraped with a wire brush and the dust obtained also forwarded to the Government Chemist through the Welsh Board of Health.

The two sacks returned by the baker were traced to a depot at Swansea, and on examination one was found to have some aromatic odour at the bottom of the sack. Samples of this sacking and the flour immediately below were again sent for analysis. The depot foreman of the flour company was able through his invoices to trace that this flour was loaded into a rail wagon at Cardiff on April 21, discharged at the Swansea depot on the 25th, and delivered immediately to the baker.

The number of the rail van was passed to the transporters and they were asked to trace both its present location and its movements and contents prior to April 21. On May 14 a report was received from the Government Chemist that after a long and difficult analysis the contaminant had been identified as endrin, a chemical used in horticultural sprays against various pests. It was also found that this chemical was manufactured only in the U.S.A. and that only one firm imported it into this country. The firm concerned was given the number of the rail wagon and asked to trace whether it had ever been used by them, and, in addition, whether they had received any complaints that endrin products had leaked during transit.

On May 22 the transporters reported that the rail wagon had been found near Cambridge, and it was later learned that it would be brought to London under seal for further examination. On May 28 representatives of the public health department, the flour firm, the chemical importers, and the transporters discussed the question in London, when it was found that leakage of endrin during transit had occurred on February 20, 1956, and that further inquiry had shown the wagon in which the spillage had occurred to be the same as that in which the contaminated flour was later transported.

It was stated that endrin was dissolved in xylene for normal spraying purposes and that the spillage into the wagon had occurred at a concentration some 800 to 1,600 times higher than that at which it was sprayed in the field. It was appreciated that under normal conditions xylene evaporates fairly quickly and that some two months had elapsed between spillage and suspected contamination of the flour, but it is felt, however, that the problem of non-evaporation is of less significance than the fact that endrin was spilled in a wagon which subsequently carried flour found on analysis to contain endrin. It was arranged at this meeting that the wagon floor be sectioned and scraped and the scrapings analysed for the presence of endrin. The laboratory reports of endrin content of the various samples are shown in the Table.

Symptoms

As a result of the episode described previously 59 persons were notified by local general practitioners as suffering from food-poisoning, and it is probable that at least a hundred more felt unwell but did not call in their doctor. All the illnesses followed the eating of bread rolls, "batches," or loaves made from flour now known to have been contaminated with endrin.

The main symptoms were in every case suggestive of a disturbance of the central nervous system. The severity of the attack appears to have been related directly to the amount of bread eaten: about three or four slices or two or three rolls were usually sufficient to produce a convulsion. The time of onset was somewhat variable. In most cases symptoms occurred about three hours after ingestion. Where the interval was only half to one hour it was usually found that some of the bread had also been eaten at an earlier meal as well.

Approximately 30 of those affected suffered from a convulsion of sudden onset. With no warning, they fell to the ground unconscious wherever they happened to be, and

Tabulated Results, with Comments, of Samples Analysed by the Department of the Government Chemist, London

Sample	Date	Description	Origin	Endrin Content		Remarks
				%	p.p.m.	
1	5/5/56	White patent flour	Shaken from empty sack "A" at bakery	Nil	Nil	Probably contaminated by storeroom contact with national flour sacks (sample 8 below)
2	5/5/56	" " "	Shaken from empty sack "B" at bakery	0.02	200	
3	5/5/56	" " "	From sack in current use	0.05	500	
4	5/5/56	Floor scrapings	Wooden floor of bakery flour storeroom	0.96	9,600	Scraped from place where used sack of national flour had rested from 25/4/56 to 2/5/56
5	7/5/56	" " "	" " "	" " "	" " "	Remaining portion of loaf which had caused illness to one person
6	7/5/56	Loaf	Mix "A" May 2	0.015	150	These samples were taken from two full sacks of national flour returned to flour depot by the baker on May 2, and sampled there
7	8/5/56	National flour	Taken from top of Sack 1, returned full by baker	Nil	Nil	
8	8/5/56	" " "	Taken from bottom of Sack 1, returned full by baker	0.55	5,500	
9	8/5/56	Sacking	Cut from bottom of Sack 1	0.15	1,500	Traces of endrin in five other flour samples of same wagon. Presence of wheat starch in all samples
10	8/5/56	National flour	Taken from Sack 2, returned full by baker	Nil	Nil	
11	8/6/56	Floor scrapings	Scraped from bottom of wagon	11.6	116,000	

several injured themselves in so doing. Eyewitnesses, including local doctors, have recorded that the convulsions were epileptiform in character, with frothing at the mouth, facial congestion, and very violent convulsive movements of the limbs, sometimes accompanied by an arching of the vertebral column. Two persons suffered from a shoulder dislocation during a convulsion. After a period of several minutes the patient became quiet but remained semi-conscious in most instances for a further 15 to 30 minutes. Three of those affected had more than one convulsion, and in one case, that of a young farm hand who had eaten almost a whole loaf, convulsions followed one another in quick succession for about an hour.

Symptoms also followed a definite pattern in the less acute cases. These patients first noticed that they were becoming dizzy, with weakness in the legs, abdominal discomfort, and nausea. Few actually vomited, but those who did, whether spontaneously or after being given a salt-and-water emetic, recovered more rapidly. In many cases the feeling of weakness increased; the patient became disorientated and felt as if he were falling forward. There was considerable confusion of thought and some actually imagined at the time that they were "going mad." At this stage some of them became a little aggressive; one or two said that the top half of their head felt as if it was solid. Several noticed that they became temporarily deaf.

Recovery was comparatively rapid even in cases where there had been a convulsion, and by the following day most of those affected felt fairly well. However, a few complained of weakness, insomnia, and loss of appetite for several days. A small minority remained away from work for two to four weeks complaining of headaches, lethargy, weakness, and anorexia, but the symptoms of some of this latter group may have been psychological in origin.

Often the whole family became ill after eating the bread, but in some cases, although all had eaten the bread, only one person became ill. It is interesting to note that very few children were affected. Among the notified cases there were only three children of 10 years of age or younger, the youngest being a girl of 8½. In all, 17 persons were sent to hospital, the majority of whom had practically recovered by the time they were admitted. Case histories show that in no cases were abnormal neurological signs discovered with the exception of some abnormal findings in the seven patients who were examined electroencephalographically. The electroencephalograms are now being repeated in some of these cases.

Case 1.—A steelworker aged 21 ate some of a contaminated batch for supper on May 2. After he had gone to bed he felt a little dizzy and could not sleep during the night. Next morning he ate more of the batch for breakfast and felt weak and giddy during the morning. At midday he had his lunch, eating four slices of the same batch. He then went to work feeling dizzy and thirsty, and having

an unpleasant taste in his mouth, with a certain amount of nausea. At 4 p.m. he suddenly fell down unconscious and remained so for about 15 minutes. He was admitted to Morriston Hospital at 6 p.m., having dislocated his left shoulder during the convulsion. On arrival at hospital he was quite conscious and there were no abnormal, neurological, or other signs. He remained in hospital three days and was discharged apparently quite well. An electroencephalogram taken four and a half hours after the convulsion suggested a paroxysmally unstable element, finding expression chiefly in the right posterior area and temporal or central areas.

Case 2.—A male member of the steelworks maintenance staff aged 28 ate three white rolls at 8 a.m. on May 2. He felt perfectly well during the morning, but while out for a walk on the road outside the works at about 11.15 a.m. he fell in a "fit" and was unconscious for approximately 20 minutes. He was brought home and went to bed feeling giddy and suffering from nausea. He slept well that night and felt no ill effects. At 12.30 p.m. on May 3, however, he ate four slices from a contaminated batch, and three hours later felt ill, weak, and dizzy once more. He returned to bed, and at 6 p.m. had a further convulsion, after which he remembered very little for about two hours. He again slept well and awoke fully recovered on the morning of May 4, except that for some days afterwards he suffered from vertigo on lying down. He returned to work on May 7. Five weeks after his illness he stated that he still felt a little vertigo on lying down.

Case 3.—A male clerk aged 50 ate three slices from a contaminated batch at about 1 p.m. on May 2. At 4 p.m. he found he could not concentrate, and at 5 o'clock he returned home from the office with a slight feeling of nausea. When he reached home he became confused in thought and felt very irritable and was perhaps a little aggressive. He felt unbalanced, and described the symptoms as feeling as if he was "going mad." He suffered from lack of orientation. The top of his head felt like a stone, and he noticed a feeling as of insects crawling on his left arm. His legs became very weak and felt heavy, and on looking in the mirror he noticed that his pupils were widely dilated. These symptoms continued during the early part of the evening, and at 8 p.m. he went to bed. From 10 p.m. until 3 a.m. he was unable to sleep, only dozing fitfully. By 3 a.m. he felt much better and slept well until 6 a.m. He got up and ate a good breakfast. About 10 o'clock, while at the office, he noticed a slight recurrence of mental confusion and disorientation, but this lasted only for about 15 minutes. He was off colour and weak for a further 72 hours. He stated that in spite of his mental confusion he was able by a great effort to collect his thoughts from time to time.

Case 4.—A man aged 24, a clerk at the steelworks, ate two white bread rolls in the works canteen at 10.45 a.m. on

May 2. Two hours later he felt "hot" and not very well, and walked to the top of the stairs to get some fresh air. He apparently had a convulsion and remembers nothing for 30 minutes. He fell downstairs, severely bruising the area around his right eye. He went home and soon felt much better, but was off his food for several days. He remained away from work for eight days.

Case 5.—A pharmaceutical chemist, aged 46, ate five slices, at 1 p.m. on May 2, of a contaminated batch which had been quite recently baked. Two hours later he felt hazy and could not concentrate. He had some flatulent discomfort but did not vomit. He became giddy and was stated to be a little aggressive and to be blinking his eyes frequently. He gradually improved but did not feel quite well. At 7.15 p.m. he ate a further five slices from the contaminated batch, and, although he still did not feel well, he attended a meeting where he was chairman. He found that he could not concentrate again, and at 8 p.m. he suddenly became rigid and fell unconscious. He bruised his nose and cut his scalp in falling and there was considerable bleeding. During the convulsion his arms and legs were jerking. He was unconscious for about 15 minutes and was removed to hospital. He thinks that he vomited before he arrived. It is stated that he was fully conscious on arrival at the hospital and there were no abnormal neurological signs. However, he still felt hazy and very restless that night, sleeping badly. Next day he felt much better. An electroencephalogram was taken approximately 20 hours after the fit. It was reported to be abnormal and suggestive of some irritative condition or mild unstable element finding expression chiefly to the right of midline in central and also to some extent in temporal areas. A further electroencephalogram was taken four days after the convulsion and was reported as showing considerable improvement, but still not typically normal, being reminiscent of persons experiencing a state of tension or anxiety.

Case 6.—A tinplate worker aged 47 ate half a loaf from a contaminated batch for supper on May 2. He felt peculiar during the night and could not sleep. At 9 a.m. he ate a further half loaf for breakfast. He did not feel like going to work, and by midday he was feeling very ill. He felt numb from the waist down, was dizzy, and had considerable confusion of thought. At 2 p.m. he had a convulsion and fell. He was noticed to be black in the face and frothing at the mouth, and his limbs were jerking. The convulsion lasted three or four minutes, and he remembers nothing for about half an hour afterwards. He was sent to hospital, where on admission his condition was satisfactory and a clinical examination was negative. He was in hospital for two days and had no after-effects.

Case 7.—A housewife aged 46 ate two slices of a contaminated batch at about 10 p.m. on May 2. She awoke at 2 a.m. feeling ill, trembling all over, perspiring, and very weak. She vomited and felt much better afterwards. At 9 o'clock the following morning she ate three further slices from the contaminated batch. She did not feel very well during the morning, and by midday she was again trembling with weakness and had abdominal discomfort and nausea. There was considerable confusion of thought. She was disoriented, was deaf, and her eyes were slightly dim. She was admitted to hospital. On the way down in the ambulance she vomited and felt slightly better afterwards. On arrival at the hospital her condition was good and clinical examination was negative. She remained in hospital for two days and had no after-effects.

Case 8.—A schoolgirl aged 16 ate four or five slices from a contaminated batch for supper on May 2. She awoke at 3 a.m. and could not sleep for the rest of the night, feeling weak and having a sensation of nausea. She felt much better next morning but did not go to school. At 9 a.m. she ate a further four slices from the batch. At 11 a.m. she felt ill and was noticed to be extremely pale. She lay down, and at 11.30 she had a convulsion, becoming unconscious. She was black in the face, frothing at the mouth, and remained unconscious for about 20 minutes.

She came round and felt weak and drowsy. Half an hour later she had a second convulsion and was again out for 15 to 20 minutes. Whilst in the ambulance she had a third similar convulsion, after which she vomited. On admission to hospital she was pale and drowsy. Nothing else abnormal was recorded. She remained in hospital for two days with apparently no after-effects.

Case 9.—A schoolgirl aged 8½ ate three slices of a contaminated loaf at 5 p.m. on May 2, but felt quite well. For breakfast on May 3 she ate a further two or three slices of the loaf with no ill effect. However, by 5 p.m., she felt "funny in her tummy," had a headache, and looked heavy about the eyes, but ate her tea, at which meal she consumed a further three slices of the bread. She played during the evening but was not quite well. She went to bed at 8 p.m., and about 8.30 p.m. her father called upstairs to tell her to keep one of the other children quiet. He received no reply, and, on going up to investigate, found the child lying on the floor in a dazed condition. She stated that she did not know where she was. He picked her up and placed her on the bed, whereupon she had a convulsion, with considerable jerking of her arms and legs, and fell off the bed again. She was semi-conscious for about half an hour; then she vomited a little and felt much better. She slept well during the night and was quite all right next day.

Case 10.—This patient, a blind man aged 55, attends an occupational centre. At 1 p.m. on May 3 he ate four slices of bread from a contaminated batch. These formed part of his lunch, which he ate as sandwiches whilst away for the day at the blind institute. About 4 p.m. he felt dizzy, "off his balance," and felt as if he was falling forward. He returned home, and at 5.15 ate two more slices of bread from the same contaminated batch. About an hour later he fell in a convulsion, cutting the top of his head. He was removed to hospital and remained there for two days; it was noted on admission that he was shocked but fully conscious. He had a laceration over the right parietal bone but no bony injury. He felt weak for several days after his return from hospital.

Case 11.—A male clerk aged 18 ate three slices from a contaminated batch for his lunch on May 3. He felt quite well, and at 5 p.m. ate a further four or five slices from the same batch. Again he felt no ill effects, but at 6.30 he fell in a sudden convulsion and was removed to hospital. On arrival he was conscious but feeling dazed. His condition was stated to be satisfactory. He felt dizzy for a further two days after his return home and remained away from work for five days.

Case 12.—This patient, a woman aged 22, was a chemist's assistant. At about 8 a.m. on May 3 she ate one round of toast made from a contaminated batch. At 11 a.m., while working in the chemist's shop, she began to feel sick and dizzy, and says that she saw double for a while. She came home at 1 p.m. suffering from nausea and feeling as if she was going to fall. She vomited a little and spent the afternoon in bed. She felt somewhat better, and at 4.30 p.m. had tea, eating three slices from the contaminated batch. She was feeling much better during the evening, but at 8 o'clock suddenly had a convulsion and became unconscious. She remembered nothing for about an hour afterwards. On admission to hospital she was stated to be quite well, with no abnormal signs. An electroencephalogram taken 19 hours after the convulsion was reported to be outside normal variation, suggesting a non-specific unstable element finding expression in the central and posterior areas generally. She remained in hospital for a week. She stated that she slept badly for a further week after return home and that her appetite was still rather poor. She was off work for five weeks.

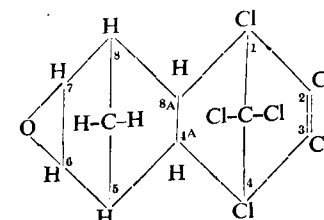
Case 13.—A farmer aged 33 consumed four or five slices from a contaminated batch at about 1 p.m. on May 3. He continued his work and felt quite well during the afternoon. About 5 p.m., whilst he was driving a tractor in a

field which he was harrowing, he fell and remembers nothing until he found himself lying on the ground, the tractor having continued on its course and run into a hedge. He got up and returned home, and for about an hour he felt ill, with some confusion. At 6 p.m. he vomited and went to bed. He slept well and felt much better the following morning, but was a little weak during that day. There were apparently no after-effects.

Case 14.—A farm hand aged 18 ate the greater part of a contaminated loaf at 10 a.m. on May 3. About two hours later he had a fit while driving cattle on the road. He fell unconscious and was noticed to be purple in the face and frothing in the mouth; his arms and legs were jerking. He became partially conscious after three or four minutes, and then had a second fit. During the next hour he had a series of similar fits each lasting a few minutes with a period of semiconsciousness between them. He was removed to hospital, and on admission was said to be drowsy and comatose. There were no abnormal neurological signs, and he recovered within a few hours. An electroencephalogram taken 48 hours after the convulsion was reported as being abnormal, but the possibility of underlying behaviour disorder was suggested in this case. This boy is at an approved school and is boarded out with local farmers. On discharge from hospital five days later he did not return to the farm where he was working, but went back to the farm school from which he originally came.

Chemistry of Endrin

The word "endrin" is a coined common name for a pure chemical with the following structural formula:



Endrin is the newest member of a triumvirate of insecticides, the others being "aldrin" and "dieldrin." All are closely related both structurally and in that all three have their origin in dicyclopentadiene, a hydrocarbon found in small quantities in distillates from "cracked" petroleum or coal-tar. Endrin, however, is the most versatile insecticide because in addition to the range of insects killed by dieldrin it also gives control of many caterpillar and aphid pests.

At present endrin is produced at the Shell plant at Denver, Colorado, U.S.A., but will soon be produced also at the new insecticide plant of the Royal Dutch Shell Group at Pernis, Rotterdam.

Endrin is soluble in aromatic hydrocarbons and ketones, sparingly soluble in alcohols and paraffin hydrocarbons, and insoluble in water. As marketed for formulation purposes, it is a pale buff granular product containing 90-95% of endrin, is easily ground, and has a faint "medicinal" smell. It became available for field evaluation outside the U.S.A. towards the end of 1952 and was generally available in March, 1954.

Formerly known as compound 269, this new insecticide has been found extremely useful in the field, exercising control over cotton and tobacco pests, borers of cane, rice, and coffee, moths, caterpillars, and aphides. In this country its main use to date has been in the fruit-growing industry for control of apple aphid, apple sucker, winter moth caterpillar, tortrix caterpillar, and apple saw-fly.

The manufacturers recommend sensible precautions with regard to endrin, while emphasizing its toxicity to be of a lower order than that exhibited by the older anticholinesterase or phosphate insecticides or by arsenic compounds.

This insecticide is comparatively new, and present information must necessarily be regarded as interim.

Toxicity of Aldrin, Dieldrin, and Endrin

So far as is known no previous cases of endrin poisoning have been reported in human beings, but cases have occurred of poisoning by aldrin and dieldrin (Princi, 1952), which are chlorinated hydrocarbons similar to endrin, and are also used as pesticides.

Endrin is an isomer of dieldrin. In these cases the early symptoms are reported as being headache, nausea, vomiting, general malaise, and dizziness. Where the amount of intoxicant which had been absorbed was small further symptoms rarely developed. However, when larger doses were taken central nervous symptoms occurred. These were characterized by convulsions which were clonic and tonic in character. If the dose was excessively large, the central nervous symptoms occurred without any other premonitory symptoms. The convulsions were sometimes followed by coma. Hyperexcitability and hyperirritability were common. Thus it is seen that the symptoms of poisoning by these substances are very similar to those caused by endrin in the outbreak at present under review.

One case of aldrin poisoning which occurred in 1951 has been described in considerable detail (Spiotta, 1951). It refers to a 23-year-old farmer in the United States of America who intentionally drank from a coca-cola bottle containing an aldrin mixture. He was estimated to have ingested 25.6 mg. of aldrin per kg. of body weight. In spite of gastric lavage generalized convulsions began within 20 minutes and persisted until large amounts of barbiturate had been given. During one of these convulsions he dislocated a shoulder. Later an electroencephalogram revealed generalized cerebral dysrhythmia. The rhythm did not become essentially normal until five months had elapsed. Haematuria and albuminuria appeared on the second day and persisted for 18 days. Although symptoms in this case persisted for 12 days complete recovery ensued and there appeared to have been no permanent kidney or liver damage. In addition no permanent organic brain changes were found either by means of electroencephalographic tracings or by psychometric testing.

Data concerning the management and treatment of aldrin and dieldrin poisoning are available, and it would appear that the treatment of endrin poisoning is on similar lines. It is recommended that if aldrin or dieldrin has been ingested in any form the stomach should be washed out as quickly as possible, and that later adequate quantities of magnesium sulphate should be given in order that the ingested material may be purged rapidly. The patient should be closely watched for 72 hours, and at the first suggestion of involvement of the nervous system barbiturate therapy should be instituted. Barbiturates may be employed in the form of either sodium phenobarbitone or sodium amylbarbitone. Glucose may be administered intravenously, care being taken that not so much parenteral fluid is given as to encourage the production of pulmonary oedema. In cases either of acute or chronic intoxication a high-protein therapy may be advantageous, since liver damage may be produced by this type of poisoning. For this purpose the intravenous administration of amino-acids is recommended. The use of morphine is definitely contraindicated. Because this type of poisoning may in very severe cases result in the production of pulmonary oedema it may be necessary to institute oxygen therapy. In acute intoxications kidney damage may be manifested by the presence of haemolysed blood in the urine, therefore the benzidine test may be positive in the absence of red cells in the urine.

Although there is apparently no literature concerning human endrin poisoning, details of the mammalian toxicity of this substance have been published (Cole, 1955). It is stated that the acute oral toxicity of endrin to small laboratory animals is greater than that of aldrin or dieldrin, the LD₅₀ to male rats being approximately 35 mg. per kg., and to female rats about half of this figure.

Summary

The investigation has established that a consignment of endrin dispatched on February 20, 1956, leaked 3 gallons (13.6 litres) into the conveying wagon in transit. The same wagon, which was used for the conveyance of empties between February 20 and April 25, was on the latter date loaded with sacks of flour at Cardiff and dispatched to Swansea. Of the 100 sacks carried in the wagon it was proved that two absorbed endrin from the vehicle floor, and both these sacks were delivered to one bakery as part of the weekly consignment. One of these sacks was returned, and endrin was found to be present in some parts of the flour to the extent of 5,500 parts per million. The other sack was used by the baker to manufacture loaves which caused 49 people to be ill enough to require medical treatment. Endrin was recovered from some parts of the bread consumed to the extent of 150 parts per million. It was further established that while in the bakery the empty contaminated sack which had contained national flour came into contact with dough made from patent white flour which, having been used to make white bread rolls, caused 10 men to become ill at a local works after consuming them.

Samples taken from the wagon floor and analysed on June 8 showed endrin still to be present in one section of the wagon to the extent of 116,000 parts per million.

The successful result of the inquiry would not have been achieved had the public health department not received the fullest assistance and co-operation from all the firms and organizations involved. It is desired to acknowledge the assistance provided by the Department of the Government Chemist, London, and the Glamorgan County Public Health Laboratory. The information on case histories was readily provided by Dr. Duncan Davies, medical superintendent, Morriston Hospital; Dr. Idwal Pugh, medical superintendent, Hill House Isolation Hospital, Swansea; and Mr. B. J. Baker, department of electroencephalography, Morriston Hospital.

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TREATMENT OF MEGALOBlastic ANAEMIA OF PREGNANCY AND THE PUERPERIUM WITH VITAMIN B₁₂

BY

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Early reports from temperate climates indicated that treatment of megaloblastic anaemia of pregnancy and the puerperium with vitamin B₁₂ was usually ineffective (Bethell *et al.*, 1948; Day *et al.*, 1949; Furman *et al.*, 1950; Ginsberg *et al.*, 1950; Ungley and Thompson, 1950; Clark, 1952). Total dosage did not exceed 120 µg. in the cases described. Later, however, a case was treated successfully in Holland with only 45 µg. (Nieweg, 1952), and recently in Dublin satisfactory responses followed the use of massive doses ranging from 900 to 5,000 µg. in 13 patients out of a series of 17 (Moore *et al.*, 1955). In warmer climates response to vitamin B₁₂ in small amounts was often satisfactory (Patel and Kocher, 1950; Chaudhuri, 1951), and good results sometimes followed the use of larger doses (Cohen, 1953; Adams and Wilmot, 1953; Tasker, 1954; Berry 1955).

Kothari and Bhende (1949) believed that the disease commonly seen in India and the Tropics was the same as that described in Britain by Callender (1944). Diagnosis depended on the presence of megaloblasts of Ehrlich in the peripheral blood or bone marrow. Cases reported from most parts of the world usually responded well to treatment with folic acid, and there were clinical similarities. Differences in response to vitamin B₁₂, however, supported the views of Thompson and Ungley (1951) and others that there are several varieties of the condition, while the work of Foy *et al.* (1952a, 1952b) in East Africa showed differences in the appearance of the bone marrow.

This paper records the results of a clinical trial using large doses of vitamin B₁₂ in 10 cases of the type of megaloblastic anaemia associated with pregnancy or the puerperium seen in Durban. The appearance of the bone marrow is briefly described.

Clinical Features

From a series of 34 patients with severe megaloblastic anaemia associated with pregnancy or the puerperium, 10 who were not dangerously ill were chosen for the trial. Two patients were African and eight Indian. Their ages and parity are indicated in Table I, which also shows the main findings in the blood on admission to hospital, and the results of gastric analysis after stimulation with histamine. Clinical features were similar to those previously described in our cases (Adams and Wilmot, 1953). These will not be discussed further except as regards infections and other factors which might be expected to retard recovery after treatment. Pyrexia was present in seven patients, all of whom were investigated for sources of infection. There was mild pyelitis in two (Cases 2 and 6); two others had com-

TABLE I

Case No.	Age	Previous Pregnancies	Haemoglobin (g./100 ml.)	M.C.V. (Cubic µ)	M.C.H.C. (%)	Reticulocytes (%)	Serum Proteins (g./100 ml.)		Serum Bilirubin (mg./100 ml.)	Free Acid
							Total	Albumin		
1	29	5	3.9	89	25	0.5	8.1	4.8	0.8	++
2	26	1	3.2	98	36	1.2	7.0	4.0	0.4	++
3	20	0	3.1	96	36	1.6	7.3	3.4	0.6	++
4	28	10	3.6	106	27	4.4	7.9	3.4	0.2	++
5	35	10	3.2	125	32	3.3	6.0	2.6	0.9	++
6	26	7	4.4	144	35	5.4	6.6	3.5	0.8	++
7	43	7	6.9	93	33	2.3	6.0	3.2	0.8	++
8	33	4	4.4	97	35	1.3	5.8	2.5	0.9	++
9	20	0	5.5	111	34	1.4	4.7	2.3	0.7	++
10	30	9	4.4	135	33	5.9	5.6	2.5	0.4	++

plained of diarrhoea before admission, but no cause was found on stool examination. X-ray examination of the chest in nine patients revealed no abnormality. One patient had evidence of puerperal sepsis, which was not severe (Case 9), but pyrexia persisted after this had been cleared up. Full investigations revealed no cause, other than severe anaemia for this pyrexia, which settled when the blood count rose. In their series Badenoch *et al.* (1955) record a high incidence of other complications such as vomiting and haemorrhage, but these were absent from my cases. In the whole series of 34 cases there was no clinical evidence of steatorrhoea, an uncommon disease in South Africa; faecal fats estimated in 21 (six of the present trial series), were always within the normal range. It thus seems unlikely that infections or other factors have obscured the results of treatment in this trial.

Diet

Dietary histories are difficult to obtain and are not very reliable. Family incomes of all were low, and carbohydrate intake tended to be high. Protein was very low in seven, and apparently adequate in one (Case 6). One patient is of particular interest in view of the suggestion of Badenoch

and his colleagues that resistance to haemopoietic factors may develop during pregnancy.

Case 4.—An Indian woman had been under my care during the seventh and eighth months of pregnancy for severe chorea gravidarum. As she was thin she had received soured milk and an egg daily in addition to hospital diet. On admission haemoglobin was 8.6 g. per 100 ml., mean corpuscular haemoglobin concentration 29%, sedimentation rate 51 mm. in one hour (Wintrobe). Treatment consisted of bed rest, salicylates, sedation with barbiturates, and ferrous sulphate. The bone marrow was not examined. Leaving hospital against advice, she delivered a stillborn infant at home two weeks later. Severe chorea recurred immediately and she was readmitted. Examination of the blood and bone marrow revealed the presence of megaloblastic anaemia, haemoglobin being 5.6 g. per 100 ml.

Bone Marrow

Diagnosis depended on examination of the bone marrow in all cases. My experience has been somewhat similar to that of Foy *et al.* (1952a), who described two groups of macrocytic or normocytic anaemia in East Africa. In one are giant metamyelocytes in the bone marrow with erythroblasts, macronormoblasts, and megaloblasts in various stages of development; in the other, giant metamyelocytes are present without megaloblasts. I have observed similar bone-marrow changes in some cases of kwashiorkor (Adams, 1954), and Berry describes them as a feature of some of the cases of anaemia of pregnancy in Lagos. Giant metamyelocytes were seen in all 10 of the present series, while in six there were megaloblasts of Ehrlich as well as cells of intermediate type similar to those described by Dacie and White (1949). Intermediate cells were present in the marrow in four, but megaloblasts were not observed (Cases 5, 7, 8, and 10). Differentiation from true megaloblasts is sometimes difficult. For the purposes of this trial a bone marrow was reported as megaloblastic if it contained true megaloblasts or intermediate cells as well as giant metamyelocytes.

Clinical Trial with Vitamin B₁₂

Before treatment with vitamin B₁₂ was started, all cases were observed over a control period—four days in Case 6, and five to seven days in the remainder. During this control period and throughout the trial which followed, progress was determined by daily reticulocyte counts, and by haemoglobin (Hb) and the volume of packed cells (P.C.V.), both estimated in duplicate every five days. Seven patients

had previously received no treatment and two had been treated with penicillin because of pyrexia (Cases 2 and 7). Significant blood changes did not occur in any of these during the control periods. Case 5 had been treated with penicillin and streptomycin seven days before vitamin B₁₂ was given. During this time a slight rise occurred in P.C.V., while the reticulocytes rose to 12.1% but dropped again to their previous level. No change occurred in the Hb, however, and examination of the bone marrow at the end of the control period showed well-marked megaloblastic erythropoiesis. She was therefore included in the series.

Vitamin B₁₂ was administered by the intramuscular route in doses ranging from 100 µg., given in one injection, to 1,400 µg. in daily injections of 100 µg. The results are analysed in Table II, which also shows the subsequent course of each patient.

It will be seen that seven responded to vitamin B₁₂. Response was good in six, but only moderate in the seventh. In four of these the bone marrow was re-examined during the trial, and in all erythropoiesis was then normoblastic, although in one some giant metamyelocytes were still present (Case 5). Three of these patients received only 100 µg. during the trial. As a group, response appeared to be as good as that of the other four who were given 1,000 µg. of vitamin B₁₂ or more. After the trial two received folic acid (10 mg. thrice daily); there was no second reticulocytosis in one of them on whom repeated reticulocyte counts were done. Three patients later showed signs of iron deficiency, for which ferrous sulphate was given.

Vitamin B₁₂ was judged to be ineffective in two patients (Cases 8 and 10). A false reticulocytosis of 20.9% occurred in Case 8, but the Hb failed to rise in both, while the bone marrow remained megaloblastic (examined on the fifteenth and seventh days respectively). The trial in Case 9 was inconclusive. Hb and P.C.V. dropped considerably and there was no rise in reticulocytes after five days, so folic acid therapy was started; but on this day partial change in erythropoiesis was observed in the bone marrow.

Discussion

In this small series satisfactory responses followed treatment with vitamin B₁₂ in all seven cases seen after delivery, 100 µg. apparently being as effective as larger doses. There was an average daily Hb rise during the trial of 0.16 g. per 100 ml. Better response followed treatment with folic acid in 14 other post-partum cases (mean daily Hb rise 0.23 g. per

TABLE II.—Analysis of Results

Case No.	Diagnosis of Anaemia	Vitamin B ₁₂ Dosage (µg.)	Hb Before Treatment (g./100 ml.)	Response to Treatment	Subsequent Course	Result of Vitamin B ₁₂ Trial
1	14 weeks post partum	1,000 (100 × 10)	4.3	13.5% reticulocytosis on 5th day, Hb 5.9 g./100 ml. on 10th day; bone marrow then normoblastic	Slow rise on further B ₁₂ , folic acid, and iron to 12.5 g. Hb/100 ml.	Good
2	8 weeks post partum	100	3.3	34.3% reticulocytosis on 5th day; Hb 5.4 g./100 ml. on 15th day	Continued rise on further B ₁₂ and later iron to 11.6 g. Hb/100 ml.	"
3	2 weeks post partum	100	3.2	28.3% reticulocytosis on 6th day; Hb 5.4 g./100 ml. on 15th day	Continued rise on further B ₁₂ to 9.8 g. Hb/100 ml.*	"
4	2 weeks post partum	1,400 (100 × 14)	5.4	12.6% reticulocytosis on 6th day; Hb 8.4 g./100 ml. on 15th day, marrow then normoblastic	Changed to folic acid with continued rise of Hb to 11.9 g./100 ml. No second reticulocytosis	"
5	2 weeks post partum	1,000 (100 × 10)	3.3	26.5% reticulocytosis on 6th day, Hb 6.9 g./100 ml. on 14th day; marrow normoblastic on 7th day, with some giant metamyelocytes	Continued rise on further B ₁₂ and later iron to 15.6 g. Hb/100 ml.	"
6	At term	1,000 (100 × 10)	6.0†	31.3% reticulocytosis on 6th day; Hb 7.7 g./100 ml. on 15th day, marrow then normoblastic	Continued rise on further B ₁₂ to 11.6 g. Hb/100 ml.	"
7	" "	100	6.5	10.1% reticulocytosis on 5th day; Hb 7.8 g./100 ml. on 15th day	Continued rise on further B ₁₂ to 13.3 g. Hb/100 ml.	Moderate
8	4 weeks ante partum	100	4.6	20.9% reticulocytosis on 8th day; no rise in Hb by 15th day, marrow then still megaloblastic	10.3% reticulocytosis on 4th day after folic acid, Hb 6 g./100 ml. 15 days later. Marrow then normoblastic. After delivery and iron Hb rose to 12.3 g./100 ml.	Reticulocyte rise only
9	4 weeks ante partum	200	6.8	No rise in reticulocytes by 5th day; Hb then 5 g./100 ml., but marrow more nearly normoblastic	22.8% reticulocytes on 7th day after folic acid, but slow rise with iron to 9.8 g. Hb/100 ml.*	Partial marrow change only
10	10 weeks ante partum	700 (100 × 7)	3.8	No rise in reticulocytes by 7th day, Hb then 3.2 g./100 ml., and marrow megaloblastic	33.1% reticulocytosis on 5th day after folic acid, Hb 5.1 g./100 ml. on 11th day. Continued rise to 8.6 g. Hb/100 ml.*	None

* Left hospital against advice. † Transfused before trial.

100 ml.), but these two groups are not strictly comparable, since the folic acid cases were usually more anaemic before treatment and could not be observed over preliminary control periods. The addition of folic acid to treatment did not seem to alter the subsequent course in two of the trial cases, while in four others who were followed long enough blood counts reached normal values on vitamin B₁₂ (with added iron in two).

Very poor results followed treatment with vitamin B₁₂ in all three cases seen during pregnancy. From Table I it is seen that total proteins and serum albumin levels were lowest in these three cases, so that, besides pregnancy, protein malnutrition might be a factor inhibiting response to treatment. This seems unlikely from my experience with folic acid series. In six cases, four treated with folic acid at term and two post partum, serum albumin was less than 3 g. per 100 ml. (range 1.6 to 2.8 g.), and in three of these the total protein was less than 6 g.; yet five responded well, including one with only 4.9 g. total protein and 2.5 g. albumin.

A similar distinction between cases treated before and after delivery is found by analysing the details of the trial reported by Moore *et al.* Ten of their 12 post-partum cases responded to the large doses they used, but in some there were only small increments in Hb in the first two weeks. Only three out of their five ante-partum cases responded to vitamin B₁₂, and in all three the average daily Hb rises were very low. On the other hand, seven of Berry's nine cases treated during pregnancy responded to vitamin B₁₂, although normal Hb levels were not reached. Like Das Gupta *et al.* (1953), who treated nutritional macrocytic anaemia with vitamin B₁₂, Berry believes that additional folic acid may be necessary for complete remission. Foy *et al.* (1955) suggest that there are two types of non-pernicious megaloblastic anaemias in Africans—classified on response to treatment—including cases seen in pregnancy. One type responds completely to penicillin (in specified doses) or to vitamin B₁₂ by mouth, and serum vitamin B₁₂ levels are very low before treatment. The other (with normal serum vitamin B₁₂ levels) responds to folic acid but not to penicillin or vitamin B₁₂.

In Durban the bone marrow differs from that described in megaloblastic anaemia seen in temperate climates. Giant metamyelocytes are always present, but erythropoiesis may be either megaloblastic or of the intermediate variety. Similar appearances are seen elsewhere in Africa. Dacie and White, who observed red-cell precursors of intermediate type in cases of pernicious anaemia not severely anaemic, ascribed the changes to minor deficiencies in haemopoietic factors. In my cases, however, as in those of Foy *et al.* (1952a) and Berry, this intermediate type of megaloblastic change may be seen when anaemia is severe.

It seems likely that there are several varieties of megaloblastic anaemia associated with pregnancy because of these differences in the appearance of the bone marrow and in response to treatment. Despite this, however, cases reported from many parts of the world have much in common. They tend to occur in the last three months of pregnancy or in the puerperium; sometimes the onset is rapid; the peripheral blood picture is inconstant; spontaneous remission may occur after delivery; and dietary deficiencies do not appear to be the only cause, although diets are often poor. The common factor among them all may well be the development of resistance to the action of haemopoietic substances during pregnancy, as Badenoch and his colleagues have suggested, rather than to absolute deficiencies.

Summary

The results of a clinical trial using vitamin B₁₂ in 10 patients with megaloblastic anaemia of pregnancy are recorded. The appearance of the bone marrow is briefly described.

Response was satisfactory in all seven treated after delivery. It appeared to be as good with doses of 100 µg.

as it was when 1,000 µg. or more was given, but better results are usually obtained with folic acid.

Three patients treated before delivery responded poorly.

Because of differences in the appearance of the bone marrow and in response to treatment, it seems likely that there are several varieties of megaloblastic anaemia associated with pregnancy.

I wish to thank the medical superintendent of King Edward VIII Hospital, Dr. S. Disler, for permission to publish, and Drs. Kelman Drummond and N. A. Rossiter for access to cases under their care.

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OPERATIVE PARATHYROID ARTERIOGRAPHY FOR LOCATION OF PARATHYROID TUMOUR

BY

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The operative discovery of a parathyroid tumour which lies at a distance from the thyroid gland, and especially of a parathyroid tumour in the superior mediastinum, can still be a difficult surgical exercise, and any procedure which locates such a tumour is of advantage. It has been found possible, at least on some occasions, to outline a parathyroid tumour by passing an arterial catheter disto-proximally into the arch of the aorta so that its tip lies at the orifice of the subclavian artery and radio-opaque material injected by way of the catheter can enter that artery, and pass by the inferior thyroid trunk to the thyroid gland and parathyroid tumour; but filling of the vertebral artery by this technique may give cerebral complications (Seldinger, 1954). The parathyroid tumour is so vascular that it may be

outlined. It occurred to one of us (R.F.) that more direct arteriography might be undertaken during the operation.

Procedure

Inferior thyroid arteriography was done during the exploration of the neck of a woman who had parathyroid osteodystrophy and investigation of whom had proved that she suffered from parathyroid overaction. Clinical examination did not expose any asymmetry of the neck, a plain x-ray film of the neck and barium swallow did not demonstrate any displacement of trachea or oesophagus, and before operation the location of the parathyroid tumour was not known.

The initial steps of the operation followed the usual pattern. The patient was placed carefully on the operating-table with the shoulders symmetrically raised on a pillow and the chin pointing directly forwards. A low collar incision was made, the infrahyoid muscles were separated in the midline and transected, and the thyroid gland was exposed. Close inspection failed to reveal any asymmetry, except the normal degree of displacement of the pyramidal lobe a little to the right of the midline. As in the case of at least one previous parathyroidectomy, the thyroid gland lay at a rather higher level than usual, the upper border of the isthmus being situated slightly above the level of the cricoid cartilage. The superior thyroid vessels, which were symmetrical on the two sides, were divided as in thyroidectomy, and the middle and inferior thyroid veins were divided also. The upper and lower borders of the isthmus and the gland were defined, as also were the medial borders of the upper poles of the lateral lobes. Then, on each side, of the upper poles of the lateral lobes. Then, on each side, the stay sutures were inserted into the lateral borders of the lateral lobes, and these were retracted while the carotid sheath was drawn laterally. Search in the areolar tissue between the thyroid gland and the carotid sheath failed to reveal a tumour, nor could a tumour be seen on close inspection of the borders of the oesophagus and the grooves between trachea and oesophagus. The fascia over the inferior thyroid artery on each side was now opened and

both inferior thyroid arteries were exposed. The right inferior thyroid artery was distinctly greater in girth than the left—a useful indication of the side of a parathyroid tumour.

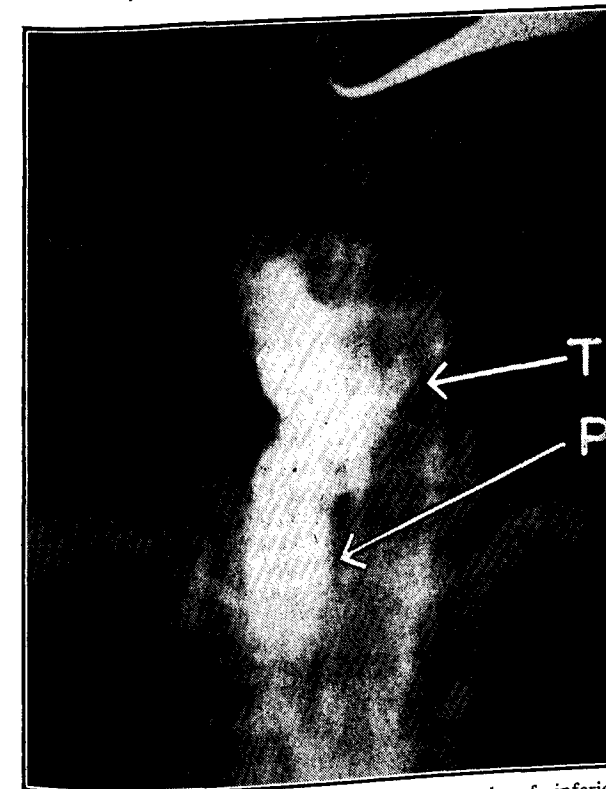
It was decided to perform inferior thyroid arteriography on the right side, the side of the larger vessel. A "record" syringe containing 10 ml. of 50% diodone was connected by "polythene" tube with a hypodermic needle. The right inferior thyroid artery was elevated on a thread support at the point of its emergence from under cover of the carotid sheath, with just enough tension to stop the flow in it. The needle was then inserted into the lumen of the artery just distal to the point of its occlusion, and the radio-opaque material was rapidly injected. With the aid of a cassette placed under the patient's neck three antero-posterior films were taken, one towards the end of the injection and two immediately after the completion of the injection. They were developed and examined wet; the first of the two films is here reproduced. This shows the right lateral lobe of the thyroid gland clearly outlined by opaque material, while below it and rather lateral to it the outline of the responsible parathyroid tumour is observed.

Comment

This film shows clearly that a parathyroid tumour can be outlined by inferior thyroid arteriography. The character of the shadows suggests that if the parathyroid tumour had lain on the side of the trachea, or in the groove between the trachea and oesophagus, the shadows of the thyroid gland and parathyroid tumour would not have been separately distinguishable. A tumour in such a situation, however, should offer no great difficulty of operative dissection. It would seem that it is precisely on those occasions when the parathyroid tumour lies at a distance from the thyroid gland that it is most easily delineated radiologically. On this occasion the tumour did in fact occupy the situation in which radiology showed it to be—in the connective tissue of the neck below and lateral to the lateral thyroid lobe, and at a distance of about 2 cm. from the lower border of that lobe. Had we failed to outline the parathyroid tumour by right inferior thyroid arteriography, we should have had recourse to arteriography on the opposite side in the hope of outlining a left parathyroid tumour. If the disparity in size had been not between the inferior but between the superior thyroid arteries the larger superior thyroid vessel would have been chosen for the injection.

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Parathyroid aortography. Needle outlines trunk of inferior thyroid artery T=right lobe of thyroid gland. P=parathyroid tumour outline.

Research into "river blindness" and plans for the control of the Simulium flies which carry the filarial worm causing the disease (onchocerciasis) are described in the annual report of the British Empire Society for the Blind. An ophthalmic team, under Dr. F. C. Rodger, has been assessing the extent of river blindness. In the worst endemic areas of the Northern Gold Coast, among the million African inhabitants, 600,000 have onchocerciasis and at least 30,000 are blind. In some villages one-tenth of the population and one-fifth of the adult males are blind. Dr. Geoffrey Crisp, leader of the entomological team, has prepared a plan to control the fly at a cost of only £66,000. This plan, worked out with the help of the London School of Hygiene and Tropical Medicine, recommends a three-year campaign by six teams of African workers supervised by an entomologist. The report explains: "Each of these teams, using a simple routine and inexpensive equipment, would treat a section of the main endemic areas, at specified points, during the vital phases of the flies' life cycle. The total effect should be rapidly to clear some of the most heavily infected points and, over the main endemic area, gradually to reduce the number of flies to manageable proportions so they can subsequently be controlled by a permanent routine." Apart from the plans being made to prevent infestation, research has been carried out into the effect of new drugs in preventing an already infested person from going blind.

MACROGLOBULINAEMIA OF WALDENSTRÖM

BY

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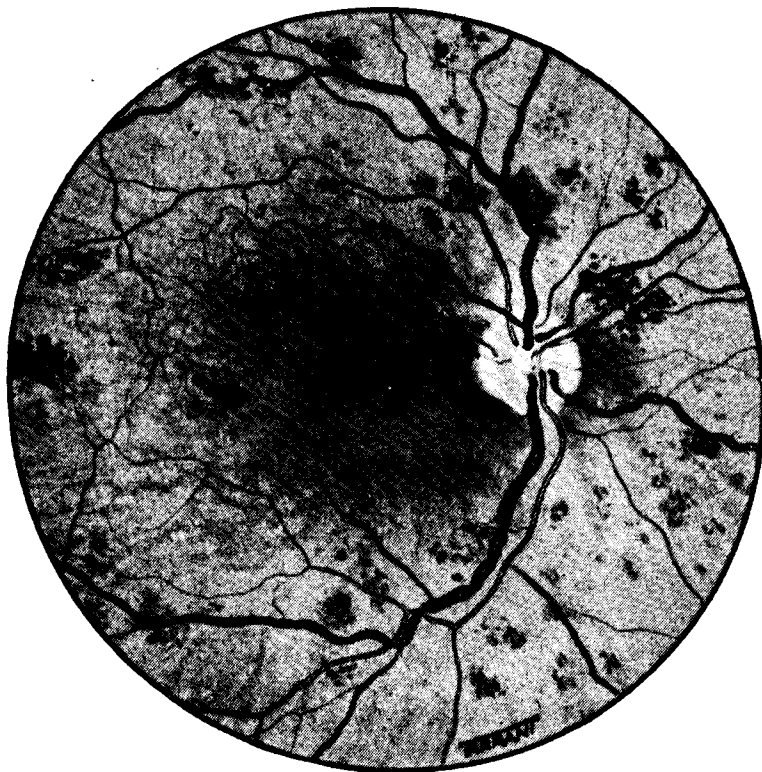
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In 1944 Waldenström described two cases of macroglobulinaemia. A similar case is here presented, with a brief review of the literature.

Case Report

A man aged 60 was referred to one of us in November, 1954, by Dr. D. R. Daniel, with a history of deteriorating vision for the previous two years. Apart from this he had little in the way of symptoms, but occasional mild epistaxes followed admission.

The only physical sign of note was a retinitis, but this presented striking and unusual features, the retinal veins



Case of macroglobulinaemia: retinal drawing.

being visibly distended and somewhat tortuous, and the fundi showing many scattered haemorrhages (see Fig.). Vision was reduced to 6/60 in both eyes. Slightly enlarged glands were present in both axillae. Anaemia was not apparent. There was no purpura, no enlargement of the liver or spleen, and no fever. Slight albuminuria appeared on occasion.

Investigation revealed a hypochromic microcytic anaemia with a haemoglobin of 31%. White counts varied between 4,000 and 6,400 per c.mm., with lymphocytes ranging from 22 to 54%, and an occasional lymphoblast. Rouleaux formation was marked. The E.S.R. was greatly elevated, ranging from 130 to 170 mm. in the first hour (Westergren). Marrow smears showed a lymphocyte preponderance, with lympho-

blasts more in evidence than in the peripheral blood (Dr. A. H. T. Robb-Smith). Liver biopsy (followed by bleeding) revealed minimal lymphocytic periportal infiltration (Dr. J. F. Heggie).

The serum was remarkably viscous, but did not gel in the cold. Total plasma proteins were 9.9 g.% (albumin 2.5 g.; globulin 7.4 g.). Paper electrophoresis showed an abnormal globulin with a mobility lying between the β and γ fractions, proportions of the various constituents being albumin 2.3 g.%, α_1 globulin 0.46 g.%, α_2 globulin 1.01 g.%, abnormal globulin 3.26 g.%, γ globulin 1.47 g.%; the figure for the abnormal globulin includes β globulin, as there was no clear line of demarcation. A paper electrophoresis after treatment showed only slight changes in pattern, but a clear demarcation appeared between the abnormal and the β globulins (abnormal globulin 2.82 g.%, β globulin 0.61 g.%). The main abnormal features of this protein pattern are the decreased amount of albumin and the very large amount of abnormal globulin present. The formol-gel test was strongly positive. Ultracentrifugation produced a sedimentation constant for the abnormal globulin of 18, indicating a molecular weight of over one million (Dr. A. S. McFarlane).

Bleeding, clotting, and prothrombin times, platelet count, and serum fibrinogen were within normal limits. X-ray pictures of the lumbar spine, pelvis, and skull showed no abnormality. Blood W.R. and Kahn were negative.

He was treated with blood transfusions initially, iron, cortisone, and tri-(2-chloro-ethyl)-amine. A slow but steady improvement took place. Vision recovered to 6/9 in both eyes, and retinal haemorrhages largely disappeared. The haemoglobin rose to 100%. A significant part of the recovery seemed to follow use of the nitrogen mustard. The man was well and at work 18 months after first being seen.

Discussion

Some important features of 16 similar cases studied, and of our own case, are shown in the Table.

Clinical Features.—The condition has been reported more often in men than in women, and usually in the older age groups. It seems to be only slowly progressive, the illnesses having lasted up to 14 years. Anaemia has been usual. A slight-to-moderate lymphadenopathy and enlargement of the liver and spleen have been reported. A haemorrhagic tendency has been usual, epistaxes and bleeding from the gums being the common manifestations. A haemorrhagic retinitis has been reported in five cases besides our own. Bone pains are not a feature, and x-ray films have been normal or have shown diffuse osteoporosis, contrasting with the findings in classical multiple myelomatosis.

Clinical Pathology.—The blood has been strikingly viscous, and the E.S.R. unusually high (in the region of 150 mm. in the first hour—Westergren). An absolute or relative lymphocytosis in the peripheral blood has been usual. Various disturbances of the bleeding mechanism have been reported, but as often as not the cause of bleeding has not been explained. Hyperglobulinaemia due to the presence of a macroglobulin has been present. Bence Jones proteinuria has been observed in five cases.

Macroglobulinaemia.—The distinguishing characteristic of a macroglobulin is, as the name suggests, the large size of the molecule. The molecular weights are all in the region of 1,000,000, while that of normal serum albumin is 65,000 and of the α , β , and γ globulins 150,000 to 300,000. Other abnormal proteins may be found in the serum or elsewhere,

AUG. 18, 1956

MACROGLOBULINAEMIA OF WALDENSTRÖM

We wish to thank Dr. J. F. Heggie for laboratory facilities; Dr. A. H. T. Robb-Smith for a report on the bone-marrow smears and for advice on pathological aspects of these cases; Dr. A. S. McFarlane for the ultracentrifuge study; Mr. J. H. Dobree for ophthalmological reports; Mr. T. R. Tarrant, of the Institute of Ophthalmology, for the retinal drawing; and Dr. R. G. Macfarlane and Professor N. H. Martin for assistance.

Macroglobulinaemia: Case Features

Author	Sex and Age	Duration (Years)	Lymphocytosis		Macroglobulin	
			Blood	Bone Marrow	Mobility	Sedimentation Constant
Waldenström (1944)	M 62	8	Yes	Yes	Between β and γ	19.2
	M 65	2	"	"	"	19.7, 25.29.3
Bichel <i>et al.</i> (1950)	M 76	14	"	"	β	20
Tischendorf and Hartmann (1950)	M 66	2	"	"	Between β and γ	Mol. wt. 1,800,000
McFarlane <i>et al.</i> (1952)	M 52	14	"	"	Between β and γ	18, 28
Schaub (1952)	F 32	3	"	"	γ	19-20
Pernis <i>et al.</i> (1954)	M 68	2	"	Yes	β	17.5, 24.20
	M 64	1½	"	"	γ	20
	M 72	2	"	"	"	26
	M 72	8	"	"	"	16.6
Wilde and Hitzelberger (1954)	F 51	6	No	"	"	19
	F 51	3	Yes	"	"	16
	F 71	6	"	"	"	15.8
Mandema <i>et al.</i> (1955)	M 69	1	"	"	γ	19.2, 30.5
	M 71	8.12	"	"	γ	15, 20
Mackay <i>et al.</i> (1956)	M 67	14	"	"	γ	17, 24
Jim and Steinkamp (1956)	F 79	4	"	"	"	18
Present case	M 60	2	"	"	Between β and γ	

such as the Bence Jones proteins, which have molecular weights of the order of 25,000 to 75,000. Cryoglobulins—weights of the order of 25,000 to 75,000. Cryoglobulins—weights of the order of 25,000 to 75,000. Cryoglobulins—weights of the order of 25,000 to 75,000. Cryoglobulins—weights of the order of 25,000 to 75,000.

Pathogenesis.—The presence of an excess of globulin and of abnormal globulins is characteristic of various disorders involving the reticulo-endothelial system. The similarity of the 17 cases here discussed suggests that a clinical entity is being described, but its nature remains uncertain. The lymphocytosis in the peripheral blood is paralleled by lymphoid hyperplasia in bone-marrow smears, but an excess of plasma cells has also been found in the latter on occasion. Lymphoid or plasma-cell hyperplasia, or both, have been observed in sections from lymph nodes, spleen, bone marrow, and other organs obtained on biopsy or at necropsy. The condition therefore has affinities with both lymphatic leukaemia and multiple myelomatosis, but final elucidation of its nature must await further evidence. In any event, it is unlikely that macroglobulinaemia will be found confined to any one disease, any more than Bence Jones proteinuria is exclusively associated with multiple myelomatosis. The second case reported by Schaub (1952) may be a case in point.

Treatment.—Cortisone, amidines, urethane, and nitrogen mustard have been used by others without seeming effect on the underlying process, though the last-mentioned drug appeared to be of value in our case.

Summary

Summary
A case of macroglobulinaemia is described. The rather characteristic features of this and similar cases from the literature are reviewed.

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Medical Memoranda

Anterior Tibial Syndrome after Acute Arterial Occlusion, Treated by Decompression

In his report of instances of an anterior tibial syndrome following arterial embolism, Watson (1955) suggests that surgical decompression of the ischaemic muscles should be attempted. The present communication reports the successful use of this treatment in a case of acute arterial occlusion which was probably due to arterial thrombosis rather than embolism (Jepson, 1955).

CASE REPORT

A man aged 68 was admitted as an emergency case at 11.15 p.m. on July 20, 1955. Five hours previously he had experienced a sudden severe pain in his right leg, which rapidly became cold, numb, and paralysed. For several months before admission he had suffered from angina of effort and intermittent claudication.

On examination his general condition was good and his temperature normal. A loud blowing systolic murmur was heard all over the praecordium, maximal at the aortic area, but there was no other evidence of cardiac disease. The left lower limb appeared healthy and the usual pulses could be felt in it. The right was pale, and felt cold from a level just above the knee. No pulsation could be felt distal to the femoral artery. Voluntary movements of the ankle were absent and there was complete sensory loss distal to the knee.

Medical treatment for arterial embolism was instituted with tolazoline, papaverine, heparin, and phenindione. Within 24 hours the whole limb, except the outer side of the foot, felt as warm as the left. No pulses had returned, but motor and sensory functions had greatly improved.

On the next morning the patient complained of pain down the front of the right leg. The pain increased during the day, and could be controlled only by morphine. By the evening the antero-lateral part of the leg was swollen and the skin over it reddened. Dilated veins could be seen here, and the maximum calf circumference was $\frac{1}{2}$ in. (1.3 cm.) more than on the left side. Sensory loss was demonstrable in this area and in that corresponding with the cutaneous distribution of the anterior tibial nerve. In view of the patient's good general state and severe pain, the anterior tibial compartment was explored.

Under general anaesthesia, a linear incision some 8 in. (20 cm.) long was made over the reddened skin area. When the deep fascia was incised the anterior tibial muscles bulged outwards and were seen to have a well-marked patchy yellowish discoloration. This faded during the next five minutes, and the muscles by that time appeared normal.

BRITISH MEDICAL JOURNAL

LONDON

SATURDAY AUGUST 18 1956

KEEPING UP WITH THE TIMES

This country has built up its reputation in the world by virtue of its belief in the sanctity of treaties and contracts, and indeed in what have been known as "gentlemen's agreements." The medical profession as a small part of this country was, we are sure, astonished to read in *The Times* of August 9 a leading article aimed, it would appear, at extricating the present Government from the pledges given to it in the reports of the two Spens Committees of 1946 and 1948. "What was unexpected," the leading article states, "was that the Government, hard-pressed to get the Health Service launched, should have solemnly promised to carry out all the proposals of the two mutually incompatible Spens Reports. That pledge has haunted Parliament ever since." Does *The Times* wish to imply that the Government of the day regarded the recommendations of the two Spens Reports just as bribes to get a reluctant profession into a State health service so that, as Mr. Bevan put it on one occasion, the fruit could be plucked when it was ripe? Who, it may be asked, regarded the proposals of the two Spens Reports as "mutually incompatible"? Was it the Government of the day? If so, its spokesmen did not say so. Was it the medical profession, who would be most likely to have divergent views on differentials? But the medical profession as well as the Government accepted the recommendations of the two Spens Committees. *The Times* states that the Consultant Spens Report "contradicted this aim," the aim, namely, of the G.P. Spens recommendations "to induce able men to prefer general to specialist practice." But this was not the view of the policy-making body of the B.M.A., the Representative Body. At the Cardiff meeting in 1953 the R.B. unanimously carried the following motion moved by a general practitioner¹: "That this meeting is of the opinion that an adequate betterment factor should now be accorded to the consultants and specialists in conformity with the intention of the Spens Report accepted by the Government and profession and

already implemented in the case of general practitioners by the Danckwerts Award." When the Representatives met in the following year at Glasgow it was again a general practitioner who voiced disquiet that the consultants had had to accept an award that was in fact not an implementation of the Spens recommendations, and the Representative Body agreed with him. In these two declarations of policy the R.B. thus backed to the full the view expressed at Cardiff in 1953 by the then chairman of the Central Consultants and Specialists Committee²: "The Spens Report not only involved adjusting remuneration to the postwar value of money, but defined the different grades of doctors serving in the hospital service and their relation to each other. It might suit the dictates of political expediency to regard the report as obsolete, but that was something to which the representatives of the profession would never agree."

The Times considers the Spens recommendations as unrealistic and asks how long the pledge given can be "regarded as binding on future Governments who have no responsibility for what their predecessors did in the wildly optimistic days of 1946 and 1948." This wild optimism must be a figment of the imagination of *The Times* leader writer, for the medical profession during that time was profoundly pessimistic and ever since has found it difficult even to be mildly optimistic over the position in which the medical profession now finds itself as a result of nationalization. Does *The Times* really seriously assert that a pledge given by one Government can be cynically disregarded by one of its successors? If the Government follows a lead thus so conveniently given to it the medical profession will then be justified, and even perhaps compelled, to review all those other conditions it accepted by entering the National Health Service in 1948. General practitioners, for example, finally and with much reluctance agreed to forgo their cherished custom of buying and selling the goodwill of general practices. They regarded this as a custom which would give them some degree of freedom and independence in a State-provided medical service. They surrendered this on compensation terms which with the subsequent devaluation of the pound have become completely unrealistic. If compensation had been paid outright at the time it would have been a different matter; but it was not. By entering the National Health Service the whole profession agreed to the profound alteration in the relationship between patient and doctor brought about by the intervention of the State as a third party. Consultants and general practitioners treating patients in the Health Service forwent the customary practice

of professional men of making private arrangements for the payment of fees. In doing this they made it impossible for themselves to make those private adjustments to the prevailing economy which members of Mr. R. H. Turton's profession, the Law, are still able to do. With much misgiving about the consequences, a misgiving which found its expression in the two plebiscites of 1948, they abandoned all these and other safeguards, because of the acceptance by the Government of its responsibility to see that in return for these sacrifices by the profession its relative economic position and social status would be preserved.

Of course the Government wants to agree with *The Times*, "that the Spens reports are outmoded." Perhaps the Health Service itself is outmoded. How the outmoded in many respects was described in the presidential address given to the Metropolitan Counties Branch of the B.M.A. in July, 1951.³ The planners of medicine⁴ have invariably singled out doctors as the principal obstacle in the way of their administrative dreams. But the planners and the politicians will never admit they may be wrong. They blandly assume that the N.H.S. is the best medical service in the world. A fatuous insularity of outlook helps them to ignore that other countries may be bold enough to doubt this. The World Medical Association, published in 1952 a valuable statement⁵ on medical services under social security which should act as a corrective to assumptions too easily accepted in this country. Quite apart from the present controversy over Spens, the time is opportune to have a fresh look at the various provisions of the N.H.S. in the light of the experience of other countries—for example in Sweden, Denmark, France, Australia, New Zealand. There are those who see that payment by capitation fee plus restriction of lists may lead to the whole-time salaried service which even a Labour Party spokesman⁶ agreed would be incompatible with free choice of doctor. But there are other alternatives successfully in operation in other countries. Why do not our politicians have a look at the Australian pharmaceutical scheme, or at the same realistic approach of other countries to this problem? Are they really blind to the undermining of individual responsibility that is always inseparable from any public system of giving something for (apparently) nothing? The old virtues of thrift, initiative, independence, personal responsibility for decision and action, are now in the discard, and rival political parties feverishly search for methods of bribing the voter, and do not hesitate to use Medicine in this unholy game. The professional classes as a whole are being squeezed

out of decent existence in the process, as numerous articles in the national press have shown during the past year or so. And it is not only their economic position which is at stake, but a way of life that with all its faults was a powerful force for good in the country. By standing up for its rights the medical profession will be doing something more than an act of enlightened self-interest; it must do it *pour encourager les autres*. We must learn the lesson with which *The Times* concluded a leading article on Suez early this month, when it quoted F. S. Oliver thus: "If a country will not stand up for its rights, it will surely lose them. The spirit of giving in is the most fatal disease to which nations are subject, and it is apt to attack them, like a cancer, when they have arrived at the meridian." A country, it might have been added, will be able to do this only so long as the individuals in it live up to this sturdy doctrine.

ATTENUATED POLIOMYELITIS VIRUSES

Prevention of poliomyelitis presents many problems. One of the most prominent at the present time, especially in countries where mass immunization is being carried out, is to know how long the protective effect of a formalized vaccine will last. Whatever may be the mechanism for persistence of antibody in poliomyelitis, there can be no doubt that its presence following natural clinical and sub-clinical infection is directly concerned in the prevention of subsequent infection of the nervous system. J. E. Salk has shown that antibody levels, comparable to those encountered in the natural disease, can be produced with a formalized vaccine, provided the vaccine itself is potent and the injections are correctly spaced.¹⁻³ In his opinion there also exists a hyper-reactive state, which results in an accelerated antibody response on subsequent injection of vaccine. What is not clear at present is whether the same type of booster response will follow natural reinfection. If it does the outlook is encouraging. A. B. Sabin, on the other hand, failed to demonstrate an accelerated response in a small number of human volunteers with minimal antibody levels given attenuated viruses by mouth.⁴ This is but one of many problems waiting to be clarified. In the meantime research on the development of modified strains of poliomyelitis continues.

¹ Salk, J. E., *Amer. J. publ. Hlth*, 1955, 45, 285.

² *J. Amer. med. Ass.*, 1955, 158, 1239.

³ *Ann. N.Y. Acad. Sci.*, 1955, 61, 1023.

⁴ Sabin, A. B., *J. Amer. med. Ass.*, 1955, 158, 1274.

⁵ Cox, H. R., *British Medical Journal*, 1954, 2, 259.

⁶ Sabin, A. B., *ibid.*, 1955, 2, 160.

⁷ Koprowski, H., in *Wild Hlth Org. Monogr. Ser.*, No. 26, p. 335.

⁸ Jervis, G. A., and Norton, T. W., *Amer. J. Hyg.*, 1952, 55, 108.

⁹ *British Medical Journal*, 1956, 1, 284.

¹⁰ Koprowski, H., *et al.*, *J. Amer. med. Ass.*, 1956, 160, 954.

¹¹ Stokes, J., *jun.*, *ibid.*, 1955, 158, 1275.

¹ Supplement to the *British Medical Journal*, 1953, 2, 27.

² *Ibid.*, 1953, 2, 26.

³ *Ibid.*, 1951, 2, 41.

⁴ *British Medical Journal*, 1944, 2, 47.

⁵ Supplement to the *British Medical Journal*, 1952, 2, 83.

⁶ *British Medical Journal*, 1946, 1, 725.

Though there are important differences in the method of attenuation they are all based on the same principle, which is to produce an asymptomatic infection of the alimentary tract with the subsequent formation of antibody.⁵⁻⁷ Four years ago H. Koprowski and his associates made a preliminary report on the effect of feeding an attenuated type 2 virus (T.N. strain) to a number of young children.⁸ All remained well, and alimentary infection, with formation of antibody, resulted. Since then the work has developed in many directions. Two strains have now been modified by serial passage in small rodents, a type 1 (S.M.) strain and an even more attenuated type 2 (T.N.) strain.⁹ Both have the same general properties of greatly reduced virulence for the nervous system and are immunogenic when given by mouth.⁹ No attenuated type 3 strain of this type is yet available. In a recent paper Koprowski and his colleagues report on further clinical investigations with these two attenuated strains, in which much of their experience of the last five years is summarized.¹⁰ The trial was carried out in a State institution for mentally defective children. Special arrangements were made for clinical observation, organization of medical and nursing staffs, isolation, and detailed laboratory investigations. The type 1 (S.M.) strain was given in a gelatin capsule and the type 2 in a milk-shake. In accordance with the actual amount of virus present, the type 1 regularly produced alimentary infection and neutralizing antibody. With the type 2 strain alimentary infection was sporadic, but antibody developed, though not quite as promptly as with type 1. As to contagiousness, the type 2 strain is almost non-contagious, since it appears only sporadically in the faeces. Special arrangements were made to determine the contagiousness of the type 1 strain by exposing non-immune subjects to conditions of very close contact and to conditions which might prevail in an ordinary hospital ward. Five out of 15 contacts became alimentary carriers of type 1 virus, but the social behaviour of some of those participating was far from normal, and was conducive to transmission of infection by the faecal-oral routes. On the other hand, 7 out of 9 nurses, who at the start of the trial had no antibody to type 1, still had no antibody several months later.

Dr. Koprowski and his co-workers had earlier shown that, if both type 1 and type 2 strains were fed together, virus "interference" resulted, which usually meant that the type 1 got the upper hand unless a much larger dose of type 2 was given. Their recent findings suggest that this can be overcome by feeding the type 2 virus several weeks after the type 1. They were also able to show that immune serum globulin

given simultaneously with virus did not prevent alimentary infection, the duration of the intestinal carrier state, or the development of antibody. This is an important observation, for it has been suggested that previous immunization with a formalized vaccine might, by virtue of the antibody present, nullify the subsequent use of an attenuated vaccine, should that be necessary. It also indicates that it may be possible in future to immunize children under cover of maternal antibody or gamma globulin.¹¹ In spite of the many difficulties encountered in this type of work great progress has been made since the original report four years ago.⁸ But as an alternative method of immunization this work is still unquestionably in the experimental stage. In the present state of our knowledge a vaccine to afford complete protection should contain all three immunological types of virus, and special problems of its safety arise on which much more information is needed. So far as they go these results are encouraging and present yet another step "in an attempt to transfer results obtained in the laboratory to actual field observations."⁸

PULMONARY EMBOLISM BY AMNIOTIC FLUID

Although pulmonary embolism due to amniotic fluid was first described in 1941 as a possible cause of shock in obstetrics,¹ published accounts of the condition were still very few some ten years later when this entity was discussed in these columns.² In what is apparently only the fourth report of this condition in British journals, H. D. Attwood has recently described a fatal case.³ The clinical picture was typical in that the victim was an elderly multipara in strong labour, with the symptoms beginning soon after rupture of the membranes disclosed meconium-stained liquor. However, the infusion of liquor amnii into the maternal circulation may begin before there is clinical evidence of rupture of the membranes, and exceptionally the symptoms precede the onset of labour or, less uncommonly, follow its conclusion. In Attwood's case there followed in rapid succession profound shock, unconsciousness, dyspnoea, and cyanosis, and the patient died within five minutes. Necropsy showed an asphyxial type of cyanosis and a greatly dilated right heart. The characteristic histological findings are shown with uncommon clarity in accompanying photomicrographs. In the

¹ Steiner, P. E., and Lushbaugh, C. C., *J. Amer. med. Ass.*, 1941, 117, 1245.
² *British Medical Journal*, 1951, 2, 901.
³ Attwood, H. D., *J. clin. Path.*, 1956, 9, 38.
⁴ Seltzer, L. M., and Schuman, W., *Amer. J. Obstet. Gynec.*, 1947, 54, 1038.
⁵ Stallworthy, J., in *British Obstetric Practice*, ed. E. Holland, 1955, London.
⁶ Reid, D. E., Weiner, A. E., and Roby, C. C., *Amer. J. Obstet. Gynec.*, 1953, 66, 465.
⁷ Schneider, C. L., *ibid.*, 1955, 69, 758.
⁸ Scott, J. S., *British Medical Journal*, 1955, 2, 290.

pulmonary arteries and arterioles and alveolar capillaries can be seen epithelial squames, mucin with enmeshed polymorphs, fat, lanugo hairs, and bile. Squames and mucin are also present in the uterine venous sinuses and in the glomerular and peritubular capillaries of the kidneys. Several strands of mucin with related polymorphs are seen in a cerebral capillary and one squame in a capillary deep in the myocardium.

The emboli thus consist of the particulate matter of amniotic fluid and meconium, and indeed P. E. Steiner and C. C. Lushbaugh¹ produced similar clinical and pathological signs in dogs and rabbits by the intravenous injection of unfiltered liquor and meconium; the injection of filtered liquor was without effect. Attwood was unable in his case to demonstrate the possible site of entry of the liquor into the maternal circulation, but in every case some abnormal communication must presumably exist through which the liquor is forced by the strong uterine contractions while the foetal head plugs the outlet. Indeed, in more than half of the previously reported cases obvious tears into the myometrium from the interior of the uterus or gross lesions at the placental site were found. This high incidence of associated pathological conditions, notably intrapartum haemorrhage and uterine rupture, is an important factor in the high mortality rate. Non-fatal forms of the disease have been recognized clinically,^{4,5} but probably in most cases with survival the diagnosis of amniotic embolism is either not suspected or not proved. The frequent accompaniment of haemorrhage, especially when death was not immediate, led D. E. Reid and his colleagues⁶ to suggest that the infusion of amniotic fluid into the maternal circulation might produce intravascular clotting and subsequent defibrination of the maternal blood, with consequent haemorrhage from the genital tract. However, C. L. Schneider⁷ concludes that, important as fibrin deposits causing pulmonary vascular occlusions may be in severe accidental haemorrhage, there is not yet any evidence that coagulation of fibrin contributes much to the circulatory embarrassment of amniotic embolism. He regards it as unnecessary to postulate that the process of circulatory obstruction after amniotic infusion is one of intravascular coagulation, because the widely disseminated pulmonary embolism of amniotic debris provides an adequate cause. Attwood confirmed in his case the enormous extent of the plugging of the maternal pulmonary vessels; and he believes that the use of special staining methods such as he used may show that the proportion of deaths in labour due to the infusion of liquor

amni is higher than present figures suggest. When the pathogenesis is considered, it is not surprising that this particular complication of labour does occur; rather is it surprising that it apparently occurs so infrequently, especially at a time when pitocin is widely, if not always wisely, given to enhance uterine contractions.

Since clinical recognition is far from easy and the frequency of immediate death high, the likelihood of being able to give specific treatment is small. However, when amniotic embolism is suspected—and especially when shock in labour is accompanied by cyanosis—the administration of oxygen is indicated, and Attwood suggests that the application of venous tourniquets would lessen the strain on the right ventricle. If the patient survives the immediate threat to life, the possibility of hypofibrinogenemia must be borne in mind and tested for by a simple technique such as that described by J. S. Scott.⁸

CRYOGLOBULINAEMIA AND MACROGLOBULINAEMIA

In 1933 M. M. Wintrobe and M. V. Buell¹ described, from a case of multiple myeloma, the presence in the serum of a protein which precipitated on cooling. Some twenty reports on the presence of such proteins in multiple myelomatosis have appeared since. C. G. Holmberg and A. Gronwall² found them in a patient with rheumatoid arthritis, and D. H. Atlas and his colleagues³ in liver disease. E. Wertheimer and his colleagues⁴ found cold-precipitable protein in kala-azar, bacterial endocarditis, malaria, chronic nephritis, and periarteritis nodosa. A. B. Lerner and C. J. Watson⁵ in 1947 coined the term cryoglobulinaemia for all those conditions in which cold-precipitable proteins are found (*κρυός* meaning cold). At that time they reviewed fourteen earlier reports on the subject, and some twenty-five have appeared since. Though one case has recently been described in which cryoglobulinaemia and a high titre for cold agglutinins were associated,⁷ the two are usually not found together. Cold agglutinins are found in virus pneumonia, mumps, infectious mononucleosis, tropical eosinophilia, and trypanosomiasis. Cryoglobulinaemia, on the other hand, is often seen in bacterial endocarditis, multiple myeloma, chronic lymphatic

¹ Wintrobe, M. M., and Buell, M. V., *Bull. Johns Hopk. Hosp.*, 1933, 52, 156.
² Holmberg, C. G., and Gronwall, A., *Hoppe-Seyl. Z. physiol. Chem.*, 1942, 273, 199.
³ Atlas, D. H., Gardon, L., and Bunata, J., *Amer. J. clin. Path. (Tech. Suppl.)*, 1943, 7, 21.
⁴ Wertheimer, E., and Stein, L., *J. Lab. clin. Med.*, 1944, 29, 1082.
⁵ Shapiro, B., and Wertheimer, E., *Brit. J. exp. Path.*, 1946, 27, 225.
⁶ Lerner, A. B., and Watson, C. J., *Amer. J. med. Sci.*, 1947, 214, 410.
⁷ Conn, H. O., *New Engl. J. Med.*, 1955, 253, 1011.
⁸ Volpé, R., Bruce-Robertson, A., Fletcher, A. A., and Charles, W. B., *Amer. J. Med.*, 1956, 20, 533.
⁹ Wirschaftler, Z. T., Williams, D. W., and Gauden, E. C., *ibid.*, 1956, 20, 624.
¹⁰ Waldenström, J., *Acta med. scand.*, 1944, 117, 216.
¹¹ Braunsteiner, H., Falkner, R., Neumayer, A., and Pakesch, F., *Klin. Wschr.*, 1954, 32, 722.
¹² Waldenström, J., *Schweiz. med. Wschr.*, 1948, 78, 927.
¹³ Mackay, I. R., Eriksen, N., Motulsky, A. G., and Volwiler, W., *Amer. J. Med.*, 1956, 20, 564.

leukaemia, and polyarteritis nodosa; it can also be found sometimes in cases of coronary disease, asthma, urticaria, gout, malaria, and brucellosis. There have been three cases in which extensive investigation before and after death failed to reveal an underlying cause; these conditions were named "essential" cryoglobulinaemia by Volpé and his colleagues.⁸ Biochemical examination of the serum shows that the cryoglobulin moves with the gamma globulin fraction on electrophoresis; gamma globulin increases in accordance with the degree of the cryoglobulinaemia. On exposure to cold the protein may be deposited intravascularly. Gelatinous material may be seen in the retinal vessels *in vivo* and has been demonstrated in other vessels *post mortem*. Partial occlusion of blood vessels with viscous protein may lead to stasis, and this may give rise to a variety of conditions ranging from simple urticaria with subsequent purpura to a fully developed Raynaud's syndrome, even with subsequent necrosis and gangrenous ulceration. Cryoglobulinaemia is worth bearing in mind when a patient is unduly sensitive to cold. An unexpected reddening of an area exposed to draught is often the first indication of the state.

It has generally been held that not much could be done for the patient apart from treating the conditions which may be associated with cryoglobulinaemia. The only effective measure was care in avoiding exposure to cooling, since this would prevent any further damage due to occlusion of vessels by sludges of viscous cryoglobulin. But Volpé and his collaborators have suggested that tissue reaction may be a factor in the pathogenesis of the lesions. The patient's own precipitating cryoglobulins might act as a foreign protein, stimulating a tissue response with associated rigors and fever, and resulting in purpura. In support of this thesis they report favourable results of treatment with A.C.T.H., without significant decrease in the concentration of the cryoglobulin. On the other hand, Z. T. Wirtschaffler and colleagues⁹ treated a patient with cortisone and found that the cryoglobulin disappeared from the plasma and that the patient no longer reacted abnormally to cold. The possible therapeutic role of A.C.T.H. and cortisone in cryoglobulinaemia will clearly have to be more widely explored.

Another pathological "globulinaemia" is a condition in which part of the globulin fraction consists of very large molecules. J. Waldenström, the first to describe it, in 1944, named it macroglobulinaemia¹⁰ and a case is reported at p. 402 of the *Journal* this week by Drs. D. G. Ferriman and A. B. Anderson. The first indication in the laboratory may be a raised erythrocyte sedimentation rate, but the large molecular weight of the protein can be identified only by ultracentrifugation. Unlike the cryoglobulins, which on electrophoresis are found in the gamma globulin fraction, the macroglobulins move on electrophoresis with the beta globulins, or between the beta and the gamma globulins. Patients with Waldenström's macroglobulinaemia suffer from lassitude, shortness of breath, and bleeding mucous membranes. The liver is usually enlarged and the lymph nodes painlessly swollen. Often, though

not invariably, numerous lymphocyte-like cells are found in the bone marrow. Ferriman and Anderson's patient presented with a history of deteriorating vision for two years, due to an unusual type of retinitis. Waldenström's patient had a low concentration of fibrinogen, and it is likely that the macroglobulins interfere with the formation of fibrin itself. H. Braunsteiner and colleagues¹¹ have shown by means of electron microscopy that the formation of pseudopodia and the adhesiveness of platelets are inhibited. Adsorption of coagulation factors on the macroglobulins may further increase the tendency to bleeding.

Macroglobulinaemia has to be distinguished from purpura hyperglobulinaemia, another condition described by Waldenström.¹² Purpura hyperglobulinaemia is associated with a hypergammaglobulinaemia, and in addition to the difference in the electrophoretic pattern there is no increase in molecular weight in this condition. Electrophoretically myelomatosis cannot be differentiated from macroglobulinaemia; the only way to arrive at a definite diagnosis (in the absence of a clear-cut clinical picture) is to test the serum for macromolecules by ultracentrifugation. I. R. Mackay and colleagues¹³ have pointed out that it appears probable that many atypical cases of lymphosarcoma and lymphatic leukaemia may in fact be cases of macroglobulinaemia. In all three are found infiltration of bone marrow and lymph nodes with small atypical lymphocytes, as well as lymphadenopathy and hepatosplenomegaly.

SPREAD OF BACILLARY DYSENTERY

Although the unprecedented numbers of notifications of Sonne dysentery in recent years are attributable in part to improved diagnostic facilities, this infection seems now to be unduly widespread, particularly in primary schools and nurseries. Dr. R. Irene Hutchinson, of the Public Health Laboratory, Southampton, has made an extensive study of the distribution of the organism in infected environments which goes far to explain how the infection may be spread.¹ Of many possible contaminated objects cultivated in homes or institutions where cases were occurring, water-closet seats, floor dust collected near them, and bedding and toys used by cases yielded the only positive results, and attention was concentrated on the first of these. Dye tests showed that the seat was splashed by flushing, and the organism could be cultivated from the seat after a liquid infected stool had been flushed away, although not after the disposal of smaller quantities of solid faeces. This finding, though the author does not say so, seems to invite an inquiry into the design of water closets with a view to preventing contamination of the seat. Observation was then kept on small children using water closets: 17 out of 37 "handled the seat with one or both hands while settling themselves upon it," and 6 of the 17 "then handled the face and mouth . . . or sucked their fingers." Though they all washed after leaving the closet,

¹ Hutchinson, I. R., *Monthly Bull. Minst. Hlth (Lond.)*, 1956, 15, 110.

transmission could already have occurred. The survival of *Sh. sonnei* outside the body, on water-closet seats and under other conditions, was also studied and found to be favoured, as would be expected, by poor illumination, low temperature, and high humidity. That these are just the conditions which exist in the average water closet was verified by observations of temperature and humidity in several of them.

It was also shown—not for the first time—that faecal bacteria readily pass through two layers of toilet paper: these experiments were done with five different makes, two containing disinfectants. Two questions therefore arise: Has anyone ever shown that the incorporation of a disinfectant in toilet paper has any hygienic value, and, Is it beyond the wit of man to devise a material for this purpose which is not freely permeable by bacteria? The finding of *Sh. sonnei* on children's hands is presumably thought to be explicable mainly in this way. The results of such tests were somewhat erratic. At a primary school and three day nurseries where outbreaks were in progress the numbers of positives were 2/118, 0/25, 0/50, and 17/35. These swabs were taken after the children "had visited the toilet for the purpose of micturition and before hand washing"; the results for boys and girls are not separately stated. It was also found that *Sh. sonnei* applied as a broth culture will survive on the fingers for three hours.

Unfortunately preventive measures based on these findings do not readily suggest themselves. That water closets should be in "a brightly lighted, warm and sunny position" is a counsel of perfection, and if it reduced the survival of *Sh. sonnei* on the closet seat from 17 days to as many hours the risk would still be there. It is an interesting thought that the most primitive provision for defaecation, such as squatting over a hole above a pit, would obviate a hazard now shown to be involved in the use of a civilized appliance, although admittedly primitive methods of sewage disposal have other and sometimes graver drawbacks.

RADIOLOGICAL PROTECTION

The public has heard or read many official and semi-official statements on radiation hazards and protective measures during recent months. But the report of the International Commission on Radiological Protection is in a special category inasmuch as this committee of experts has had the subject under review for almost thirty years, and its membership has always been drawn from many nations. Reporting last week to the 8th International Congress of Radiology meeting in Mexico City, the Commission made no drastic changes in its recommendations about permissible levels for occupational exposure, but some ambiguities were removed and new detailed recommendations made on specific matters. Sir Ernest Rock Carling comments on the report in our correspondence columns this week (p. 416). In the Commission's last report¹ there was a recommendation that "in the case of the prolonged exposure of a large population the maximum permissible levels should be reduced by a factor of 10 below those accepted for occupational

exposure." In some quarters this was taken to mean that the whole population could safely be subjected to one-tenth of the level permitted for occupational exposure. The Commission denies this interpretation and states that the recommendation was, and is, intended to ensure that if large numbers of people live near a nuclear energy establishment it shall not be considered safe to expose them to the same dose as may be received by the smaller number who actually work in the establishment. This safety factor was presumably introduced on genetic grounds, and the Commission has now recognized its responsibility to assess the larger genetic hazard which could arise from the exposure of the whole population as a result of widespread use of nuclear energy as a source of power. It promises a quicker study of this problem and in the meantime holds that it would be "prudent to limit the dose of radiation received by gametes from all sources additional to the natural background to an amount of the order of the natural background in presently inhabited regions of the earth." The recent M.R.C. report on radiation hazards² estimated that in Britain the average dose to the gonads from diagnostic radiology alone was 22% of the natural background dose, and the corresponding American report³ estimated that the diagnostic dose in the U.S.A. was about equal to the natural background dose. These figures emphasize again the narrow margin between present practice and present estimates of the "safe" genetic dose.

The committee considering very high energy x rays and heavy particles has this year supplemented its recommendations with a number of practical appendices on the properties of high-energy radiations, their attenuation in different materials, and the danger from secondary neutrons and protons when very high energy rays are used. In view of the increasing number of research institutions where cyclotrons or other high-energy accelerators are in use, the I.C.R.P. has wisely given thought to the problems of induced activities and stray radiations from such machines. When the Commission's last report was published in 1955 the committee on the handling of radioactive isotopes and the disposal of radioactive waste had not yet reported. This committee has now issued a long report touching on all aspects of these two subjects. It emphasizes the need for continuing study of the many problems entailed in large-scale disposal of waste and promises more detailed consideration of this topic in subsequent reports.

It is good that the traditions of caution and of international co-operation between experts without governmental interference, which were built up by the I.C.R.P. long before the subject of radiological protection had assumed any political significance, are still being maintained so well, and its recommendations should be given the greatest weight. The Commission has been recognized by W.H.O. as a non-governmental organization, and it is to be hoped that this link will facilitate the work of the Commission and make it more widely known without restricting its freedom in any way.

¹ *Brit. J. Radiol.*, 1955, Suppl. No. 6. See *British Medical Journal*, 1955, 2, 370.
² *British Medical Journal*, 1956, 1, 1418.
³ *Ibid.*, 1956, 1, 1482.

FIRST INTERNATIONAL CONGRESS
OF HUMAN GENETICS

[FROM SPECIAL CORRESPONDENTS]

For many years students of human genetics have played an active part at the International Genetics Congresses. Now for various reasons it has become desirable that a congress of purely human genetics should take place. The interest of medical men in genetics has been increasing with the development of genetic clinics to which doctors may refer their patients; in addition, great strides have been made in the development of serological genetics. Much anxiety is felt too about the genetic effects of nuclear energy, even when put to peaceful use. The obvious country for the first meeting was Denmark, which, under the inspiring leadership of Professor TAGE KEMP, is genetically the most thoroughly investigated country in Europe. Thus during August 1-6 the First International Congress of Human Genetics was held at Copenhagen. Over 250 papers, demonstrations, or films were given there, and it is only possible to report those that were novel or of general interest.

Radiation and Mutation

The possible effect of radiation in increasing human mutation has been fully evaluated recently in the Medical Research Council's report on *The Hazards to Man of Nuclear and Allied Radiations* and the report of the National Academy of Sciences from the U.S.A.¹ Accordingly there was little more to be said on this apart from additional information given at the Congress by Professor J. V. NEEL, of Ann Arbor, U.S.A. He reported that the apparent alteration in the sex ratio of children born to irradiated mothers, earlier reported, no longer existed now that additional children had been brought into the series. There were, in fact, now no clear indications that radiation of parents had affected their later-born children except in the few cases where the mother was already pregnant at the time of the exposure.

There was considerable discussion on the amount of deleterious mutations already current in human populations and the effect on this load of, for example, doubling the mutation rate. There were here two contrasting viewpoints. Professor H. J. MULLER, of Bloomington, U.S.A., argued that the load was already very considerable and would be proportionately increased by any increase in mutation rate. In human beings, he said, a number of different lines of reasoning suggested that the average mutation rate per gene locus was about 1/100,000 and that the total mutation rate at all gene loci was of the order of 1/10. Accordingly the chance that a newly conceived child would receive a fresh mutation was about 1/5. Nearly all mutations, he suggested, were partially "dominant" and they exerted some effect in the heterozygote—that is, when present on only one member of a chromosome pair with a normal corresponding gene on the paired chromosome. This meant that to balance the new mutations constantly arising in each generation it was necessary that about one individual in five should suffer a genetically determined death. Only a minority of this elimination could occur, he thought, from intrauterine death. Clearly, then, a doubling of the mutation rate would be a most serious matter.

Professor L. S. PENROSE, of London, thought that current estimates of mutation rates were all rather high; that with dominant mutations, for example, what appeared to be a single pathological entity was often caused by several alternative mutant genes, each individual gene having a mutation rate several lower than that required if all cases were due to mutation at the same gene locus. More important, he considered that many genes which caused serious diseases in the homozygous state—that is, when present on both members of a chromosome pair—had been kept relatively common by a selective advantage of the

gene in the heterozygote. This selective advantage might occur only in certain environmental circumstances; for example, some high frequencies of deleterious mutations in the population to-day might be there because of advantage in relation to major epidemic diseases now eliminated. In this situation a doubling of the mutation rate would have little effect on the frequency in the population of a deleterious mutation. The selective advantage of the heterozygote had brought the frequency of the disorder present in the homozygotes much above the level which would be maintained by the mutation rate alone. It was possible, he thought, that an alteration in environmental circumstances—for example, the elimination of a serious infectious disease—might reduce the frequency of some genetic disorders in spite of a rise in the mutation rate for the genes responsible.

Dr. T. C. CARTER, of Harwell, England, made the point that, since there were a considerable number of genes which were undoubtedly disadvantageous in the heterozygous state and under almost any conceivable circumstances, an increase in mutation rate was undesirable.

Cousin Marriage

One way of estimating the frequency in the population of deleterious genes which are recessive—that is, genes that are readily detectable only when homozygous—is to study the offspring of cousin marriages. If a man marries a first cousin there is a 1/8 chance that she will carry any particular genetic factor he has himself, and so with rare genes the risk is much increased that a child will receive the same abnormal recessive gene from each parent. No large-scale studies of cousin marriages are yet available. Professor J. A. BÖÖK, of Uppsala, Sweden, reported an interesting small-scale, but thorough, study of all first-cousin marriages in an isolated area of Northern Sweden. There were 34 such unions, with 218 live-born children, and their experience was compared with a similar number of random control families. The fertility of the parents and the number of abortions and stillbirths in the cousin marriages was much the same as in those of the controls. But more intellectually defective children were found in the offspring of the cousin marriages, and Professor Bök calculated that the total risk of hereditary disorder to children of these marriages was as high as 16%, as compared with 4% in the control marriages. He estimated tentatively that the average individual in this area was heterozygous for three recessive genes which would cause major illness in homozygotes and that in the whole district there were from 150 to 450 such deleterious recessive genes current in the population.

Others present reported cousin marriage studies contemplated or already begun—for example, Professor A. C. STEVENSON, of Belfast, and Dr. J. MOHR, of Oslo. Much the biggest, however, will be that in Japan, where a very large number of cousin marriages have been ascertained in the Hiroshima and Nagasaki surveys.

Another use of cousin marriages was illustrated by Dr. ELIOT SLATER, of London. The investigator starting with a series of individuals who have a rare recessively determined disorder finds that a considerable proportion are the children of parents who were cousins or otherwise blood relations. Dr. Slater reported a study of 242 patients with psychotic illnesses whose parents were related and 242 controls with psychotic illness whose parents were not related. The one type of mental illness significantly more frequent in the first group was schizophrenia, and Dr. Slater showed that one might tentatively estimate that if a single recessive gene was responsible for this excess in the group of cousin marriages it would account for about one-fifth of all cases of schizophrenia.

Twinning

Twins have been important in the study of human genetics since Francis Galton first pointed out in the last century that twins were of two types, now called "identical" and "fraternal," or better "monozygous" and "dizygous." Professor P. J. WAARDENBURG, of Leyden, Holland, and Dr.

N. F. WALKER, of Toronto, outlined the development since then of the methods available for distinguishing the two types of twins. Over 25 years ago it was established that by no means all monozygous twins were monochorionic; they might have entirely distinct placentas and membranes. The methods now used were mainly blood-group determination and analysis of finger-prints. Dr. WALKER stressed the value of the recent discovery by Smithies of the haptoglobulins in blood plasma and the demonstration by Smithies and herself that there were three types simply inherited on the basis of two allelomorphous genes, the heterozygotes being distinguishable from either homozygote. The addition of these plasma types to the blood groups based on red-cell antigens meant that 94% of dizygous twins could be distinguished by sex and blood alone. Professor WAARDENBURG noted that inter-pair differences between monozygous twins gave an idea of the range within which a given genetic constitution might be modified by the environment. The comparison of the degree of resemblance of monozygous and dizygous pairs was useful in estimating the role of heredity in determining conditions which were difficult to study by the family method—for example, senile conditions—but, he added, the shortcomings of the method must constantly be borne in mind.

A number of speakers described important twin studies now being contemplated or already under way. Notable among these is a scheme in Denmark to ascertain every twin born between 1870 and 1910. Some preliminary reports of this Danish study were given. The importance of complete ascertainment in this way was well illustrated in a paper from Dr. B. SIMONDS, of London, showing how in her own survey the apparent resemblance of twin pairs for pulmonary tuberculosis was much affected by the way in which, and the completeness with which, the twins were ascertained.

Detection of the Carrier

Genetic analysis and the reliability of genetic advice to parents who are referred by their general practitioners to genetic counselling clinics is made much simpler when it is possible to pick out the carriers of the gene. These carriers may be heterozygotes for recessive genes or, in the case of women, for sex-linked recessive genes. Dr. D. Y. HSIA, of Harvard, U.S.A., reported that the heterozygotes for the recessive gene responsible for phenylpyruvic amentia could be distinguished by a high plasma level of phenylalanine following a test dose of 0.1 g. per kg. body weight, though there might be overlap in individual cases. Dr. C. O. CARTER and Dr. M. J. SIMPKISS, of London, reported that women heterozygous for the sex-linked recessive gene for nephrogenic diabetes insipidus could be distinguished in most instances by a simple urine concentration test. Carriers may also be those with a dominant gene who are themselves apparently unaffected. Professor A. CODOUNIS, of Athens, reported that some individuals possessing the dominant gene responsible for hereditary methaemoglobinemia, although the amount was below the level which produces clinical cyanosis.

Antenatal Sexing and Blood Grouping

Dr. F. FUCHS and his co-workers, of Hellerup, Denmark, gave an account of sexing the human foetus as early as the fourth month from amniotic fluid cells, and of the determination of the ABO group of the foetus late in pregnancy. Dr. L. SACHS and his co-workers, of Jerusalem, gave a similar account of the possibility of early antenatal sexing.

Man's Chromosome Number

Man's chromosome number of 48 has gone unchallenged for more than 20 years, but Dr. J. H. TJO, from Spain, had a demonstration of slides prepared from tissue culture of cells from three-months human embryos showing that the true number was 46.² Dr. C. E. FORD and Dr. J. L. HAMERTON, of Harwell, England, showed photomicrographs of cells

from three human testes confirming that the true number was 46, and estimating that the total length of the human chromosomes was 27 morgan units, half as long again as those of the mouse.

Specialist sessions were held on internal medicine, neurology, ophthalmology, psychiatry, and odontology. The part played by genetic factors in the first three specialties is well known, but two excellent papers in the dental section, by Dr. C. J. WITKOP, of Bethesda, U.S.A., and Dr. C. SCHULZER, of Göttingen, Germany, were noteworthy for putting genetic studies for the first time firmly on the map in this specialty.

Recent research on abnormal haemoglobins was described by two British workers, Dr. H. LEHMANN (London) and Dr. A. C. ALLISON (Oxford).

Blood Groups and Disease

The section entitled "Population Genetics—Anthropology—Blood Groups" accounted for about one-third of all the papers presented at the congress, and a great majority of these, about 28 papers, dealt with some aspect of the blood groups—clear evidence of the vitality of research in this field. A subject which was almost for the first time introduced on an international platform was the relation between blood groups and the incidence of various diseases. The outstanding previous paper which initiated the present rapid development of the subject was that of I. AIRD, H. H. BENTALL, and J. A. FRASER ROBERTS,³ who early in 1953 showed a highly significant excess of group A subjects among sufferers from carcinoma of the stomach. At this congress the introductory paper was given by Sir RONALD FISHER (Great Britain), who showed how a new science was being created by the coming together of demography, biometry, and physical anthropology under the aegis of the blood groups. One among many stimulating ideas put forward was that of evolutionary modification of blood group frequencies under environmental influences. This was taken up by Dr. A. E. MOURANT (Great Britain), who showed that the present distribution of the ABO groups was such as to suggest that it was the effect of such influences; he stated that the recently observed disturbances of frequencies of the ABO groups among sufferers from certain diseases showed that the environment was indeed favouring the survival of certain groups at the expense of the others. Dr. J. A. FRASER ROBERTS (Great Britain) summarized the knowledge won in the last three years on altered ABO blood group frequencies in carcinoma of the stomach, duodenal and gastric ulcer, and diabetes mellitus, while the frequencies were essentially unaltered in several other diseases.

In a subsequent session it was a striking experience to hear speaker after speaker bring forward either new correlations between blood groups in disease or important confirmations from one country of correlations previously observed in another. Such confirmations are important, since they tend to show that the correlations observed are direct rather than accidental by-products of stratification of the population of a particular country. Mr. H. H. BENTALL (Great Britain) reported a collaborative investigation which for the first time demonstrated unmistakably the previously suspected excess of group A persons among patients with pernicious anaemia. Dr. J. A. BUCKWALTER (U.S.A.) showed that in Iowa the trends in gastric and duodenal ulcer and in gastric carcinoma are similar to those found in Great Britain. Dr. C. A. CLARKE (Great Britain), in collaboration with Dr. P. M. SHEPHERD, showed that the association in the general population between Group A and duodenal ulcer did not extend to sibships (that is, sibships including persons with and without ulcers—some siblings being of group A and others of group O). Possible explanations are that the population is indeed stratified, or that the ulcer diathesis depends not directly on the patient's own blood group but on that of his or her mother. Dr. R. B. MCCONNELL (Great Britain), again with the collaboration of Dr. SHEPHERD, showed that patients with duodenal ulcer include an excess of non-secretors of the ABO antigens, not only in the population as a whole, but in sibships.

³ Ibid., 1953, 1, 799.¹ British Medical Journal, 1956, 1, 1418; 1472.² British Medical Journal, 1956, 2, 353.

It would thus appear that ulceration is more directly related to secretion than to blood group.

Dr. E. MAYR (U.S.A.) reported an investigation in collaboration with Drs. L. K. DIAMOND, P. LEVINE, and M. MAYR on blood group frequencies in a variety of diseases of the central nervous system and associated structures. The numbers were inadequate to prove definite correlations, but two observations were highly suggestive—an association of chromophobe adenoma of the pituitary with group O and one of glioblastoma multiforme with Rh-positiveness. Dr. I. ZEYINOGLU (Switzerland) did not confirm the previously demonstrated association of diabetes mellitus with group A. He did, however, find such an association with the Kimmelstiel-Wilson syndrome and, less markedly, with diabetic retinitis. The impression left by these papers was that a field of great promise first fully opened up by British workers is now being cultivated by investigators from many different countries.

Somatic Mosaicism

Only a few of the many other papers on blood groups can be selected for mention. Dr. C. W. COTTERMAN described somatic mosaicism leading to a mixture of A₂ and O red cells in a single individual. He found the character of blood-group mosaicism to be inherited. Rather surprisingly, therefore, the person in whom the character was first observed showed also a striking eye-colour mosaicism. Possibly related to the A₂-O mosaicism is the Bw group described by Dr. P. LEVINE (U.S.A.); in these cases the individual has mainly red cells with group O properties, together with a very small minority of B cells, anti-B being absent from the serum.

The biochemical action of the A and B blood-group genes was considered by Dr. WINIFRED M. WATKINS and Professor W. T. J. MORGAN (Great Britain), who showed that in the ovarian cyst fluid of heterozygous AB women most if not all of the mucopolysaccharide molecules possessed both A and B activity. In A₂ women, on the other hand, it was in some cases possible to precipitate the molecules having A activity, leaving molecules in the supernatant which had H but no A activity. This accords well with other evidence suggesting that the H substance is not, as has been supposed, a product of the O gene but is a basic substance which the A and B genes are able to "stamp" with their own characteristic antigenic properties.

Dr. R. GRUBB (Sweden) announced his discovery of a hereditary character involving human serum. When human red cells are sensitized with an incomplete antibody (e.g., D-positive cells with incomplete anti-D) the cells are not agglutinated when suspended in saline. They can be caused to agglutinate by certain reagents such as Coombs reagent (anti-human-globulin serum). It has now been shown that they are also agglutinated by certain empirically selected sera from cases of rheumatoid arthritis. Agglutination so produced is inhibited by many human sera. The inhibiting component is a γ -globulin, the product of a single gene to which the symbol Gm^a has been given. Among Swedes 60% are inhibitors, but among Greenland Eskimos 95%. This character, readily investigated by the techniques of blood-group serology, promises to be of considerable interest and importance.

Blood-group Anthropology

Among many interesting papers on the application of blood groups and other genetical characters to anthropology we can mention only two. Dr. R. SINGER (South Africa), in collaboration with Dr. P. BRAIN, showed that, in Madagascar, though the culture and language are derived from South-east Asia, the blood groups and the high frequency of the sickle-cell trait indicate that most of the tribes are far more African than Asiatic. Dr. L. SACHS (Israel), working with Dr. M. BAT-MIRIAM, has used fingerprint patterns as a valuable addition to blood-group data in investigating the affinities of Jews in Israel.

Dr. P. HÖSLI (Switzerland), who has collaborated with Dr. A. HÄSSIG and Professor A. FRANCESCHETTI, announced a new example of linkage between two sets of genes in man—those for the MNSs blood groups and those determining the presence or absence of congenital ptosis. Outside the sex chromosomes only three examples of linkage were previously known in the human species, all involving blood groups. The study of the blood groups is thus proving indispensable in the mapping of the human chromosomes, as was foreseen many years ago by Sir Ronald Fisher.

At the end of the meeting it was generally agreed that this first human genetics congress was a great success, for which much credit must go to the admirable efficiency of the Danish organizing committee, and that further congresses on human genetics could be held perhaps at five-yearly intervals without prejudicing the activities of the International Genetics Organization.

INTERNATIONAL CONGRESS OF PHYSIOLOGY

MEETING IN BRUSSELS

[FROM A SPECIAL CORRESPONDENT]

The 20th International Physiological Congress was held in Brussels from July 30 to August 4, under the presidency of Professor C. HEYMANS. Over 2,600 members from 43 different countries were present, and the opening ceremony was graced by the presence of Her Majesty QUEEN ELIZABETH OF BELGIUM. Professor C. H. BEST, F.R.S. (Canada), took advantage of the occasion to review briefly the activities of the International Union of Physiological Sciences, which was formed at the previous International Congress held in Montreal in 1953 and of which he is president. He also announced that Professor B. A. HOUSSAY's invitation to hold the 21st International Congress in the Argentine had been accepted.

At the scientific sessions a wealth of material was presented. Fifteen lecture theatres were used simultaneously during the four morning sessions, when papers were read, and four for the symposia held on the three afternoons. In addition there were numerous demonstrations and films. A few of the more "applied" subjects discussed at the meeting are here noted.

Gastric Secretion

Professor B. K. M. UVNÄS (Sweden) reviewed the nervous and humoral control of gastric secretion. He was definite that gastrin released from the antrum was not histamine; gastrin was a protein material. He discussed the hypothesis that gastrin stimulates the gastric glands by releasing the histamine which is so abundant in the body of the stomach, but thought the evidence was far from complete. He suggested on the basis of experimental evidence in animals that the antral mucosa contained mechano- and chemo-receptors which generated impulses in afferent nerves, and that these impulses were relayed via local synapses to efferent cholinergic fibres which in turn stimulated the gastric glands to produce gastrin. Further, the pH in the antrum influenced the release of gastrin, an increased acidity depressing gastrin secretion and vice versa. In dogs, if the antral region were excluded from the acid-secreting areas, both the resting secretion and that produced in response to food and insulin hypoglycaemia were greatly increased. This often caused death of the animals from bleeding or perforation secondary to ulcer. Uvnäs described observations by Noring on human subjects before and after resection of the pyloric antrum, which accorded with his experimental observations.

Mr. A. P. MCE. FORREST (Britain) reported that the formation of an innervated antrum-pouch provoked a profound hypersecretion in all dogs. Denervation of the pouch decreased their secretion.

These findings, if they prove applicable to man, may require some reevaluation of the operation of gastro-enterostomy, as protection of the antrum from contact with the acid content of the stomach might seem liable to increase the acid secretion from the fundus; perhaps, however, denervation might decrease this effect.

Hypothermia

Dr. E. NEIL (Britain) reviewed the metabolic, circulatory, and respiratory changes in animals and man during hypothermia, dealing at length with the acid-base changes. In addition to a respiratory acidosis due to the reduction in spontaneous respiration, there was also a reversible metabolic acidosis. If circulatory arrest was superimposed upon hypothermia it became more difficult to reverse the metabolic acidosis, as in intracardiac surgery. Dr. Neil produced evidence that this effect was associated with congestion and damage to the liver. The latter could be avoided by removing blood from the systemic veins and reinfusing it into the arterial system, a procedure which prevented the marked rise in venous pressure otherwise seen.

Thirst and Appetite

Dr. B. ANDERSSON (Sweden) reviewed the role of the hypothalamus in the control of water intake. He described the evidence for the existence of a thirst centre in the hypothalamus of the goat, and showed a film of the goat's behaviour when this centre was stimulated electrically by behaviour when this centre was stimulated electrically by indwelling electrodes. After a latent period as short as five seconds, the animal sought out the bowl of water provided and drank until stimulation was discontinued. A goat could be induced in this way to drink water up to 40% of its body weight within a short period of time, with resulting haemolysis and haemoglobinuria. Destruction of this region of the hypothalamus resulted in hypodipsia (or this region of the hypothalamus resulting in hypodipsia) lasting for a variable time. The centre was near and somewhat overlapping the centre controlling the neurohypophysis.

Professor J. R. BROBECK (U.S.A.) described the concept of two hypothalamic "centres" associated with food intake—a medial part concerned with satiety, and a lateral part with appetite. Lesions of the medial part in man led to obesity. The sense of satiety was mediated, Professor Brobeck suggested, by the temperature changes associated with the specific dynamic action of the foods consumed, but he produced little evidence in support of this hypothesis.

Dr. JEAN MAYER (U.S.A.) reviewed the evidence for the role of glucose as a regulator of appetite. He described the hyperphagia resulting from the administration of aurothioglucose which selectively destroys cells in the ventromedial region of the hypothalamus. (It is suggested that this region normally exerts an inhibitory influence on food intake and that its activity is dependent upon the local concentration of glucose.)

Renal Studies

Professor K. J. FRANKLIN, F.R.S., and Dr. M. WISE (England) reported that in animals the effusion of blood on to the endometrium, peritoneum, pericardium, or pleura, or into the myometrium resulted in a rapid reflex renal cortical constriction which could be prevented by denervation of the kidney. These findings clearly may have important implications for the cortical necrosis which occurs clinically in such conditions as concealed accidental uterine haemorrhage.

Dr. A. GROLLMAN (U.S.A.) put forward the hypothesis that hypertension is due to the lack of a substance normally produced by the kidney which lowers the blood pressure in animals and in man. He claimed that renal extracts when administered orally lowered the blood pressure with-

out harm to the experimental animal or to the human patient. He also claimed that he had been able to detect this substance in the blood of normal subjects, and that it was decreased in the blood of animals with renal hypertension. If this is correct, as Grollman pointed out, it suggests a way to a more rational approach to the control of this disease than is at present available.

Alcoholic Nystagmus

Dr. L. GOLDBERG (Sweden) studied positional nystagmus before and after the intake of 40–300 ml. of whisky. He described two phases. The first came on 30 minutes after ingestion of the whisky, and lasted for about three hours. It occurred when the blood alcohol level was about 0.038% and consisted in jerking with the rapid phase to the right on looking to the right and to the left on looking to the left. The second phase was characterized by the rapid phases occurring in the opposite direction. It began about 5½ hours after the consumption of the alcohol and lasted on the average for 11 hours. It persisted for 5–6 hours after all the alcohol had left the body. He suggested that the manifestations of the second phase—and those of the hangover—were due to secondary metabolites rather than the alcohol itself. These observations should obviously be borne in mind when assessing the significance of an isolated finding of nystagmus.

Correspondence

Because of heavy pressure on our space, correspondents are asked to keep their letters short.

Freudian Concepts and Brain Physiology

SIR,—One cannot but admire the several able addresses and papers which have combined to celebrate the centenary of Sigmund Freud. Yet many must feel that an atmosphere of unreality surrounds the thoughts of his disciples, for they seem to make no serious attempt to correlate their studies with current knowledge of brain physiology. Thus if we take Freud's so-called "discovery of the unconscious," it has now become pretty certain that the thousands of millions of nerve cells in the brain are in constant activity. This supports the view that nearly all thought is unconscious, and that the mechanisms which operate when we are actually aware of what we are thinking constitute only a minute fraction of general cerebral activity. The "unconscious" repression of a thought is from the physiological point of view a different matter, as also is the individual's ignorance of the remote influences and behaviour patterns which to a large extent determine his present reactions. Or, again, the conception of the super-ego is no doubt convenient as a means for explaining human doubts and hesitations, but what happens to this mechanism when the frontal lobes are seriously damaged? Further, the Freudian ideas about memory and forgetting appear grossly inadequate in relation to clinical studies of the various amnesic states.

Freudians should not evade these and other issues, for it seems reasonable to suppose that the only psychoanalytical conceptions which will survive will be those that are at least compatible with modern studies of the brain in health and disease.—I am, etc.,

Oxford.

W. RITCHIE RUSSELL.

Gas Gangrene Risks

SIR,—Publicity has recently been given to a case at the South Devon and East Cornwall Hospital in which gas gangrene following a leg amputation is said to have been attributable to defects in the operating theatre (see *Journal*, August 4, p. 309). May I suggest that details of this case

and its surrounding circumstances should be published so that others may form their opinions on it and have the benefit of such lessons as are to be learned from it?

The architecture and ventilation system of perhaps a majority of operating theatres are such that particles of floor dust liable and indeed likely to contain spores of pathogenic *Clostridia* must sometimes pollute their atmosphere, yet gas gangrene and tetanus are fortunately very rare. This is because these spores cannot germinate in tissue oxygenated by a normal blood supply. It may be significant that the Plymouth patient was aged 71. I have within the past two years twice seen gas gangrene follow an amputation necessitated by obliterating arterial disease, a condition in which the oxygen tension even in the tissues above the line of amputation is liable to be abnormally low. Each of these was an amputation through the thigh, and this involves an additional factor. The skin in the neighbourhood of the anus is contaminated with intestinal bacteria to a greater distance than is generally supposed: these bacteria include *Cl. welchii*, the spores of which are not destroyed by ordinary methods of skin disinfection. The infection in gas gangrene following a thigh amputation may therefore be autogenous, however polluted the atmosphere in which the operation takes place.

Whatever the circumstances of the Plymouth case, I feel it should be more widely recognized that amputations either for obliterating arterial disease or through the upper part of the thigh—and particularly when both factors exist—involves an exceptional risk of gas gangrene. Such operations afford one of the few imperative indications for full penicillin cover.—I am, etc.,

London, E.C.1.

LAWRENCE P. GARROD.

Radiological Protection

SIR,—A preliminary report of the April meeting of the International Commission on Radiological Protection was presented to the Eighth International Congress of Radiology in Mexico City on July 28. I am informed by a member who was present that there was widespread desire for information as to the exact figures likely to appear as emendations of the 1954 publication which had world-wide circulation.

Pending the issue of the full text of the report, as to which there must be some delay, it may be stated in the meantime that as regards persons occupationally exposed to ionizing radiations it is proposed that the maximum permissible levels continue to be represented by weekly doses of 300 mrems (milli-roentgen equivalent medical) in the blood-forming organs, the gonads, and the lenses of the eyes, and 600 mrems in the skin. In exceptional circumstances, in which it is necessary for a person to receive in one week more than the basic permissible weekly organ doses, the unit of time may be extended to 13 weeks ($\frac{1}{4}$ year), provided that the total dose in any organ accumulated in a period of 13 weeks does not exceed ten times the respective basic permissible weekly doses.

Whilst the possible bodily injury manifestable in the lifetime of an individual exposed at the present permissible levels would be very slight or difficult to detect, the Commission has given consideration to the possible limitation of the total dose accumulated during a lifetime, since certain effects, such as shortening of life-span, might become significant when large groups are examined statistically. Accordingly the Commission feels that it would be prudent to limit the accumulated doses to 50 rems by the age of 30, and beyond that age to average doses of 50 rems per decade. Thus by the age of 60 no one should have received more than 200 rems (200 rems by age 60 is the figure subsequently adopted by the committee which produced the White Paper). In practice it has been found that in order not to exceed the recommended maximum permissible weekly doses, and to comply with the general recommendation of the Commission "that exposure to radiation be kept at the lowest practicable level in all cases," a considerable factor of safety must be allowed in the design of protective devices and operating pro-

cedures. Therefore, under present conditions, it is expected that the average yearly dose actually received by an occupationally exposed person would be about 5 rems and the accumulated dose in the employment period up to 30 years of age would be about 50 rems. Accordingly the Commission recommends continuation of the present conservative practice as regards doses received by occupationally exposed persons to keep the accumulated doses as low as possible, especially up to age 30.

Since doubt has been expressed, it should be stressed that there is no carry-over from one decade to the next: for example, if a man starts work at 35, he must get no more than 50 rems by age 45.—I am, etc.,

London, W.1.

E. ROCK CARLING,
Chairman until recently of the
International Commission on Radiological Protection

Diesel Oil and Lung Cancer

SIR,—While many of us may feel that the increased use of diesel fuel may have some bearing on the increasing lung cancer rate, I found it difficult to swallow Dr. F. F. Waddy's "fact" (*Journal*, July 7, p. 44) that "the dirtiest and blackest oil is issued from these vehicles by bad driving." His subsequent exposition left me in still further doubt as to the accuracy of his statements. Before rushing into print, I took the precaution of consulting my friend, Mr. L. Cohen, M.I.M.I., A.M.I.M.E., who was kind enough to produce the following authoritative information.

"The writer, Dr. Waddy, appears not to be a motorist, in view of his implication that it is not necessary to 'put his foot down' when driving a petrol engine at a hill or uphill. The correspondent is under the misapprehension of the method of control and governing applied to all diesel vehicles in this country. For this reason the theory which he puts forward, to explain why some vehicles emit more smoke than others, is entirely erroneous. The control of all diesel road vehicles is by means of a pneumatic, hydraulic, or mechanical governor, connected to the engine fuel pump. The function of the governor is primarily to control speed and to limit the maximum speed of the engine. In addition to the governor proper there is a fuel control which is so set by the makers to permit the injection of no more fuel than can be satisfactorily burned without the production of excessive smoke however the vehicle may be driven. This fuel control is usually sealed at the manufacturer's works. The production of smoke from an engine which has the makers' original fuel setting can occur only after deterioration of fuel pumps or injectors—i.e., as a result of lack of maintenance. An also not infrequent cause of smoke is the tampering with the maximum fuel stop, by drivers and others, to permit increased fuel, in an attempt to get more power from the engine."

The emission of excessive smoke from road vehicles is at best a nuisance and at worst a danger to health, but this is already a punishable offence under the Road Traffic Act, 1930 (Construction and Use Regulations, 1955). If and when diesel fumes are finally proved to have some relationship to lung cancer, it is to be hoped that the police will enforce the existing law more strictly.—I am, etc.,

London, S.E.17.

E. K. PRITCHARD.

Air Pollution, Smoking, and Lung Cancer

SIR,—The report by Dr. Percy Stocks and Dr. John M. Campbell on the relation of air pollution to lung cancer (*Journal*, October 15, 1955, p. 923) concludes that the urban/rural ratio is 9 to 1 among non-smokers for this disease. This conclusion is based on the assumption that fewer than 4% of the male population of the city of Liverpool, aged 45 to 75, are non-smokers. 3.9% of the "control" group in Liverpool hospitals were non-smokers. But if the non-hospital or the total male population, aged 45 to 75, of Liverpool were polled as to smoking history, it would probably be found—as in London—that about 10% or 12% were non-smokers. Thus table III of Doll and Hill¹ shows only 4.5% non-smokers among male non-cancer patients in London hospitals, while their table XXI shows 12.1% non-smokers among males (of corresponding ages) in the general population of London. It is of interest that the

figure of 3.9% for Liverpool hospital patients who are non-smokers corresponds closely with 4.5% for the London group. Calculations based on a 10% non-smoking Liverpool male population show that 100 instead of the actual 539 Liverpool deaths would occur if no one smoked—an 81% decrease.

As there is mounting evidence that smoking increases the incidence of diseases other than lung cancer, it is to be expected that a "control" group consisting of hospitalized men will contain a lower proportion of non-smokers than the general male population of a city. Therefore one must question the logic of comparing lung cancer patients with other hospitalized patients rather than with the general population (of same age and sex) in regard to smoking habits.

I agree with those who conclude that air pollution, both general and special—that is, in specific occupations—significantly increases the incidence of lung cancer. But complete eradication of such pollution could at the most reduce the lung cancer death rate among men in urban areas by about 40%, according to the data of Stocks and Campbell (315 expected deaths instead of 539 actual deaths in Liverpool).—I am, etc.,

WALTER MENAKER.

New York.

REFERENCE

¹ Doll, R., and Bradford Hill, A., *British Medical Journal*, 1952, 2, 1271.

Rauwolfia Serpentina in Psoriasis

SIR,—In view of the favourable report about the use of rauwolfia serpentina for psoriasis by Dr. G. Leslie (*Journal*, June 11, 1955, p. 1428), we have carried out a short pilot investigation on a series of twenty patients. These were taken at random from patients attending the skin department at Huddersfield Royal Infirmary and by coincidence the series was equally divided between the sexes. Their ages ranged from 20 to 70 years and they all showed characteristic forms of psoriasis. In addition, one had rheumatoid arthritis and seven showed some degree of hypertension.

Messrs. Squibb and Co. very kindly provided "raudixin" in 50-mg. tablets and at the same time provided the control in 50-mg. tablets. Alternate patients were treated with raudixin A and tablets. Alternate patients were treated with raudixin B and no one in the hospital knew which was the dummy tablet. Treatment was continued over a period of two months and no patient showed any intolerance. The results were reviewed at the end of this time and in the control series one patient cleared initially but relapsed, five improved, one very markedly, one remained stationary, and one became worse. Amongst those receiving raudixin, one cleared completely, one cleared at first but relapsed, three improved slightly, four remained stationary, and one became worse. Of the seven patients showing some degree of hypertension, two received raudixin and the patient whose psoriasis cleared was one of these; the other showed no improvement. One of the five hypertensive cases receiving the control tablet, however, also improved, almost to the point of clearing, and another also showed considerable improvement.

The natural history of psoriasis varies so widely that it is of necessity difficult to draw any conclusions from such a small series as this. It is however felt that raudixin treatment are not significant enough to suggest that raudixin appreciably modifies the course of psoriasis or to merit a larger investigation.—We are, etc.,

M. C. HOLGATE.
A. J. E. BARLOW.

Huddersfield.

Early Management of Poliomyelitis

SIR,—Dr. E. G. Brewis's article (*Journal*, June 30, p. 1539) counselling the treatment of all but a few cases of poliomyelitis in the home must have alarmed all those who have extensive experience both of the unpredictable nature of the disease in the first few days and of the end results of inadequate care even in the most mildly affected cases. Dr. G. E. Breen (*Journal*, July 21, p. 175) has already made the necessary comment so far as the acute phase of the

disease is concerned, and there is little to add to his criticisms, except that if lumbar puncture is not routinely carried out it is only a matter of time before a case of bacterial meningitis is unnecessarily left for several days without treatment.

Dr. Brewis's article contains many *ex cathedra* statements which our experience does not support. I would, however, like to lay especial emphasis on the danger of inadequate physical control and treatment, even in children who show only moderate paralysis, and indeed in those who have "muscle tightness" without any actual paralysis at all. The poliomyelitis unit at Queen Mary's Hospital for Children, Carshalton, has in recent years always contained between 50 and 130 cases of poliomyelitis, about half of which are admitted in the acute phase, the other half being transferred later in the course of the disease. Our routine treatment, which has recently been described in detail,¹ is, very briefly, as follows: (1) Rest, in carefully controlled positions requiring constant nursing supervision. (2) Hot-packing of muscle groups showing "tightness," at frequent intervals throughout the day. (3) Early passive movements to the extent that tightness, as partially liberated by hot-packing, will allow. (4) Later a carefully controlled re-educative process carried out in the physiotherapy department, which is different for each child and which varies from week to week. Much of this process is directed towards limiting a child's spontaneous activity to that which he has already learnt to do well. If he is stimulated or even allowed to "run before he can walk" he will develop fixed pathological patterns of movement, dictated not only by differential paralysis, but also by tightness spontaneously developing into fixed contractures.

If this process, and it is a most laborious one for all concerned, including the child, is not conservatively and rigorously carried out, the child will be left with much needless deformity and disability. It cannot be too strongly emphasized that much of the residual disability of poliomyelitis is due not only to actual paralysis but to the uncontrolled progress of tightness into contracture. We have ample proof of this in our experience of comparing the residual disabilities of children who have been carefully handled from the start with those who have been transferred to us after weeks of pure passivity or of inexperienced physiotherapeutic management. This kind of treatment could not possibly be carried out in the home, but can only be done effectively in a fully equipped hospital with a specialized physiotherapeutic and nursing team working in the closest co-operation and, so far as children are concerned, in a hospital which can provide a full range of educational services during the long periods of in-patient treatment which are essential.

In short, there is no doubt that the course which Dr. Brewis advocates will lead to unnecessary deaths in the acute stage, to the failure to treat bacterial meningitis in children, especially during a poliomyelitis epidemic, and to a very large amount of avoidable disability and deformity in the survivors.—I am, etc.,

Carshalton, Surrey.

DAVID LAWSON.

REFERENCE

¹ Reynolds, R. J. S., *Physical Measures in the Treatment of Poliomyelitis*, 1956. Faber, London.

Progressive Massive Fibrosis

SIR,—In their paper on progressive massive fibrosis (*Journal*, May 26, p. 1193) Dr. A. L. Cochrane and co-workers discuss the various theories of causation. I am prompted to make some remarks on one of the theories according to which progressive massive fibrosis (P.M.F.) develops only in a tuberculous site. The authors state that "most people believe that tuberculosis plays some part in the aetiology of P.M.F., but many fewer believe it to be the only factor (in addition to coal dust)." Those who hold these views, especially the latter, base their contention on the morbid anatomy in P.M.F. in coal-miners. The question arises whether P.M.F. always supervenes in a tuberculous lung in other or all types of pneumoconiosis. I would draw attention to graphite workers' pneumoconiosis,

first described by *de* in Hull, and later confirmed by others elsewhere in the U.K., Italy, and Germany. P.M.F. often occurs in graphite pneumoconiosis. Hitherto, in the cases that have come to necropsy, careful examination of the lungs has failed to detect histological evidence of tuberculosis either in this country or abroad. In others of these workers whom I have followed up, no instance of later onset of clinical pulmonary tuberculosis so far has been seen, in contrast with the relatively high incidence of tuberculosis which is well known in other types of pneumoconiosis—for example, coal-miners, grain-dockers. From the morbid histological findings in graphite pneumoconiosis one may conclude that tuberculosis is not necessarily a prerequisite in the development of P.M.F.

Among cases I have published² occurring in graphite workers were some where the x-ray pattern was at first of "snowstorm lungs"; later a proportion of these cases developed P.M.F. by local conglomeration of separate nodular lesions. I must add, however, that I have as yet been unable to obtain post-mortem examination in any of this small group, so that all I can say is that clinical evidence of pulmonary tuberculosis was absent and sputum bacteriology in the men examined by me was negative.—I am, etc.,

Hull.

LASAR DÜNNER.

REFERENCES

- ¹ Dünner, L., *Brit. J. Radiol.*, 1945, 18, 33.
- ² — *ibid.*, 1948, 21, 182.

Nystagmus in Alcoholic Intoxication

SIR,—I have read with great interest Dr. D. E. Howells's article on nystagmus in alcoholic intoxication (*Journal*, June 16, p. 1405). May I suggest—as a lawyer for the defence in an impaired driving case might—that there is a little vagueness as to quantities? Dr. Howell says, "The majority required from 0.7 to 1 ml. of absolute alcohol per kg. body weight," etc. Later he says, "Alcohol when given in approximately the same quantities in the form of whisky or gin produced the same effects" (my italics). And again, "can be produced in experimental subjects by giving ethyl alcohol, whisky, or gin."

The question is, does that mean an ounce of ethyl alcohol, or of whisky, or of gin? Or does it mean an ounce of absolute alcohol, or the amount of whisky or gin required to give one ounce of absolute alcohol? My presumption would be the latter, but the lawyer for the defence could lodge a doubt in the jurors' minds.

The value, to my mind, of the test is that it proved every driver tested showing nystagmus as a result of taking alcohol had his driving impaired anywhere from 4.3% to 40.5%. I should be grateful to Dr. Howells if he would make the point I raise clear.—I am, etc.,

St. John's, Newfoundland.

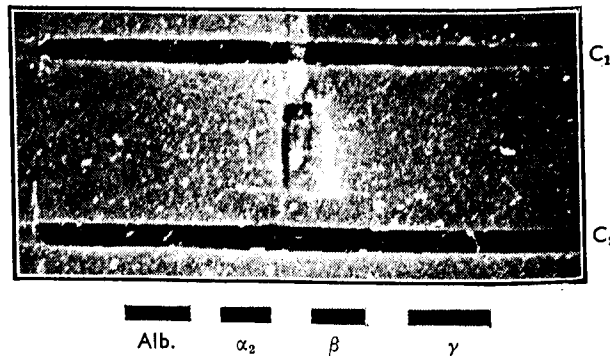
CLUNY MACPHERSON.

C-reactive Protein

SIR,—Your recent annotation on C-reactive protein (*Journal*, July 21, p. 145) gave a misleading indication of the nature of this substance, since no mention was made of two important and comparatively recent investigations.

Wood, McCarty, and Slater¹ isolated crystalline C-reactive protein by a modification of the technique used by McCarty,² and reported that it was located in the fast component of the gamma globulin when subjected to zone electrophoresis in a starch-supporting medium. It was also detected in this position after a similar analysis of an acute-phase human serum. In free solution, on the other hand, the crystalline preparation migrated as a beta globulin, and they pointed out that this was in agreement with its behaviour on ammonium sulphate precipitation. Brattsten³ showed that C-reactive protein occurred in the gamma globulin after continuous electrophoresis in a starch medium.

The technique of immuno-electrophoresis⁴ now enables a direct confirmation to be made of the electrophoretic mobility of the C-reactive protein of acute-phase serum under conditions approximating closely to those of free



Photographed by dark-ground illumination. Positions of protein fractions obtained by taking a filter-paper print from the surface of the gel.

solution. The result of such an investigation is shown in the illustration (immuno-electrophoretic analysis at pH 8.2 of acute phase serum; C₁ and C₂, canals containing C-reactive protein anti-serum), where the arcs of precipitate clearly occur in the position of the beta globulin fraction. It is also interesting to note that it appears to be associated with the chylomicrons, which migrate as a sharp band under these conditions.—We are, etc.,

London, N.W.3.

EVELYN V. HESS.
R. L. MARKHAM.

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- ¹ Wood, H. F., McCarty, M., and Slater, R. J., *J. exp. Med.*, 1954, 100, 71.
- ² McCarty, M., *ibid.*, 1947, 85, 491.
- ³ Brattsten, L., *Scand. J. clin. Lab. Invest.*, 1955, 7, 99.
- ⁴ Grabar, P., and Williams, C. A., *Biochim. biophys. Acta*, 1955, 17, 67.

Sulphonamides in Aetiology of Lupus Erythematosus

SIR,—We read with interest the report on a case of systemic lupus erythematosus presenting with sulphonamide hypersensitivity reaction, by Dr. Michael Honey (*Journal*, June 2, p. 1272), but do not agree that the exhibition of the sulphonamide was an aetiological factor. The pre-existing pleurisy and haematuria were possibly all part of the lupus erythematosus syndrome. The degree of leucopenia on admission to hospital and the morbilliform rash point to the existence of the syndrome before the sulphonamide was exhibited.

We believe that hypersensitivity reactions to sulphonamides, penicillin, gold, mepacrine, and chloroquine are simply another manifestation of the already present disease and that in all cases of acute reactions to drugs the possibility of systemic lupus erythematosus should be considered.—We are, etc.,

Newcastle, N.S.W., Australia.

W. WARD.
W. GUNTHER.
A. MCGEOCH.
D. DOWNIE.

Treatment of Hypertension

SIR,—The recent article by Dr. S. Locket (*Journal*, July 21, p. 116) underlines once more the importance of developing satisfactory hypotension-maintaining drugs. From the case material presented it would appear that the two new drugs described are capable of producing very profound and lasting falls in blood pressure.

Whether it is desirable to produce extreme blood-pressure reduction in patients with advanced arteriosclerotic disease is a matter of debate. This is but one of the questions that can only be answered after prolonged use of hypotensive agents. Among others, we require to know more about the long-term effect of blood-pressure reduction by whatsoever means, on the patient's symptoms, on cardiac function, and on the cerebral, renal, and other complications of hypertension. Perhaps the most important question of all is when, if ever, hypotensive treatment may be omitted.

I would submit, Sir, that the answers to these and to many other questions on this important subject will come

from the field of general practice. The general practitioner has unique opportunities for the follow-up of these patients, opportunities which are denied to the hospital physician. The general practitioner is able to supervise his patients' treatment more closely over longer periods than can be possible with long-interval out-patient appointments. His blood-pressure readings are likely to reflect more realistically the patient's everyday levels. Indeed, the many published hospital reports on this subject illustrate the extremes of misinterpretation liable to arise owing to the methods employed. Thus at one end of the scale we have studies on patients kept at rest in bed over long periods. This regime results in the achievement of optimistically low readings when applied to the subsequent exigencies of everyday life. On the other hand the tension of out-patient sessions is liable to induce higher readings than are found in the atmosphere of the consulting room, as a recent study has shown.¹ Similarly, treatment by self-administered injection at home is in the main impracticable. Indeed, 20% of Dr. Locket's patients omitted treatment of their own accord, with disastrous results in one.

In short, the conditions of hospital practice are not the most suitable for a long-term study of hypotensive treatment. It is duly appreciated that without preliminary hospital studies on the actions of the drugs employed, such as that described by Dr. Locket, effective hypotensive treatment probably would not be available at all. I feel that we now require information from general practitioners on their practical experience of hypotensive therapy over the past few years. We require, too, a means of continuing such reporting over the years to come. Such an investigation would provide information of incomparable value on this subject.—I am, etc.,

Twickenham, Middlesex.

DAVID WHEATLEY.

REFERENCE

- ¹ Freis, E. D., *Med. Ann. Distr. Columbia*, 1954, 23, 363.

Pregnancy Test

SIR,—It is with dismay that I have received this morning a brochure from a drug firm describing a test for differentiating between pregnancy and amenorrhoea by the administration of a mixture of synthetic hormones, and the induction of withdrawal bleeding in those with amenorrhoea. There must be few cases in which it is necessary, either from the point of view of the patient or the doctor, for an immediate diagnosis to be made. In those few cases where an early differentiation is desired there are adequate tests available of a high degree of reliability, and which do not require the administration of drugs to the patient.

The test would presumably be used in the first few weeks of pregnancy, at a time when the main structures are being laid down in the embryo, and when the embryo is most susceptible to noxious influences. It seems a shocking thing to administer drugs which will upset the delicate hormonal balance of the mother and the foetus at this stage. So-called tests of the safety of this procedure are condemned by their only too obvious crudity; a continued pregnancy and an apparently normal child is no guarantee that no harm is being done.—I am, etc.,

London, N.W.8.

H. G. BRITTON.

Hibernation in Shocked Patients

SIR,—Dr. Sheila Kenny's experiences with the use of chlorpromazine in severely shocked cases (*Journal*, July 28, p. 211) lead me, in the absence of our consultant anaesthetist, Dr. E. K. Gardner, to mention briefly a similar technique we use at Whipp's Cross Hospital. The emphasis is on autonomic block, and we have made no attempt to record the lowering of body temperature before or after induction of anaesthesia, or to prolong the hypothermia. To this end we have used hexamethonium in conjunction with chlorpromazine.

The principal points are: (1) intravenous injection of chlorpromazine ("largactil") 25 mg. in 20 ml. on arrival in the anaesthetic room; (2) adoption of 10 degrees head-down

tilt and liberal oxygenation throughout induction and operation; (3) anaesthesia by the standard sequence thiopentone-pethidine-nitrous oxide-oxygen-curare, though with greatly reduced dosage; (4) replacement of sufficient blood to restore the blood pressure to 80–100 systolic; thereafter the rate of the drip is slowed and hexamethonium used to lower the systolic pressure to 60–65 mm. Hg throughout operation.

I have recently used this technique with signal success in anaesthetizing four severely shocked patients when attempts to raise the blood pressure by the usual methods had failed. Operations lasting up to 2½ hours have been performed calmly in an almost bloodless field, and with little anxiety to the anaesthetist. We wonder if we are right in restricting this technique to the very poor risk patient and whether other milder cases might not also benefit.—I am, etc.,

London, E.11.

A. S. GARDINER.

Preparation for Marriage

SIR,—We are grateful to Dr. G. de M. Rudolf (*Journal*, July 28, p. 244) for drawing attention to the part played by Catholics in the field of marriage guidance. To avoid confusion, however, may I point out that our correct name is the Catholic Marriage Advisory Council? We shall be pleased to give further information about our work to any doctor who may have Catholic patients with marital problems.—I am, etc.,

STEPHEN ACKROYD,
Acting General Secretary,
Catholic Marriage Advisory Council.

London, S.W.1.

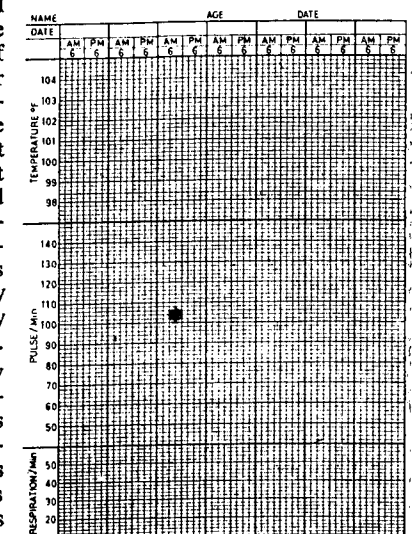
The Chart in General Practice

SIR,—In many cases of ill-health there are three measurements which can and should be made with reasonable accuracy: the temperature of the body, the rates of the pulse, and respiration. In hospital practice it was always useful, if not essential, to have the patient's chart at hand when considering diagnosis and progress. Yet after several years in N.H.S. general practice I have found no trace of a suitable chart for recording these observations. The introduction of yet another form must be approached with great trepidation, and the specimen shown has been produced only after a lengthy period of gestation.

So often in my practice I am meeting brief (and less often more prolonged) fevers whose aetiology is not really quite as clear as one would like to think. The pattern of the illness is all too often lost when irregular "T.P.R." recordings are jotted down anywhere but where they belong—on a simple chart. It is hoped that the simple ruling should allow the facts to be recorded by parents or other attendants in many cases, and that the chart will be of real value. The cost of charts works out at about one penny each, and they are printed for me from my own block by Messrs. H. K. Lewis.—I am, etc.,

Andover.

JOHN W. EVANS.



Practice in the U.S.S.R.

SIR,—Three weeks ago I went to the Soviet Union as a tourist. I was given an opportunity to visit a polyclinic and a children's hospital and also to have a chat with doctors about general medical services in Russia. The main unit for general medical services is a polyclinic, which is like a hospital out-patients run by G.P.s. Each district has its own polyclinic, to which go all the families living in that district. The clinic has a large staff of doctors, including specialists and nurses. Patients are seen by appointment, which may be for the same day or the following day. There are no waiting-lists.

In the first place, I was told that medical care in the Soviet Union was completely free. But further questions elicited the fact that it was not so. All consultations and treatment at the clinic (including injections, dressings, drugs) are free, but drugs, appliances, injections, etc., for use at home have to be paid for. I was told that one injection of streptomycin would cost about 10 roubles (about 19s. at the present rate of exchange), ordinary drugs from 1 to 6 roubles. If a person wishes to have doctors or specialists of his own choice he can attend one of the paying clinics, where he has to pay for consultation and treatment. There is no free treatment for temporary residents. There are special clinics for them where they have to pay for consultation and treatment. Tourists from abroad, however, are treated free, but they have to pay for their drugs like the Soviet citizens.

Polyclinics have special emergency departments which are open for treatment day and night. Emergency domiciliary visits are arranged by these departments. Ordinary domiciliary visits, of course, are paid by the doctors at the polyclinic. Factories and large stores have their own polyclinics. Sick notes in the first place are given by doctors at these industrial clinics.

A number of clinics are grouped round one general hospital, which admits all their patients. Nearly all confinements take place in hospital. I tried to visit a mental hospital, but they were rather unwilling to grant facilities. Doctors have no surgeries of their own. They are all salaried officers. They work about 5 to 5½ hours a day, and get long holidays and regular off-duty days. Facilities are readily available for specialization. The initial salary of a doctor is 800 roubles a month, rising up to 1,500 roubles. For specialists it rises up to 3,000 roubles. They compare very unfavourably with doctors' incomes here, but there are compensating advantages, like regular hours, plenty of leisure and time for studies, no worries about finding locums, and no practice expenses. On retirement there is a very generous pension for the doctor and his wife. Generally speaking, the position of a G.P. in the Soviet Union is no better than that of a skilled factory worker. My impression is that from the point of view of the patient our Health Service is much better; but for the doctor, the Soviet system has many advantages, apart from his income.—I am, etc.,

Birmingham, 32.

D. R. PREM.

Is Tonsillectomy Necessary?

SIR,—Mr. John Fry (*Journal*, August 4, p. 302) applies a false criterion of efficacy to his management of the tonsil problem. His criterion is: Can my patients survive recurrent tonsillitis treated conservatively with unimpaired health? He has good reason to believe that they can, for he states in his letter that his child patients grow up into healthy adolescents. The criterion in this problem should surely be: Will my patients grow into healthy adolescents having spent less time in bed and away from school without tonsillectomy than they would with it?

We have progressed beyond the stage where our concern in this matter is with survival or preventing gross impairment of health. Septicaemia, bronchopneumonia, mastoid, and chronic otitis media can generally now be taken care of. Our present concern is with days in bed and absence from school, and it is on this point that Dr. Fry should give us information. Tonsillectomy is a risky operation, but if it

could be shown that there is a considerable lessening of morbidity after tonsillectomy that would surely provide a fair case for taking the calculated risk. If tonsillectomy failed to produce this effect then I should join Dr. Fry in advising my patients to hang on to their tonsils.—I am, etc.,

London, S.E.26.

JOHN BURKINSHAW.

Athlete's Foot

SIR,—Regarding the recent letters of Dr. D. Hooker (*Journal*, May 26, p. 1239) and Dr. G. R. Addlestone and Dr. M. D. A. Heller (*Journal*, June 23, p. 1486), in connexion with athlete's foot, I would like to make the following comment.

In our warm climate, athlete's foot and hyperhidrosis with severe maceration occur frequently, often together, and are often clinically indistinguishable. It would not be practical to make microscopical examinations in all cases. In uncomplicated cases the following routine has proved very effective and practical as an addition to other adequate hygienic measures:—First day: (1) Swab foot and between toes with methylated spirit. (2) Paint between toes and other affected areas with pig. Castellani. Second day: Paint between toes and any macerated areas with tinct. benz. co. When the balsam is dry, dust with talcum powder. Third day: Repeat as in first day.

These alternate applications are continued for several weeks, and after the subsidence of symptoms a bi-weekly application of gentian violet or pig. Castellani alternated with tinct. benz. co. during the summer months will usually prevent a relapse. It is important that any residual balsam be removed before application of fungicide, to facilitate penetration. The above gives equal importance to treatment of maceration and possible fungal infection. It is well tolerated and completely effective in a very high percentage of cases.—I am, etc.,

Johannesburg, S. Africa.

C. B. SROKA.

Shoe-fitting X-ray Fluoroscopes

SIR,—In the *Journal* of August 4 (p. 269) there is an eight-column article by Dr. E. D. Dyson on x-ray viewing machines in shoe shops, with a most elaborate investigation of their possible dangers.

Surely the problem can be restated in words of one syllable. If a shoe fits it is comfortable. If it doesn't fit it isn't. It is just as simple as that. Is it really necessary to use a complicated and potentially dangerous machine to decide whether a new shoe hurts or not? A one-clause Act of Parliament making pedoscopes illegal would appear to be the sanest solution.—I am, etc.,

Morley.

W. STANLEY SYKES.

Purpose of Medical Education

SIR,—Without going into details of Professor G. W. Pickering's exposition on the purpose of medical education (*Journal*, July 21, p. 113) I should like to comment on three points which he makes.

(1) From the Planning Committee of the Royal College of Physicians he quotes the following: "The average student leaves his medical school at about the age of 25; during the subsequent 30 or so years of professional life his ability to learn from his own experience and that of others, and to keep abreast of the stream of advancing medical knowledge, depends entirely on those qualities in which his training has left him defective." (2) He says: "Will the medical course be arranged primarily in the interests of educating the student, or primarily in the interests of the prestige of the teachers?" (3) He says: "I have no doubt that with a little encouragement they could open a new era in medical education in this country. They have a right to expect, and I hope would receive, support from other faculties in achieving this."

It is perhaps misleading to pick out individual comments from their context, but with regard to (2) I believe sincerely that the medical curriculum should be arranged in the interests of the public upon which it is going to be practised. Concerning (3), I feel that the planning authorities should show new "vision" in the training of a science where its

practitioners are, whether they like it or not, called upon to minister to the deepest needs of humanity. This leads to point (1), where one must agree wholeheartedly that "the training is defective" in those essential qualities which are needed to treat adequately the whole man.

Very many students, unfortunately, come from materialist homes, for we live in a materialist age; they are precipitated into a scientific training and launched out on an unsuspecting public veritable cripples, for they are intellectually one-sided and spiritually defective, although their future work lies in ministering to the spirit/mind/body of humanity. It seems to me, therefore, that just as the minister of religion in this scientific age is one-sided and unable to be of full use to his "people," so the medical scientist, without some sort of serious training in philosophy, and especially in theology, is not able to use the knowledge which he has acquired for the full benefit either of his own life or of that of his patient.

I must therefore refer back to a letter I wrote (*Journal*, June 9, p. 1363) and reiterate the need for a certain number of men and women who feel "called" to insist on a dual training and so form the "leaven" which would lift up both the Church and medical science to their proper place of usefulness and influence among society. This would necessitate a new faculty, but, as Professor Pickering says, we have "a right to expect, and I hope would receive, support from other faculties" in achieving expansion along progressive lines which would give fuller usefulness to the public whom we wish to serve.—I am, etc.,

JANE H. THOMPSON.

Morpeth, Northumberland.

Poliomyelitis in Cork

SIR,—In view of the wide publicity caused by the B.B.C. broadcast of August 9 in relation to a seaman who travelled from Cork to Liverpool on s.s. *Glengariff* on Saturday, August 4, and was found on arrival to be suffering from poliomyelitis, the impression has been created that this case was badly missed by the public health authorities here. In fairness to this department, therefore, I would be grateful if you would afford me the opportunity of placing the following facts before your readers.

On July 29 the seaman in question was in Glasgow. He was suffering from sore throat and consulted a practitioner in that city. He was told, I am informed, that he had laryngitis and city. His ship, the m.v. *Birchfield*, left could carry on his occupation. His ship, the m.v. *Birchfield*, left Glasgow on July 30 and put into Whitehaven on July 31. It arrived in Cork on August 2 and remained here until August 4, when it sailed for Dublin. During its stay in Cork the sailor certainly consulted a practitioner, and was, I believe, informed that he was suffering from the effects of either "slipped disk" or "fibrositis." In view of the circumstances the master requested that he be taken from Cork to Liverpool by the *Glengariff*, and this request was granted.

The first I heard of this case was in the early afternoon of Thursday, August 9, when I received a letter from Dr. J. B. O'Regan, City Medical Officer, Dublin, in which he recorded the essential facts as reported to him by Dr. John Walker, Port Medical Officer, Dublin. By that time the B.B.C. broadcast had been on the air and in a very short time inquiries were being received from newspapers both in this country and in Great Britain. I do not wish to be taken as criticizing those responsible for the broadcast, which, in the circumstances, was thoroughly justified. I merely wish to dissipate the impression that has gone abroad that the Cork health authorities have slipped up on this case. If I had any idea of what was happening the patient would certainly not have undergone the ordeal of that journey from Cork to Liverpool.

Since the occasion of this letter has arisen I would further ask your hospitality to enter a protest against the exaggerated newspaper notoriety afforded to the poliomyelitis epidemic here. The total number of cases recorded to date from June 1 amounts to 91. Among these there has been one death, affording a fatality rate of 0.9%. There has been no indication so far of any change in trend, and the proportion of non-paralytic cases remains about 52%. In these circumstances I think it is likely that this epidemic will go down as one of the mildest on record. Meanwhile

a state bordering on mass panic has been engendered among the people of this city which reflects no credit on the newspapers concerned. This criticism does not apply to Irish newspapers only.

I take the opportunity of expressing my appreciation of the help afforded me by Dr. A. B. Christie, medical superintendent of the Fazakerley Hospital (as well as the two colleagues mentioned), in elucidating the essential facts of this incident.—I am, etc.,

J. C. SAUNDERS,
City Medical Officer.

Cork.

"Strawberry Lesion" of the Recto-sigmoid

SIR,—May I avail myself of the hospitality of your columns to congratulate Mr. G. K. Thomas on his grasp of this novel syndrome which he describes (*Journal*, July 28, p. 209), and to make one or two suggestions to explain certain difficulties which he encountered?

He mentions that he has only come across one case in five months showing the above lesion as contrasted with our Eastbourne incidence of one case in two months on an average. At that time we were receiving all the local public health material in the way of loose stools. That might explain the incidental difference. The failure to find spirochaetes might be due to (1) over-zealous lavage prior to sigmoidoscopy; (2) failure to use the diagnostic silver stain (Fontana); (3) using films which were too thick. I may be quite wrong in making these suggestions, and, if so, trust I may be forgiven. In our cases the lesion swab films usually showed embryonic, massed short forms in vast numbers.

The highly original suggestion of carbasone suppositories seems ideal for the adult case, but in children I think that oral acetarsol preferable, as I have reason to believe that the intestinal involvement is very extensive. At any rate, stained films from the stools show sometimes 100 or more spirochaetes per field. For primary diagnosis, the finding of spirochaetes in thin—very thin—films of the stools in appreciable numbers saves much time.

In conclusion, may I congratulate Mr. Thomas on his accurate study of the meagre literature of the subject, and for his generous appreciation of my efforts to put this syndrome "on the map." He would have seen a full demonstration at the B.M.A. meeting last month at Brighton. But perhaps he did?—I am, etc.,

Eastbourne.

A. GEOFFREY SHERA.

St. George-in-the-East Hospital

SIR,—The very same day that I read in the papers that St. George-in-the-East Hospital will close (see *Supplement*, p. 103), it was announced in Vienna that in the Allgemeines Krankenhaus a special "heart attack rescue unit" is to be started which will deal with cases suffering from coronary infarction.

As it seems that there are enough beds in the area of the North-east Metropolitan Regional Hospital Board, would it not be possible to start, as an experiment, a special "coronary unit" in that region, to which heart attack cases could be rushed to obtain speedy benefit of specialist treatment?—I am, etc.,

Crowthorne, Berks.

RUDOLPH PAYNE.

Purkyně's Letters

SIR,—Having recently completed an edition of the complete works of J. Purkyně, I am preparing to publish his letters. In this connexion I am seeking especially letters which he wrote to the British physiologist Martin Barry (1802–1855), and also any letters which show Purkyně's relations with the Royal Society. I should be grateful if anybody possessing letters by or concerning Purkyně, or anybody knowing of their whereabouts, would write to me.—I am, etc.,

Komenského nám. 2,
Brno, Czechoslovakia.

VLADISLAV KRUTA.

Perhaps Scot Skirving's epitaph was truly written by an Edinburgh physician over 50 years ago in one of the testimonials now in front of me which "Scot S." used as his application for the appointment of assistant physician to the Prince Alfred Hospital: "A gentleman in feeling and breeding, and actuated by high moral principles, he is possessed of those personal attributes which make him the best and most desirable of colleagues."

T. BATTERSBY JOBSON, M.D., D.P.H.

Dr. T. Battersby Jobson, who inaugurated the ear, nose, and throat department at the Royal Surrey County Hospital, Guildford, died suddenly on August 1 at the age of 84. After giving up his hospital work in 1946, on account of age, he continued to specialize in private practice, seeing a patient on the morning of the day on which he collapsed. He was blessed with remarkably good health throughout his long and active life, apart from an attack of diphtheria which he contracted from a patient on whom he performed an emergency tracheotomy in 1929.

Thomas Battersby Jobson was born at Donaghdee, Naas, Co. Kildare, on July 22, 1872, and was educated at Cork Grammar School; Fawcett's School, Cork; and Cranbrook School, in Kent. He entered Trinity College, Dublin, where he graduated B.A., winning the gold medal in natural science, in 1894. In the medical school he took the degrees of M.B., B.Ch. and subsequently the M.D. in 1897. He then worked at St. Bartholomew's Hospital, and took the D.P.H. of the English Royal Colleges in 1901. He engaged in general practice at Hendon and Ilford before the first world war, but, his mind turning towards special work, for which his education and temperament made him particularly well fitted, he became registrar at the Central London Throat Hospital in 1912-13. After the war, in which he served as a captain in the R.A.M.C. in England and Egypt, he lived at Guildford while undertaking special work in London. Appointed ear, nose, and throat surgeon to the Royal Surrey County Hospital, he inaugurated the department in 1919. It had grown to be one of the largest in the hospital when he retired in 1946. He took an active part in the affairs of the British Medical Association, being a member for some time of the executive committee of the Guildford Division, and many meetings were held at his house. In 1944 he was elected president of the Section of Otolaryngology of the Royal Society of Medicine, an honour of which he was justly proud, as it comes to comparatively few whose work is done in the provinces. The subject which he chose for his presidential address was the audibility of the radio voice, and in preparing the address he enlisted the aid of Mr. John Snagge. Dr. Battersby Jobson's name is associated with several improvements in technique and with certain inventions, such as Jobson's scoop, an auto-anaesthetic apparatus, a mouth-breathing apparatus, and tonsil clamps. He was twice married. First, in 1905, to Muriel Maconechy, who was descended from John Hunter. His own family was also connected with Hunter, although more remotely. This relationship and connexion made him an enthusiastic Fellow of the Hunterian Society, and he made many interesting contributions to the Hunterian Museum. In recognition of his work he was elected an honorary Fellow of the Society in 1953. He had four children; his son, Dr. P. H. Jobson, succeeding to his father's position in the ear, nose, and throat department of the Royal Surrey County Hospital. Mrs. Jobson died in 1933, after a long and painful illness. In 1935 he married

Miss Marjorie Minns, daughter of Dr. A. Minns, of Thetford, Norfolk, who survives him, together with his son and three daughters.

Dr. J. BURNETT RAE writes: Although our work took us along very different paths, I never lost my admiration for Jobson's good judgment and the delicacy of his touch and skill, which always inspired confidence in his patients and made him many friends. He was essentially an all-round man. This was due no doubt in part to his wide experience, not only in medicine and surgery, but in everyday affairs and sport. He was always keen on athletics, cricket, and, especially, golf, winning many trophies at the latter game, including the Ulster Cup at the Annual Meeting of the B.M.A. at Porstmouth in 1923. He was not a man of many words and he greatly disliked public speaking, but behind all that he said and did was a depth of good thought and feeling. One of his older colleagues writes: "In all the years I have known him, I do not think I ever heard him say an unkind word about anyone, and his untiring work at the hospital helped greatly to raise it from what was no more than a larger cottage hospital to what it is now." With T.B.J. go some precious links with the past, but the memory of a good doctor and a fine man remains.

E. W. S. writes: Dr. T. B. Jobson, like many provincial consultants in the past, graduated to his specialty through general practice. This method of adopting a specialty, now no longer possible in the National Health Service, may have had drawbacks, but it had the advantage of bringing with it a broader outlook both on the patient's difficulties and the needs of general practitioners. This quality contributed in no small way to Jobson's success. After demobilization from the R.A.M.C. in 1918 he settled in Guildford. The staff of the Royal Surrey County Hospital at that time were all general practitioners except for an ophthalmic surgeon and a dental surgeon. The time was ripe for the creation of special departments, and it fell to the lot of Jobson to start the E.N.T. Department. Such was his energy and ability that soon the department was large and flourishing. The hospital was in a state of rapid development, both in size and efficiency, as other departments were being opened, and Jobson's regular attendance and wise council on committees helped materially in this progress. I think the most outstanding side of his character was his unfailing kindness and good temper.

Mr. DUGALD CAMERON, for many years surgeon to the West Kent General Hospital, Maidstone, died suddenly at Scarborough on July 31. He was in his 65th year, and had been in practice in Maidstone for nearly 30 years. Originally intending to read law, Dugald Cameron, who was born on February 27, 1892, took his M.A. at Edinburgh University in 1914. This date probably had a profound effect upon him, as upon many another. He joined the Royal Field Artillery for service in the first world war and was present at the Gallipoli landings. He rose to the rank of captain, was wounded several times, and was awarded the Military Cross. On his return to civilian life he read medicine at his old university, where he graduated M.B., Ch.B. in 1923. He then held the appointment of resident house-surgeon at Edinburgh Royal Infirmary. Later he became surgeon and medical superintendent at the Randolph Wemyss Memorial Hospital, Buckhaven, Fife, at the same time conducting a practice at Leven. He returned to Edinburgh to take his Fellowship of the Royal College of Surgeons of Edinburgh in 1928. In the following year he settled at Maidstone, and was appointed surgeon to the West Kent General Hospital. He served the town and the hospital with skill, experience, and faithfulness, and was still on the active list when he died. He leaves a widow and a son of 19, who is studying law at London University.

R. H. P. writes: Few would claim that mutual magnanimity was a conspicuous feature of the professions.

Yet even in Dugald Cameron's lifetime it was remarked that he seemed to have no jealousy at all. However, one had only to hear him speak of incompetence or injustice to find that his attitude came from philosophy and not from softness. A lay friend described him as a dour Scot whose manner was not understood by all. I think it was understood by his patients and by all who knew him at all. He suffered in health in his last years, but concealed this entirely from his colleagues; but he had not looked well in recent months. It is, perhaps, too easy to call a death tragic, but there can surely be no other word for Cameron's untimely end, while on holiday, and a few short months before the retirement he had so very well earned.

Universities and Colleges

UNIVERSITY OF OXFORD

In Congregation on July 7 the following degrees were conferred:

D.M.—C. W. Bartley.
B.M.—G. Richman, J. A. F. Barnes, D. H. S. Stephens, K. P. S. Lumley, E. A. Morris, D. Y. Sharples, J. H. Scott-Wilson, A. B. Shrank, J. M. Brindle, H. L. Craig, R. D. Stedford, D. A. Lilliecrap, W. H. Clarke, Pamela M. Fullerton.

Dr. A. G. M. Weddell has been appointed a Curator of the Bodleian Library for ten years from the first day of Michaelmas Term, 1956.

The Horatio Symonds Studentship in Surgery for 1956 has been awarded to Michael Peter Wright, B.M., B.Ch., of Magdalen College.

ROYAL COLLEGE OF PHYSICIANS OF LONDON

At the quarterly comitia of the College held on July 26, with the President, Sir Russell Brain, in the chair, the following Fellows of the College were elected officers for the ensuing year: *Harveian Librarian*, Sir Charles Dodds, F.R.S.; *Assistant Registrar*, Dr. M. I. A. Hunter.

Sir Russell Brain was reappointed the College representative on the governing body of the British Postgraduate Medical Federation, and Sir Adolphe Abrahams on the Professional Classes Aid Council. Dr. T. C. Hunt was appointed as representative on the advisory committee of the Empire Medical Association, and Dr. J. visory Bureau of the British Medical Association, and Dr. J. Forest Smith on the council of the London Association for Hospital Services.

The following lecturers were appointed for 1957: Lumleian, Dr. L. C. Hill; Goulstonian, Dr. R. Daley; Oliver-Sharpey, Professor J. R. Squire; Mitchell, Dr. F. P. Lee Lander; Langdon Brown, Dr. R. Bodley Scott; Marc Daniels, Dr. W. D. Brooks. For 1958: Croonian, Dr. P. H. Wood; FitzPatrick, Dr. W. S. C. Copeman; Watson Smith, Dr. M. Sydney Thomson.

It was announced that the Murchison Scholarship for 1956 had been awarded to Dr. Alwyn Michael Parfitt.

The following, having satisfied the Censors' Board, were admitted Members of the College:

G. M. Aber, M.B., B. G. Barnard, M.B., A. R. Bird, M.B., G. H. Blair, M.B., J. Blake, M.D., H. D. Breidahl, M.D., D. H. Davies, B.M., R. E. Eban, M.B., R. T. D. Emond, M.B., E. J. Epstein, M.B., J. C. Farrell, M.B., I. B. Hales, M.B., C. J. Hayter, M.B., G. E. Hession, M.B., E. W. Jones, M.B., R. V. Jones, M.B., Captain, R.A.M.C., G. F. Joplin, M.B., D. M. Krikler, M.B., G. C. R. Morris, B.M., A. D. Munro, M.B., J. F. Niall, M.D., I. C. S. Normand, B.M., Captain, Faure, B.M., N. J. O'Doherty, M.B., G. Pampiglione, M.D., A. J. Peppert, R.A.M.C., N. J. O'Doherty, M.B., D. B. Shaw, M.B., Muriel E. M.B., M. Rayne, M.B., H. E. Reef, M.B., D. B. Shaw, M.B., Muriel E. Sidaway, M.B., F. G. Silberberg, M.B., K. Sinclair, M.B., Isabel G. Stubbe, M.B., R. W. Smithells, M.B., R. Sougin-Mibashan, M.D., J. L. Stubbe, M.D., Bidi M. Wild, M.B., C. W. E. Wilson, M.B., K. G. Wormsley, M.B., S. Zwi, M.B.

Licences to practise were conferred upon the following 122 candidates who have passed the final examination in medicine, surgery, and midwifery of the Conjoint Board and who have complied with the bylaws of the College:

E. O. O. Arbener, G. M. D. Archer, G. W. Arthur, J. K. Arthur, R. M. Baddeley, B. H. Bee, N. C. Bhandari, R. M. L. Bowles, P. H. Boyle, R. P. Britt, J. R. Burgess, Barbara L. Burroughs, G. W. Chance, M. D. B. Clarke, G. Cohen, Elizabeth A. Coles, F. L. W. Collins, D. C. Colwell, M. R. Colwill, B. J. E. Cooke, C. C. Cory, G. Cowburn, Margaret J. Darch, J. K. Dauncey, D. B. A. L. Davies, W. H. E. Davies, B. P. Day, W. Deighton, R. A. Delevante, G. C. Denton, T. S. Dogra, J. N. Drinkall, C. J. Drouet, G. S. Duncan, Elizabeth M. Everard, G. W. M. Faris, Barbara S. Finch, D. B. Fowler, C. A. Fox, M. Galton, J. Gelson, J. H. Gervis, Ann B. Gray, B. H. Grundy, A. L. Gunn, Ursula H. Hamilton, D. B. Hill, T. W. Hoskins, H. J. Hoyland, B. D.

Hughes, D. I. Hughes-Davies, Elizabeth M. Jewell, P. G. John, G. C. A. Kenavon, R. C. M. Kew, C. F. Knowles, Monica J. Langhan, Rosemary F. Leslie, Leila Lieber, N. R. Locke, E. Long, K. Longstaff, W. S. B. Loosmore, E. W. Lord, J. B. Lynch, Margaret J. McBroom, A. J. Mann, N. M. C. Mayne, B. S. Merry, K. F. C. Muncey, D. J. R. F. Nash, F. O. Negbenebor, M. G. B. Noel, D. E. Page, P. A. Parish, P. B. Parnaby, D. Parrott, P. T. Penny, W. F. Percera, B. Philpott, J. L. Provan, Shirley G. Ratcliffe, M. D. Rawson, F. F. Richards, F. N. Rigby, I. Roberts, E. D. Rosen, C. A. Rushton, R. J. Rushton, J. R. Sandford, D. A. W. Sansome, K. L. Saunders, P. R. Seed, G. F. Shah, A. A. el-F. Shandall, E. M. Skinner, M. G. Smedley, B. Smith, Jacqueline A. K. Smith, R. W. M. Smith, R. D. C. Southcott, S. J. Steele, M. A. Stewart, J. D. Stirland, G. J. Taylor, P. F. Teebay, I. A. D. Todd, R. S. Walton, M. J. Watson, P. G. Watson, L. G. Whitby, Diana M. Wigley, G. E. G. Williams, P. N. Williams, D. Wilson, R. H. Wilson, C. W. O. Windsor, P. Wolstencroft, H. O. Wooller, G. Yates, J. M. Young, M. J. Young.

The following diplomas were conferred jointly with the Royal College of Surgeons of England:

DIPLOMA IN ANAESTHETICS.—Mary P. Armstrong, S. Baigel, T. W. Baillie, D. R. Ball, D. C. F. Banks, Colette A. Barouch, M. E. H. Barrow, R. C. Bellingham, E. D. L. Bennett, G. Berry, J. Biggins, T. R. Bonomi, Eileen S. Browne, A. F. Buck, J. C. Burt, G. W. Burton, D. C. T. Bush, Anne Cairns, M. S. Chayen, T. H. Chillingworth, Pauline M. Collins, H. R. P. Coutanceau, Davina M. Cowan, N. C. Das, R. D. McC. Davie, R. C. Davison, Josephine Dec, P. H. Dennison, D. W. A. Drew, Lillie S. Dummer, W. S. Dykes, J. W. C. Fox, A. Ganesan, Patricia E. Gardner, Patricia Gorman, W. H. Graham, R. J. J. Gray, T. Grogan, M. Grossberg, T. K. Hardy, S. Harrison, R. D'A. Harvey-Kelly, P. J. Healy, W. J. Hegarty, A. W. G. Housby, J. D. Hunter, Frances C. E. Hutchison, C. G. Ingram, Beryl E. Jack, D. C. Jackson, J. B. Jacovelli, S. W. Kemp, M. H. Lawrence, J. W. Leach, A. F. M. Little, C. G. Lloyd, H. F. F. Lorang, J. D. Lumsden, M. J. Lyons, Betty McCarthy, D. T. McClements, Jean M. MacDonald, Margaret E. McMullin, W. D. McNaul, D. M. McWilliams, Hannah M. R. Marks, Shelagh Mathias, F. X. Micallef, J. B. Montgomery, T. R. Morley, C. Moss, Sheila M. Mullally, Jean C. Munro, T. J. Nagle, A. P. M. Nicol, Carol A. N. Nompozo, M. H. Norman, Patricia Painter, Isabella R. Paterson, L. A. Phillips, T. Pimblett, Barbara A. Renwick, J. Rintoul, Lydia J. Rose, Rosamund O. F. Shanks, P. Steward, A. P. Thomas, Sheila M. Topping, M. E. Tunstall, Margaret M. Voysey, Ethna A. Walsh, C. S. Ward, D. J. Waters, Dorothy A. Wescott, Mary F. West, W. M. Wilkinson, Cynthia M. Worrall, S. Yousuf.

DIPLOMA IN CHILD HEALTH.—K. D. Coorey, C. Lucey, T. Valaas.
DIPLOMA IN INDUSTRIAL HEALTH.—J. R. Bowker, A. J. de Villiers, J. E. Epsom, T. A. Evershed, M. N. Guha Majumder, C. E. S. Myers, D. A. Narasimhan, J. K. Sehgal, A. S. Sethi, K. N. Sharma, D. Tingle, M. Zeville.

DIPLOMA IN LARYNGOLOGY AND OTOTOLOGY.—I. E. Backwell, Margaret V. Bickerton, V. Briffa, S. Das Gupta, L. S. Goldman, G. B. Hill, D. A. James, D. A. L. Lourensz, A. M. K. Mojis, R. R. Patel, J. S. Ritchie, T. S. N. Sinha, J. A. van der Merwe, R. W. Ware, J. S. H. Whitehead.

DIPLOMA IN MEDICAL RADIOLOGY.—A. W. Atukorala, P. E. Billimoria, W. I. H. Bourne, Eva E. Epstein, W. A. Evans, B. B. Fazackerley, A. K. Kouppas, B. Kramer, J. I. Levy, N. J. McKellar, D. G. Potts, M. A. Rahman, M. C. Stevens, D. A. Symers, V. Visweswariyah, M. Weerasena.

DIPLOMA IN MEDICAL RADIOTHERAPY.—G. A. B. Cowan, I. Fix, G. E. Flatman, J. A. G. Holt, N. Howard, R. J. R. Johnson, B. Lall, Marjorie E. Nobbs, J. S. Scott, A. K. Turnbull, Eileen M. Williamson.

DIPLOMA IN PATHOLOGY.—J. G. Azzopardi, E. F. Bowers, R. R. Chaudhuri, Helen L. D. Duguid, R. J. Elvy, A. F. Ollerenshaw, Carolyn C. Rigby, A. M. Womack.

DIPLOMA IN OPHTHALMOLOGY.—H. Akhtar, J. Anderson, E. J. Arnott, R. Banerji, K. K. Biddappa, J. S. Brown, D. H. Coop, Margaret E. Coop, A. J. Dark, Doris M. Davies, G. B. Davies, Jean A. Fairhurst, C. R. A. Fenton, A. D. Fox, A. H. Haley, Mary J. L. Hall, S. A. Husain, S. I. Husain, A. G. H. Ishak, C. R. Kanagasundaram, V. V. Kayarkar, T. H. Khan, S. Kumar, O. Lawrence, E. C. B. Mackey, E. A. McWilliams, Khan, S. Kumar, O. Lawrence, E. C. B. Mackey, E. A. McWilliams, I. B. O. Odd, H. N. O'Donoghue, M. E. Quatermass, Y. P. Singh, I. B. Speight, S. Stead, Hilary K. R. Steen, E. J. Trencery, P. L. Wong.

DIPLOMA IN PHYSICAL MEDICINE.—S. K. Banerjee, S. K. Dutta, T. G. Hovenden, N. R. Lewis.

DIPLOMA IN PSYCHOLOGICAL MEDICINE.—W. McC. Anderson, T. Baasher, L. B. Bartlett, Enid Caldwell, A. Capstick, A. Chakraborty, J. A. Clark, D. Craigen, J. L. Crammer, M. S. De Mowbray, G. P. S. Fernandez, R. T. D. Franklin, N. G. Fraser, J. A. Gorst, Sarah K. R. Gray, A. C. R. Hamer, O. E. F. Hodgson, J. A. Hutchinson, I. M. Ingram, S. Iskandar, E. H. Jacobs, G. G. Macdonald, N. J. C. McGill, D. H. Malan, E. Mellor, T. J. K. Merritt, H. Nichol, C. Ounsted, R. A. Pargiter, J. M. Pencheon, N. J. Prichard, P. E. Rixon, P. P. E. Savage, J. P. Scrivener, B. P. Shah, A. Sittampalam, P. M. Tow, H. J. Walton, R. D. Watson, N. V. Wilkinson, J. L. Wilson, Lorna G. Wing.

DIPLOMA IN PUBLIC HEALTH.—Colina C. Adeniyi-Jones, C. C. A. Adeniyi-Jones, O. B. Alakija, Margaret M. Bates, B. H. Burne, Margaret Capra, Engenie F. Coetzer, Marjorie T. Dare, Rachel Jacobs, Katie Keane, Anne D. Lepine, Joan M. MacCarthy, R. D. MacLean, May T. McQuaid, Geraldine T. O'Carroll, A. A. Qureshi, P. T. Regeer, G. A. Roberts, S. K. Sarkar, Marjorie Smail, Gwendolyn R. Tapp, T. B. Whitehead.

DIPLOMA IN TROPICAL MEDICINE AND HYGIENE.—D. M. Du Toit.

ROYAL COLLEGE OF SURGEONS OF ENGLAND

At a meeting of the Council of the College held on July 26, with Sir Harry Platt, President, in the chair, the Handcock Prize was awarded to R. D. C. Southcott, of Guy's Hospital Medical School.

Diplomas were granted, jointly with the Royal College of Physicians of London, in Anaesthetics, in Child Health, in Industrial Health, in Laryngology and Otolaryngology, in Ophthalmology, in Medical Radiodiagnosis, in Medical Radiotherapy, in Psychological Medicine, in Physical Medicine, in Public Health, in Tropical Medicine and Hygiene, and in Pathology to the successful candidates whose names are printed above in the report of the meeting of the Royal College of Physicians of London, also held on July 26.

Vital Statistics

Summary for British Isles for week ending **July 28**
(No. 30) and corresponding week 1955.

Figures of *cases* are for the countries shown and London administrative county. Figures of *deaths* and *births* are for the 160 great towns in England and Wales (London included), London administrative county, the 17 principal towns in Scotland, the 10 principal towns in Northern Ireland, and the 14 principal towns in Eire.

The table is based on information supplied by the Registrars-General of England and Wales, Scotland, N. Ireland, and Eire, the Ministry of Health and Local Government of N. Ireland, and the Department of Health of Eire.

CASES in Countries and London	1956					1955				
	Eng. & Wales	Land.	Scot.	N. Ire.	Eire	Eng. & Wales	Land.	Scot.	N. Ire.	Eire
Diphtheria ..	3	0	0	0	5	7	1	2	0	1
Dysentery ..	843	89	153	1		471	34	155	20	
Encephalitis, acute	5	0		0		2	1		0	
Enteric fever:										
Typhoid ..	4	0	0	15		6	1	1	0	1
Paratyphoid ..	25	4	2 (B)	6		29	2	3	0	
Food-poisoning ..	419	25		5		461	18		3	
Infective enteritis or diarrhoea under 2 years ..				12	28				18	50
Measles* ..	3,270	363	81	31	216	12,100	166	64	86	155
Meningococcal infection ..	19	2	11	0	2	24	2	17	0	2
Ophthalmia neona- torum ..	45	0	6	0		43	2	3	0	
Pneumonia† ...	198	15	96	1	1	233	14	89	1	
Poliomyelitis, acute:										
Paralytic ..	71	1		2	14	121	19			
Non-paralytic ..	89	2	4			120	32	15	0	1
Puerperal fever‡ ..	205	30	5	1		240	24	11	1	
Scarlet fever ..	573	36	39	11	14	342	29	28	10	4
Tuberculosis:										
Respiratory ..	641	56	101	15		654	103	109	17	
Non-respiratory	73	4	19	6		78	11	15	5	
Whooping-cough ..	2,388	208	186	34	61	1,705	74	50	84	112

DEATHS in Great Towns	1956					1955				
	Eng. & Wales	London	Scot.	N. Ire	Eire	Eng. & Wales	London	Scot.	N. Ire	Eire
Diphtheria ..	0	0	0	0	0	0	0	0	0	0
Dysentery ..	0	0		0		1	0		0	
Encephalitis, acute		0			0		0			0
Enteric fever ..	0	0	0	0		0	0	0	0	
Infective enteritis or diarrhoea under 2 years ..	4	0	1	1	0	8	0	3	0	0
Influenza	5	2	0	0	0	2	0	0	0	0
Measles		0	0	0	1		0	0	0	0
Meningococcal infection ..		0	1				0	1		
Pneumonia ..	137	20	11	11	5	134	13	16	5	5
Poliomyelitis, acute	1	0			0	2	0			0
Scarlet fever ..		0	0	0	0		0	0	0	0
Tuberculosis: Respiratory .. } Non-respiratory .. }	41 {	7 {	6 {	2 {	1 {	56 {	6 {	7 {	0 {	3 {
		0	3	0	0		2	1	0	0
Whooping-cough ..	0	0	0	0	0	0	0		0	0
Deaths 0-1 year ..	156	28	482	8	5	184	22	25	7	12
Deaths (excluding stillbirths) ..	4,527	660	21	109	123	4,349	572	459	87	136
LIVE BIRTHS ..	7,748	1147	966	209	452	7,856	1185	929	211	432
STILLBIRTHS ..	189	27	15			205	16	21		

* Measles not notifiable in Scotland, whence returns are approximate.
† Includes primary and influenza pneumonia.
‡ Includes puerperal pyrexia.

Includes puerperal pyrexia.

• **Средства массовой информации:** Газеты, журналы, радио, телевидение.

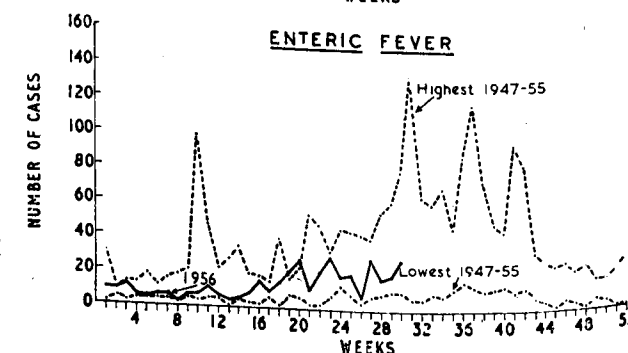
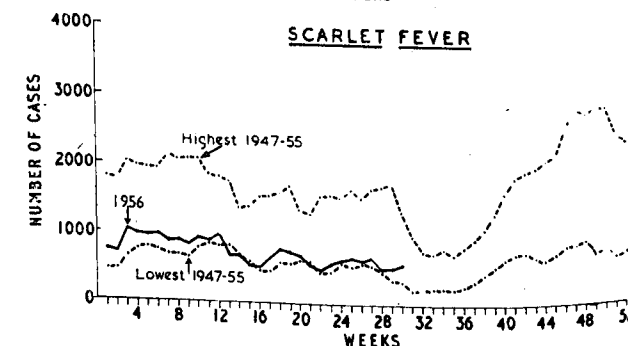
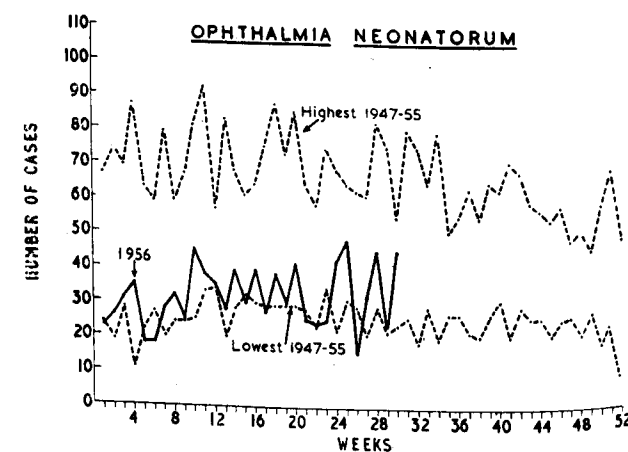
Poliomyelitis

Poliomyelitis notifications in the week ending August 4 (31st week of the year) were as follows: Paralytic 73 (71), non-paralytic 58 (89), total 131 (160). This is a decrease of 29 compared with the previous week, the figures for which are in parentheses.

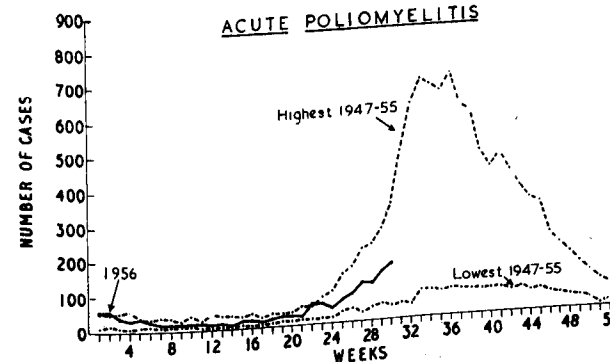
Cases notified from the beginning of the year (with rate per 100,000 population in parentheses) are as follows for districts of relatively high incidence: Macclesfield M.B. 25 (69); Whitehaven M.B. 22 (87); Ennerdale R.D. 18 (63); Yeovil M.B. 19 (79); Guildford M.B. 32 (64); Manchester C.B. 212 (30); Woking U.D. 17 (30); and Reigate M.B. 16 (33).

Graphs of Infectious Diseases

The graphs below show the uncorrected numbers of cases of certain diseases notified weekly in England and Wales. Highest and lowest figures reported in each week during the nine years 1947-55 are shown thus -----, the figures for 1956 thus ———. Except for the curves showing notifications in 1956, the graphs were prepared at the Department of Medical Statistics and Epidemiology, London School of Hygiene and Tropical Medicine.



ACUTE POLIOMYELITIS



Week Ending August 4

The notifications of infectious diseases in England and Wales during the week included: scarlet fever 426, whooping-cough 2,146, measles 3,220, acute pneumonia 196, acute poliomyelitis 131, dysentery 603, paratyphoid fever 8, and typhoid fever 1. There were no cases of diphtheria.

Infectious Diseases

The notifications of infectious diseases did not show any large fluctuations in England and Wales in the week ending July 28. Notifications of scarlet fever rose by 43, from 530 to 573, and of measles by 19, from 3,251 to 3,270. Whooping-cough notifications fell by 170, from 2,558 to 2,388. The decline in dysentery notifications also continued, from 970 to 843, a fall of 127. Notifications of paratyphoid fever rose from 16 to 25, while those of typhoid numbered 4 as in the previous week.

Of the paratyphoid notifications, 5 came from Yorkshire West Riding (Leeds C.B. 4, Morley M.B. 1), 4 from Kent (Bexley M.B. 4), 4 from London (Bethnal Green 1, Camberwell 1, Fulham 1, Hammersmith 1), and 4 from Middlesex (Acton M.B. 1, Hendon M.B. 2, Tottenham M.B. 1).

In Lancashire 89 cases of food-poisoning were notified, more than in the previous week; the main centres were Oldham C.B. 35, Liverpool C.B. 17, and Royton U.D. 14. In Warwickshire 68 cases were notified, an increase of 61 over the previous week's cases; the rise was due to an outbreak at Birmingham C.B. 64.

Medical News

International Action on Atomic Energy.—International co-operation in the field of nuclear energy is quickening and extending. The council of the International Organization for Standardization—a body of which the British Standards Institution is the United Kingdom member—has decided that its technical committees should turn at once to the question of securing agreed international standards. The first standards to be dealt with are those concerned with terminology, definitions, and symbols; safety standards for protection against radiation hazards; and standards for the safe and effective operation of reactors. Taking advantage of the recent meeting of the First International Congress of Human Genetics (see p. 412), W.H.O. convened an international study group in Copenhagen immediately after it to discuss the effects of radiation on human heredity. The W.H.O. group, which includes among its members Professor L. S. PENROSE, F.R.S., Dr. T. C. CARTER, Dr. W. M. COURT BROWN, Dr. C. A. B. SMITH, and Professor A. C. STEVENSON, began its meetings (which were due to last for a week) on August 7. Other evidence of international co-operation is the signing in London on July 31 of a ten-year agreement between Britain and Western Germany on the peaceful use of atomic energy. The agreement provides for Western Germany to obtain from Britain research reactors and their fuel, training facilities at the Atomic Energy Authority, and

certain unclassified information on the design and operation of nuclear reactors.

New Surgeon-General.—Dr. L. E. BURNLEY has succeeded Dr. Leonard A. Scheele as surgeon-general of the United States Public Health Service. Dr. Scheele resigned unexpectedly last June (see JOURNAL, July 14, p. 109). Dr. Burnley, who is 49 years of age, has been an assistant surgeon-general for the past two years. Most of his professional life has been in the public health service, and he served as public-health commissioner in Indiana from 1945 to 1954. The surgeon-general's salary is \$22,626 per year.

Intradermal T.A.B. for Boosting.—The War Office announces that in future the Army booster doses of T.A.B. will be given "into the skin," not under it. This is to avoid the usual reaction from T.A.B., which it is stated "is associated with the giving of an injection under the skin." Intradermal injection has not been adopted earlier, in spite of its known low reaction rate, because there were doubts about the immunity it conferred. Now, states the War Office announcement, evidence from the United States that the method is effective for reinoculation against enteric (though inadvisable for primary inoculation), and favourable confirmatory experiments at the Army vaccine laboratories at Everleigh, allow the change to be made. The Army is continuing its investigations of the intradermal technique, with the object of adapting it to both primary inoculation and combined prophylactics.

Dr. Ravdin Honoured.—The Royal College of Surgeons of England announces that it has conferred its honorary fellowship on Dr. I. S. RAVDIN, of Philadelphia. Dr. Ravdin is the chairman of the Board of Regents of the American College of Surgeons and is professor of surgery at Pennsylvania University. He intends to visit London in December, when he will sign the Roll of Honorary Fellows and deliver a Moynihan lecture at the College.

London University.—Dr. NORMAN MORRIS, first assistant in the obstetric unit at University College Hospital, has been appointed to the university readership in obstetrics and gynaecology tenable at the Institute of Obstetrics and Gynaecology. Mr. H. M. PICKARD has been appointed to the university readership in conservative dentistry tenable at the Royal Dental Hospital of London.

Harben Lecturer.—Professor PHILIP DRINKER, professor of industrial hygiene at the Harvard University School of Public Health, has been appointed Harben lecturer for 1956 by the council of the Royal Institute of Public Health and Hygiene. Professor Drinker will give his lectures next year (May 13, 14, and 15) in London. His subject will be "Air Pollution and the Public Health."

COMING EVENTS

Institute of Biology.—A symposium on "The Biology of Ageing" will be held on September 27 and 28 in the Anatomy Theatre, University College, London, W.C.1. Details from the general secretary, Institute of Biology, 41, Queen's Gate, London, S.W.7.

European Association Against Poliomyelitis.—Annual symposium, at Bologna, September 20–22. Details from the general secretary, European Association Against Poliomyelitis, 67, Boulevard A. Reyers, Brussels.

Association of Anaesthetists of Great Britain and Ireland.—Annual meeting at the Royal College of Surgeons, 45, Lincoln's Inn Fields, London, W.C.2, on November 1 and 2. Those wishing to read papers should send a 250-word summary to the secretary before August 30.

Sixth Congress of the European Society of Haematology.—Copenhagen, August 26–31, 1957. Details from the secretary-general, Blegdamsvej 11, Copenhagen, Denmark.

International Symposium on Medical-Social Aspects of Senile Nervous Diseases.—Venice, July 20 and 21, 1957. Details from the secretariat, Viale Morgagni 85, Firenze, Italy.

Twelfth International Congress on Occupational Health.—Helsinki, July 1-6, 1957. Details from the secretary-general, c/o Työterveyslaitos, Haartmaninkatu 1, Helsinki-Töölö, Finland.

Sixth International Congress of Otolaryngology.—Washington, D.C., May 5-10, 1957. Details from the general secretary, 700, North Michigan Avenue, Chicago 11, Illinois.

NEW ISSUES

British Journal of Ophthalmology.—The new issue (Vol. 40, No. 6) is now available. The contents include:

FACTORS AFFECTING THE HYDRATION OF THE CORNEA IN THE EXCISED EYE AND THE LIVING ANIMAL. Maurice E. Langham and Irvin S. Taylor.
VASCULARIZATION OF THE OPTIC PATHWAY. IV. OPTIC TRACT AND EXTERNAL GENICULATE BODY. J. François, A. Neetens, and J. M. Collette.
DESCRIPTION OF BEHCHET'S SYNDROME IN THE HIPPOCRATIC THIRD BOOK OF ENDEMIC DISEASES. Aryeh Feigenbaum.
BLOOD IN THE CANAL OF SCHLEMM. Redmond Smith.
NORMAL INTRA-OCULAR PRESSURE. M. Alimuddin.
CONCOMITANT ESOTROPIA OF LATE ONSET. PATHOLOGICAL REPORT OF FOUR CASES IN SIBLINGS. Atilio L. Norbis and Enrique Malbrán.

Issued monthly; annual subscription £4 4s.; single copy 8s. 6d.; obtainable from the Publishing Manager, B.M.A. House, Tavistock Square, London, W.C.1.

British Heart Journal.—The new issue (Vol. 18, No. 3) is now available. The contents include:

ABSENCE OF THE LEFT PULMONARY ARTERY IN FALLOT'S TETRALOGY. Richard W. Emanuel and J. Norman Pattinson.
PREMATURE OBLITERATION OF THE FORAMEN OVALE. G. Austin Gresham.
ABERRANT BEATS OF WOLFF-PARKINSON-WHITE CONFIGURATION IN ARTERIO-SCLEROTIC HEART DISEASE. Irwin Hoffman, Milton H. Morris, Louis Friedfeld, and Robert D. Gittler.
SUPERNUMERARY CHAMBERS TO THE LEFT HEART. P. J. Barnard and A. J. Brink.
THE VALVE OF THE INFERIOR VENA CAVA. John B. Hickie.
LEFT ATRIAL "PULMONARY CAPILLARY" AND OESOPHAGEAL BALLOON PRESSURE TRACINGS IN MITRAL VALVE DISEASE. Alvin J. Gordon, Leslie Kuhn, Salomao S. Amram, Ephraim Donoso, and Eugene Braunwald.
CHRONIC GENERALIZED MYOCARDIAL ISCHAEMIA WITH ADVANCED CORONARY ARTERY DISEASE. W. F. M. Fulton.
THE DIAGNOSIS OF CONGENITAL HEART DISEASE IN INFANTS BY CATHETERIZATION AND SELECTIVE ANGIOCARDIOGRAPHY. Ib Boesen, John Lind, B. Merrild-Hansen, Th. Rosendal, Ole Storm, and Carl Wegelius.
ANOMALOUS PULMONARY VENOUS DRAINAGE. John B. Hickie, T. M. D. Gimlette, and A. P. C. Bacon.
SELECTION FOR ANTICOAGULANT THERAPY IN CARDIAC INFARCTION USING THE HEPARIN RETAINED COAGULATION TIME. A. A. Fitzgerald Peel.
FURTHER STUDIES ON THE CEREBRAL BLOOD FLOW ESTIMATED WITH THORIUM-B LABELLED ERYTHROCYTES. Erik Gustave Nylin, Hans Blömer, Hardin Jones, Sven Hedlund, and Carl-Gösta Rylander.
TWO MORE FAMILIES WITH CARDIOMEGALY. Maurice Campbell and Margaret Turner-Warwick.
SPECTRAL PHONOCARDIOGRAPHIC STUDIES IN CONGENITAL HEART DISEASE. Victor A. McKusick, Oliver N. Massengale, Jr., Milton Wigod, and George N. Webb.

CASE REPORTS:
PATENT DUCTUS ARTERIOSUS WITH PROGRESSIVE DILATATION OF THE PULMONARY ARTERY. J. A. Cosh.
CARDIAC FAILURE DUE TO PRIMARY AMYLOIDOSIS. Heather Ashton.
HEART FAILURE DUE TO EXTREME OBESITY. T. B. Counihan.
STOKES-ADAMS ATTACKS IN ACUTE RHEUMATIC CARDITIS. T. C. Gibson and J. P. Hughes.
ABSTRACTS OF CARDIOLOGY.

Issued quarterly; annual subscription £2 2s.; single copy 12s. 6d.; obtainable from the Publishing Manager, B.M.A. House, Tavistock Square, London, W.C.1.

Journal of Neurology, Neurosurgery and Psychiatry.—The new issue (Vol. 19, No. 2) is now available. The contents include:

OBSERVATIONS ON THE EXTENDED USE OF THE MARCHI METHOD. Marion C. Smith.
THE RECOGNITION AND PREVENTION OF ARTEFACTS OF THE MARCHI METHOD. Marion C. Smith.
STUDIES IN SENSATION: OBSERVATIONS ON THE LOCALIZATION OF THE SENSATIONS OF TOUCH AND PRICK. John Marshall.
REFERENCE OF SENSATION AT THE SPINAL LEVEL. P. W. Nathan.
AWARENESS OF BLADDER FILLING WITH DIVIDED SENSORY TRACT. P. W. Nathan.
TWO CASES OF MYOPATHY LIMITED TO THE QUADRICEPS. John N. Walton.
A STUDY OF 25 CASES OF COMPRESSION OF THE CAUDA EQUINA BY PROLAPSED INTERVERTEBRAL DISCS. W. Bryan Jennett.
E.E.G. ABNORMALITIES FROM THE TEMPORAL LOBE STUDIED WITH SPHENOIDAL ELECTRODES. G. Pampiglione and J. Kertridge.
THE EFFECT OF INSULIN COMA AND E.C.T. ON THE SHORT-TERM PROGNOSIS OF SCHIZOPHRENIA. J. Hoenig, D. M. Lieberman, and I. Auerbach.
SODIUM AMYTAL AND BEHAVIOUR IN NEUROTIC SUBJECTS. S. G. Lavery and C. M. Franks.
DISSEMINATED SCLEROSIS TREATED WITH ISONIAZID WITH A METHOD OF EVALUATING CHRONIC NEUROLOGICAL DISORDERS. Barbara M. Ansell and Edwin Clarke.
ISCHAEMIC AND POST-ISCHAEMIC PARAESTHESIAE: NORMAL RESPONSES IN THE UPPER LIMB WITH SPECIAL REFERENCE TO THE EFFECT OF AGE. E. W. Poole.
FAMILIAL PERONEAL MUSCULAR ATROPHY AND ITS ASSOCIATION WITH THE FAMILIAL ATAXIAS AND TREMOR AND LONGEVITY. Raymond Hierons.

Issued quarterly; annual subscription £2 2s.; single copy 12s. 6d.; obtainable from the Publishing Manager, B.M.A. House, Tavistock Square, London, W.C.1.

SOCIETIES AND LECTURES

A fee is charged or a ticket is required for attending lectures marked ●. Application should be made first to the institution concerned.

Thursday, August 23

INSTITUTE OF LARYNGOLOGY AND OTOTOLOGY.—5.30 p.m., special lecture by Dr. J. R. Lindsay (Chicago): Vascular Accidents as They Affect Vestibular Function.

APPOINTMENTS

HOSPITAL FOR SICK CHILDREN, Great Ormond Street, London, W.C.—J. P. Partridge, F.R.C.S., Resident Assistant Surgeon; Judith N. Nicholas, M.B., B.S., D.A., Junior Resident Anaesthetist; J. P. Stanfield, M.D., M.R.C.P., Winifred Burgess, M.B., B.S., M.R.C.P., D.C.H., and M. L. Weidman, M.D., House-physicians; S. W. Mannion, M.B., Ch.B., and D. A. M. Ellis, M.B., B.S., House-surgeons; G. G. Woodruff, M.D., Assistant Medical Registrar; A. C. Woodmansey, M.D., M.R.C.P., D.P.M., D.C.H., Part-time Medical Officer in the Department of Psychological Medicine; F. R. H. Wrigley, M.B., B.S., D.Obst.R.C.O.G., Resident Anaesthetist (Tadworth); Ann M. Haines, M.B., Ch.B., D.C.H., D.A., Junior Resident Anaesthetist; Rachel M. Arnold, M.B., Ch.B., D.C.H., Assistant Resident Medical Officer (Tadworth); D. H. H. Pullon, M.B., Ch.B., M.R.C.P.Ed., D.C.H., House-physician; Margaret M. Heley, M.B., B.S., D.Obst.R.C.O.G., House-surgeon.

MILNE, JOHN COUTTS, M.B., Ch.B., D.P.H., D.T.M.&H., Assistant County Medical Officer of Health, Hampshire County Council; Medical Officer of Health, Alton Urban and Alton Rural District Councils.

SOUTH-WESTERN REGIONAL HOSPITAL BOARD.—B. O. P. MacMahon, M.D., M.R.C.P.I., Senior Medical Registrar to the West Cornwall Clinical Area; H. G. Mather, M.D., M.R.C.P., Consultant Physician to the Bristol Clinical Area; H. F. Lyon, M.B., Ch.B., M.R.C.P., D.T.M., Assistant Physician (Geriatrics) at Manor Park Hospital, Bristol; M. Hewitt, M.B., B.S., M.R.C.P., Consultant Dermatologist to the West Cornwall Clinical Area; A. G. G. Toomey, M.R.C.S., L.R.C.S., D.M.R.D., Consultant Radiologist to the North Gloucestershire Clinical Area; A. R. Bollen, M.B., Ch.B., Anaesthetic Registrar to Bath Group of Hospitals; C. Gregory, M.B., Ch.B., Registrar in Psychiatry at Bristol Mental Hospitals; Joan Guy, M.B., Ch.B., D.C.H., Registrar to South-west Regional Blood Transfusion Service, Southmead, Bristol; J. Warner, M.B., Ch.B., Registrar in Child Psychiatry and Mental Deficiency at Bristol Child Guidance Clinic and Hospitals of the Northam-Brentley Group; A. J. Walt, M.S., M.B., Ch.B., F.R.C.S.C., Surgical Registrar to Bath Group of Hospitals.

TATLOW, W. F. T., M.D., F.R.C.P.(C.), M.R.C.P., Assistant Professor of Neurology, McGill University and Associate Neurologist to Montreal Neurological Institute.

BIRTHS, MARRIAGES, AND DEATHS

BIRTHS

Davis.—On August 3, 1956, at King's College Hospital, London, S.E., to Margaret (formerly Liddle), S.R.N., wife of Leslie R. Davis, M.D., a son, Richard Burn.
Lennox.—On August 9, 1956, at B.M.H. Hostel, B.A.O.R., to Elizabeth Leslie (formerly Handasyde), M.B., Ch.B., wife of Ian Gordon Lennox, M.B., Ch.B., a daughter.
Nagley.—On August 1, 1956, at Farnborough Hospital, Kent, to Sylvia, wife of Dr. Martin M. Nagley, a son—Timothy Nigel.

DEATHS

Armour.—On July 31, 1956, at Crichton House, Anstruther, Fifeshire, Matthew David Sutherland Armour, M.B., Ch.B.
Beck.—On July 27, 1956, at Martyrwell, Cheriton, Hants, William Distin Beck, M.D.
Buist.—On July 24, 1956, at Cape Town, South Africa, Herbert John Martin Buist, C.B., C.M.G., D.S.O., M.B., C.M., Colonel, late R.A.M.C. (retired), aged 88.
Cameron.—On July 31, 1956, at Scarborough, Yorks, Dugald Cameron, M.C., M.B., F.R.C.S.Ed., of 114, Tonbridge Road, Maidstone, Kent.
Crabtree.—On July 23, 1956, at Stansfield Hall, Tordomden, Lancs, Walter Crabtree, M.C., M.B., Ch.B., formerly of Nelson, Lancs, aged 80.
Duncan.—On August 2, 1956, James Matthews Duncan, O.B.E., M.D., of Murtle, Sunninghill, Ascot, aged 82.
Eppyn-Phillips.—On August 1, 1956, at Oulton Broad, Suffolk, Mary Elizabeth Eppyn-Phillips, M.B., aged 81.
Greville.—On July 29, 1956, the result of an accident, Andrew C. Greville, M.B., Ch.B., D.M.R.D., of Eaton Lodge, Roby Road, Roby, near Liverpool, aged 37.
Heller.—On July 20, 1956, at his home, 1, Beckett Close, Worcester, Alois Heller, M.D.
Jobson.—On August 1, 1956, at Maryknoll, Guildford, Surrey, Thomas Battersby Jobson, M.D., D.P.H., aged 84.
Jocelyn.—On July 25, 1956, Frank Steven Jocelyn, M.D., of 10 Marius Road, Balham, London, S.W.
Loosely.—On July 20, 1956, in a nursing home, Hindhead, Surrey, Alfred Edward Arthur Loosely, M.B., F.R.C.S.
O'Beirne-Ryan.—On July 24, 1956, at Oddmeads, Langford Budville, Wellington, Som., Charles O'Beirne-Ryan, L.R.C.P.&S.I. & L.M., Surgeon Lieutenant-Commander, R.N.V.R. (retired), late of Harrogate, Yorks.
Reichert.—On July 21, 1956, Edward Reichert, M.D., of "Patria," Norley Road, Cuddington, near Northwich, Cheshire, aged 57.
Rice.—On July 23, 1956, at Newport, Rhode Island, U.S.A., Alexander Hamilton Rice, M.D., aged 80.
Toogood.—On July 30, 1956, at Point House, Fowey, Cornwall, Frederick Sherman Toogood, O.B.E., M.D., D.P.H., Lieutenant-Colonel, R.A.M.C. (retired), aged 93.
Vane-Percy.—On July 17, 1956, at Shenton Park, Western Australia, Nora Aileen Vane-Percy, M.B.
Walker.—On July 16, 1956, in a nursing-home, Torquay, Devon, Henry Roe Walker, M.R.C.S., L.R.C.P., of Ipplepen, Newton Abbot, Devon, aged 85.
Wall.—On July 20, 1956, at the home of his daughter, "Cranleigh," Fell Drive, Grange-over-Sands, Lancs, Douglas Larmer Wall, M.C., M.B., Ch.B., formerly of "Fairlawn," Hoo, Kent.

Any Questions?

We publish below a selection of those questions and answers which seem of general interest. It is regretted that it is not possible to supply answers to all questions submitted.

Coitus in Old Age

Q.—Am I right in advising aged married couples to continue coitus if both parties so wish and are in good health? There seems to be a widespread idea that sexual intercourse is harmful in old age.

A.—With the exception of those cases where there might be some medical contraindication to physical exertion there is no reason why married couples should not continue coitus in old age if they so desire. Many cases are encountered where regular sexual relations continue well into the seven-ties, or longer. However, the post-menopausal woman, owing to diminishing secretion of mucus and atrophy of the vagina, may suffer from a degree of dyspareunia varying from slight discomfort to severe pain, and this may bring the sexual relationship to an end quite unnecessarily. Pathological conditions having been excluded by examination, advice on the use of a lubricant jelly or, if necessary, carefully supervised local or general oestrogen therapy can alleviate this dyspareunia. Regular coitus can then often be satisfactorily maintained into old age with benefit and comfort to both partners.

Olecranon Bursitis

Q.—One meets a number of cases of olecranon bursitis with effusion that fail to clear up on aspiration alone. Are sclerosants of use here, and, if so, which is advised?

A.—There are several causes of bursitis in this region. Some instances are due to injury, and some of them respond well to the injection of sclerosing solutions, but the use of sclerosants is at best uncertain and often very painful. Excision of the affected bursa is a simple little operation which is much more reliable, and which can be done in which is much more reliable, and which can be done in many most cases quite safely as an out-patient procedure. A variety of rheumatoid arthritis; others have a gouty basis. Sclerosing injections are, of course, inadvisable in both these types.

If a sclerosant is used, ethanolamine is probably the safest.

Oral and Intravenous Procaine

Q.—What are the clinical effects of giving procaine (a) orally, (b) intravenously? I heard it claimed recently that oral procaine was sometimes successful in relieving severe pain when all else had failed. If intravenous procaine is safe, can it be combined with morphine for the relief of pain?

A.—A considerable literature has accumulated on the effects and therapeutic uses of intravenous procaine. In the main, it has been used for the relief of pain, particularly the pain of post-operative pain and that due to burns, for the treatment of peripheral vascular disease, for the prevention of arrhythmias during cardiac surgery, and for the relief of pain and spasm in various arthritic conditions. It has also been used to produce general anaesthesia and obstetric analgesia. The method is safe only if administered by someone able to deal with the effects of overdose, which may appear with dramatic suddenness. Convulsions, respiratory arrest, and severe hypotension may all come on with little warning. An intravenous drip of procaine should never be left running with only a nurse in attendance. Intravenous procaine is not advised in conjunction with morphine, because the combined effects of both drugs on the respiration may be severe. The uses of intravenous procaine have been reviewed by Mushin and Rendell-Baker¹ and by Graubard and Peterson.²

The administration of procaine by mouth has been described by Roka and Lajtha.³ These authors, on a basis of x-ray investigations, claim that 100 ml. of 1% procaine taken orally, once or twice a day, will relieve non-organic pyloric spasm. Nearly complete paralysis of the pylorus appears to occur within ten minutes. This treatment, they claim, may also relieve vomiting due to gastric ulceration, and also benefit patients with carcinoma of the stomach, allowing nutrition to be improved before surgical treatment. No published account of the treatment of pain by oral procaine can be found.

REFERENCES

- Mushin, W. W., and Rendell-Baker, L., *Lancet*, 1949, 1, 619.
- Graubard, D. J., and Peterson, M. C., *Clinical Uses of Intravenous Procaine*, 1951. Blackwell Scientific Publications, Oxford.
- Roka, G., and Lajtha, L. G., *British Medical Journal*, 1950, 1, 1174.

Cortisone and Corticotrophin in Disseminated Sclerosis

Q.—Has cortisone or corticotrophin any place in the treatment of disseminated sclerosis?

A.—As soon as cortisone and corticotrophin were available experimental treatment was carried out in disseminated sclerosis, at first in the United States. Almost from the first the results were conflicting, some observers noting "significant improvement," others results that were "profoundly disappointing." The position up to 1955 is reviewed, together with references, by McAlpine, Compston, and Lumsden.¹ At the time of writing there would seem to be no evidence at all that either of these preparations has any effect in this disease, but as with all forms of treatment in this disease the assessment of results is wellnigh impossible. It may, however, be true that corticotrophin has an important therapeutic role in acute disseminated encephalomyelitis (which is an allied though different condition), and the position here has been reviewed by Miller.²

REFERENCES

- McAlpine, D., Compston, N. D., and Lumsden, C. E., *Multiple Sclerosis*, 1955, E. and S. Livingstone.
- Miller, H. G., *British Medical Journal*, 1953, 1, 177.

Pain and Urinary Retention after Haemorrhoidectomy

Q.—What are the best ways of preventing retention of urine and pain on defaecation after operation for internal haemorrhoids?

A.—After haemorrhoidectomy the reduction of pain and avoidance of complications, of which retention of urine is the most common, depend on attention to a number of points, such as (1) correct choice of cases for operation—this involves selection of third-degree piles which are free from recent infection and thrombosis; (2) correct operative technique, which must be based on accurate knowledge of ano-rectal anatomy—it is particularly important that an accompanying dorsal fissure should be recognized and dealt with, preferably by adequate drainage and suitable division of the internal sphincter in the right posterior quadrant; (3) a well-chosen post-operative regime, which must be well understood by the nursing staff and carried out with gentleness, thoroughness, and confidence. Many of the rectal cases are of the nervous, apprehensive type and need much reassurance. It is a great help to use a type of anaesthesia which permits the male patient to be stood out of bed early to pass urine, and a combination of local analgesia (2% aqueous procaine) with intravenous thiopentone and gallamine has proved to be the ideal method. Spinal analgesia has been discarded owing to the high incidence of post-operative retention of urine. Finally, in patients of the nervous type it is a great help to give phenobarbitone, $\frac{1}{2}$ gr. (32 mg.) twice daily, for the first week after operation. Most patients treated on these lines will need only one injection of injectio papavereti (B.P.C.) on the night after operation, and it is gratifying to find that the majority now say that their fears were groundless and that their post-operative course has been much better than anticipated. It

is curious how the old tradition of patients having "excruciating pain" after operation for haemorrhoids still persists, but each additional patient successfully dealt with on modern lines should help gradually to kill this myth.

Exact Control in Diabetes

Q.—On the assumption that it is impossible to stabilize exactly a diabetic who is having insulin, is it better to aim for slight hypoglycaemia rather than slight hyperglycaemia in order to avoid complications and prolong life? Is prolonged slight hypoglycaemia detrimental to health in any way?

A.—It is true that it is impossible to imitate exactly the normal physiological control of carbohydrate metabolism by means of injected insulin, but the object of treatment should be not to produce a state of either slight hypoglycaemia or hyperglycaemia but rather, if possible, so to arrange the diet and insulin that the blood sugar is within normal limits at the time of maximum insulin action. The duration of this period of normoglycaemia will, of course, depend upon the type of insulin and number of injections given daily.

It is difficult to say whether the diabetic whose blood sugar is constantly slightly below normal is better off than the one who is always a little hyperglycaemic; but, as it is impossible to be sure that the hypoglycaemia will always be slight, it is probably safer to err a little on the side of excess, or, in other words, it is safer to have the urine tests sometimes green rather than always blue. This is particularly true in elderly patients with evidence of coronary artery disease.

There is no evidence that prolonged slight hypoglycaemia is detrimental to health, but it is quite impossible to maintain this state with any degree of safety in the diabetic patient. There is always the danger, if an attempt is made to do so, that the patient will sooner or later have a severe attack of hypoglycaemia.

Failure to Settle at Night

Q.—A healthy boy aged 6 has a fear of going to bed. When persuaded to go to bed at 7.30 p.m. he lies awake and often comes downstairs to the living-room at any hour up to 11 p.m. or into his parents' room later in the night with a request for a drink or something. He is very intelligent, has been at school a year, and is happy. He has a brother aged 3 of whom he has no need to be jealous. The father is a professional man and happily married. The boy himself does not know why he cannot get to sleep. He has his brother in the room with him and a night-light by request. His parents are immediately available if he wants them. Should I administer a barbiturate or should I seek psychological help? The trouble now has been going on for some months.

A.—If the child stays awake and gets up because he cannot bear to give up the pleasures of the day, firmness is needed. If it is badly received, it may be tempered with a barbiturate for a couple of weeks. The questioner's account of the case is, however, clear, and one has to accept his first sentence at its face value. The cause of the fear of going to bed has eluded a careful doctor and intelligent parents; therefore they should seek for help, and from whom better than from a good children's psychiatrist? Nevertheless, one cannot help wondering whether there are not other clues in this admirable clinical précis—e.g., "He is very intelligent," but has he been enough in the day to be mentally tired at bedtime? "He has a brother aged 3 of whom he has no need to be jealous." Is there insecurity here? For it would have been simpler to say, "Of whom he is not jealous."

Salivation in Glaucoma

Q.—A patient with glaucoma suffers from excessive salivation. What drugs are available for dealing with the salivation without affecting the eye condition?

A.—On the assumption that the excessive salivation is due to the drops the patient is using for his glaucoma, it may

be worth while trying a different method of treatment. Pilocarpine drops are more apt to produce salivation than eserine, and the tendency to salivation may perhaps be inhibited if systemic absorption of the drops is avoided by taking care that none pass into the mouth via the lacrimal duct and the nose; this may be achieved by compressing the lacrimal sac at the root of the nose when the drops are put into the conjunctival sac. If in spite of these measures the salivation still persists, it is a moot point whether the systemic use of atropine or its derivatives would be justifiable. In addition to influencing the salivation there would be many other effects, some of them highly undesirable—and this quite apart from the danger of precipitating acute glaucoma from the cycloplegic effect that these drugs all have. If such drugs are to be used, hyoscine-N-butylbromide ("buscopan"), with its poor cycloplegic effect, might be considered. It should, however, be appreciated that excessive salivation is a symptom, and no treatment should be undertaken until an accurate diagnosis has been reached.

Obstinate Sycosis Barbae

Q.—What treatment is advised for a case of sycosis barbae of 20 years' duration? Epilation, local penicillin, chloramphenicol, chlortetracycline, oxytetracycline, and x-ray therapy have all been tried without success.

A.—This is evidently an extremely difficult case. The questioner makes no mention of a search for chronic infection in the nose, accessory sinuses, or the mouth. Any of these sites may provide a reservoir of infection by which the skin disease is perpetuated. If this has not already been considered, a scrupulous search should be made in these areas. Even in the absence of clinical signs of infection, mild degrees of chronic rhinitis—for example, from smoking—may enable staphylococci to be carried in the nose and to reinfect the skin.

There are three usual local applications which have not been mentioned: the old and well-tried Dalibour water (copper and zinc sulphates lotion, B.P.C.), "graneodin" ointment (neomycin 2.5 mg. and gramicidin 0.25 mg. per g.), and "quinolor" compound ointment. Any of these local applications gives occasional success where others have failed.

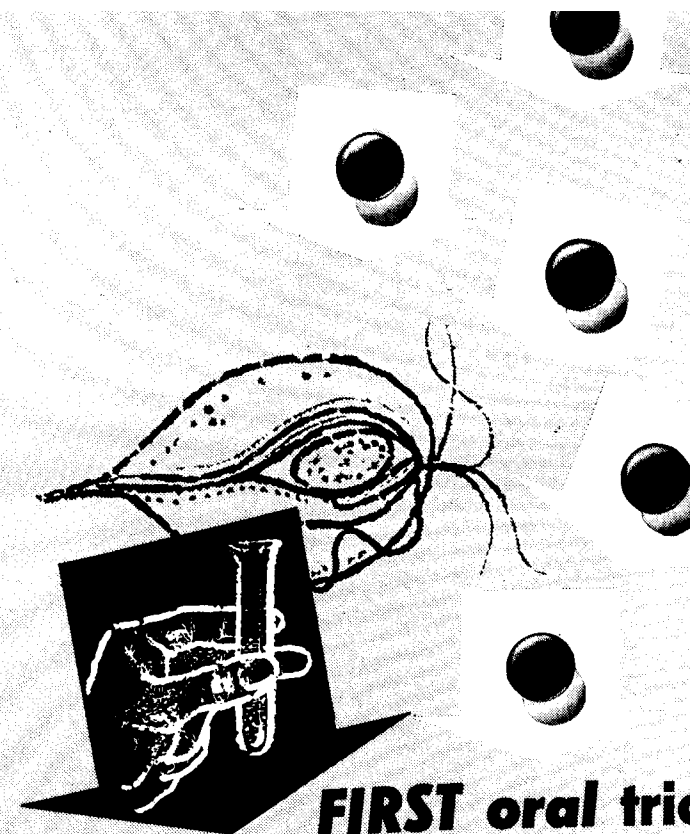
NOTES AND COMMENTS

"Approved Names."—In the supplementary list of "approved names" printed in our issue of June 16 (p. 1423), sodium calcium-edetate, a substance which has been recommended for the treatment of lead poisoning, was stated to be obtainable from manufacturers of laboratory reagents. We now understand that Riker Laboratories Ltd. are the sole suppliers of this substance for therapeutic, as distinct from commercial or chemical, purposes. They market sodium calcium-edetate under the proprietary name of "calcium disodium versenate."

Corrections.—In discussing the very variable results with topical hydrocortisone, Dr. G. B. Mitchell-Heggs is reported (*Journal*, July 21, p. 152) as suggesting that this was "possibly owing to the deficiencies in the various preparations. . . ." The word "deficiencies" should have read "differences."

In Dr. John Bullough's letter (*Journal*, August 11, p. 360) the dosage of rectal thiopentone was wrongly printed as 1 gr. per 50 lb. (23 kg.) instead of 1 g. Dr. Bullough omitted to give the reference to the technique he described in 1952—this should be Bullough, J., *Lancet*, 1952, 2, 999.

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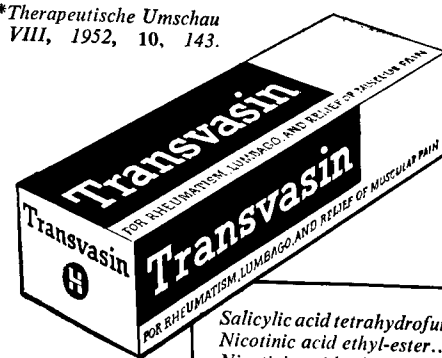
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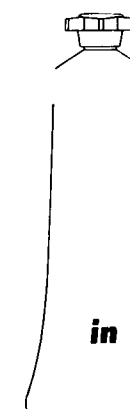
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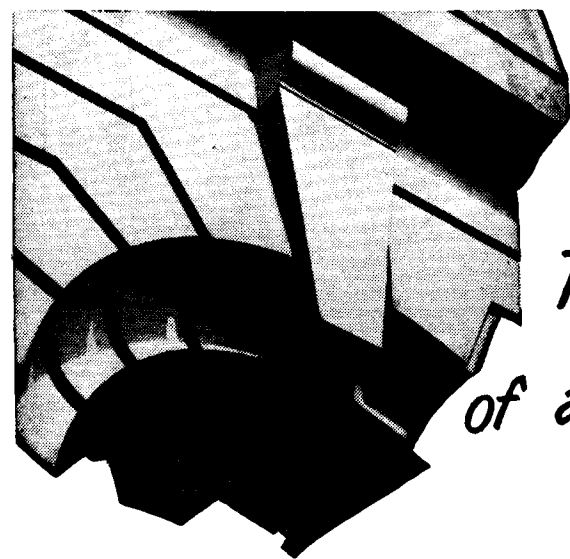


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BRITISH MEDICAL JOURNAL

LONDON SATURDAY AUGUST 25 1956

HYPOGLYCAEMIC AND ANTIDIABETIC SULPHONAMIDES

BY

F. G. YOUNG, D.Sc., F.R.S.

Professor of Biochemistry, University of Cambridge

In 1942 Janbon and his colleagues at Montpellier, in the course of treating typhoid fever patients with *p*-aminobenzenesulphonamidoisopropylthiodiazole (=I.P.T.D., 2254RP, P.A.S.I.T., see formula I), observed that hypoglycaemia sometimes developed and that this could be fatal under the dietary conditions obtaining in France at that time. Professor Auguste Loubatières was able to follow up these interesting chemical observations by laboratory experiments at Montpellier despite the difficult conditions which then prevailed. He has recently summarized his findings concerning the action of I.P.T.D. (Loubatières, 1955). He finds that the administration of the drug by oral or by intravenous means can induce substantial hypoglycaemia in numerous species of animal under conditions of fasting, and in a dog from which the pituitary gland, or the adrenal glands, or the thyroid plus parathyroid glands, together with the gonads, have been removed. Nevertheless, he states that complete removal of the pancreas prevents the hypoglycaemic action of I.P.T.D., although the drug is capable of augmenting the utilization of glucose in the partially depancreatized dog. In the alloxan-diabetic rabbit the daily administration of I.P.T.D. was found by Loubatières to reduce or abolish the diabetic symptoms. Similar but less striking and consistent results were seen in the alloxan-diabetic dog. No evidence was found that the drug could oppose the diabetogenic action in the dog of a crude extract of anterior pituitary tissue.

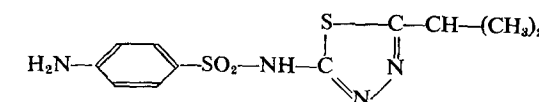
Cross-circulation experiments with a donor dog treated with the drug, and an alloxan-diabetic recipient animal, led Loubatières to deduce that I.P.T.D. stimulates the secretion of insulin by the β -cells of the pancreatic islets. On the basis of these and other experiments he concludes that the drug may have a dual action on the islets—that of stimulating the secretion of insulin by β -cells and depressing the secretion of glucagon by the α -cells.

In 1952 Davis made the interesting observation that the administration of "synthalin" (decamethylene-diguanidine, see formula II) induces degenerative changes in the α -cells of the pancreatic islets of the normal rabbit. This substance was developed many years ago as a synthetic hypoglycaemic and antidiabetic agent, active by mouth (Frank, 1927), and when von Holt and his colleagues at Hamburg (1954, 1955) found that I.P.T.D. also exerts a toxic action on the α -cells of the pancreatic islets it seemed possible that the effects of these two substances might be related. von Holt has

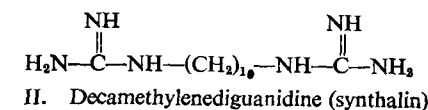
in fact ascribed the hypoglycaemic action of I.P.T.D. to its destructive action on the α -cells of the pancreatic islets. (For recent reviews see Ferner, 1956; von Holt *et al.*, 1956.)

Mechanism of Action

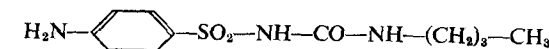
On October 7, 1955, a series of publications appeared in the *Deutsche medizinische Wochenschrift* (Franke and Fuchs, 1955; Achelis and Hardebeck, 1955; Bertram



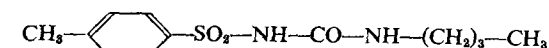
I. *p*-Aminobenzenesulphonamidoisopropylthiodiazole (=I.P.T.D., 2254RP, P.A.S.I.T.)



II. Decamethylenediguanidine (synthalin)



III. *N*₁-Sulphanilyl-*N*₂-*n*-butylcarbamide (=BZ 55, Nadisan, U 6987)



IV. *N*₁-*p*-Tolylsulphonyl-*N*₂-*n*-butylcarbamide (=D 860, U 2043, Orinase)

et al., 1955) describing the hypoglycaemic and antidiabetic action of *N*₁-sulphanilyl-*N*₂-*n*-butylcarbamide (*N*-butyl-*N*'-sulphanilylurea, BZ 55, "nadsan," U 6987, see formula III), the substance being active when administered by mouth or parenterally. Apparently, as with I.P.T.D., this sulphonamide derivative was found to possess an important effect on carbohydrate metabolism as the result of chance clinical observation. The first suggestion about the mechanism of its action was that it might inhibit the activity of the α -cells of the pancreatic islets, in line with the views of von Holt and Ferner about the action of I.P.T.D. Subsequently Mirsky and his colleagues (1956) found that BZ 55 and related substances are non-competitive inhibitors of the enzyme found in the liver which destroys insulin (insulinase), and that a diminution in insulinase activity is associated with the hypoglycaemia induced by these substances. The natural suggestion was therefore made that these substances act on carbohydrate metabolism,

at least in part, by preventing destruction of insulin. The fact that these drugs were capable of controlling the symptoms of diabetes in a proportion of patients suffering from this disease might indicate that in some diabetic patients abnormally vigorous destruction of insulin could be a significant factor in the maintenance of the condition (Mirsky *et al.*, 1956).

In addition to its action on insulin BZ 55, like I.P.T.D., appears to stimulate the secretion of insulin by the β -cells of the pancreatic islets (Kracht and Rausch-Stroomann, 1956).

Animal Experiments

In our own laboratory we have given BZ 55 orally to a cat with a diabetic condition which had persisted for about a year after a short period of treatment with growth hormone (metahypophyseal diabetes). In the cat, untreated metahypophyseal diabetes usually shows spontaneous remission after six to twelve months (Young, 1948), but in this particular animal (No. 286) the diabetes had become mild (5–10 g. of glucose excreted daily) with no sign of complete remission over a period of many months. After two daily oral doses of 20 mg. of BZ 55 the diabetic condition disappeared, and during the following ten days the blood sugar averaged about 50 mg. per 100 ml., as compared with 250 mg. per 100 ml. before treatment with the BZ 55. The animal was killed ten days after the diabetic condition had disappeared, and histological examination of the islets kindly carried out by Mr. K. C. Richardson showed extensive hydropic changes in both α - and β -cells of all the pancreatic islets examined. In cats which show spontaneous recovery from metahypophyseal diabetes the α -cells are usually normal in appearance while the β -cells are intensely hydropic (Young, 1948).

Among the chemical relatives of BZ 55 that have been shown to be hypoglycaemic and antidiabetic, the most highly active appears to be N_1 - p -tolylsulphonyl- N_2 - n -butylcarbamide (D 860, U 2043, "orinase," see formula IV). This substance is not an obviously active antibacterial agent.

It is of interest to recall that for long it has been known that acridine derivatives possess hypoglycaemic activity (Nielsen, 1929; Monasterio, 1931), while more recently Mendes-Alves (1952) and Mendes-Alves and Gomes (1954) have demonstrated an antidiabetic action of penicillin in partially depancreatized dogs and in alloxan-diabetic rats. The studies of Mendes-Alves were undertaken as the result of the observation that the administration of penicillin to certain diabetic patients induced an alleviation of the diabetic condition, which could not obviously be attributed to the suppression of an infective state. In some instances the amelioration of the diabetic condition persisted after cessation of the treatment with penicillin, and the possibility of an action of penicillin on the cells which produce insulin was suspected (Mendes-Alves and Gomes, 1954).

When one considers the range of substances which exert some degree of hypoglycaemic and antidiabetic action—guanidine derivatives, acridines, sulphonamides, and penicillin—one is struck by the fact that all possess some antimicrobial action. Can these two actions reasonably be related?

At this point I should like to recall the fact that Markowitz, Rappaport, and Scott (see Markowitz and Rappaport, 1951) observed that, although dogs usually die if the hepatic artery is ligated, they survive the operation when given large amounts of penicillin to facilitate post-operative recovery. This unexpected finding led Markowitz and Rappaport (1951) to survey the literature concerning the bacteriology of normal liver. It appears from this that the livers of many species of animal normally contain spore-bearing anaerobic bacteria, and in numerous instances *Cl. welchii* can be isolated. Moreover, tissues of normal animals other than the liver are frequently found to contain bacteria, often anaerobic organisms. But as Markowitz and Rappaport strikingly comment, "It is logical that the liver, situated

at the head of the portal system which drains a cesspool, should have bacteria in it more consistently than other tissue." They conclude that penicillin prevents death in the dog, when the hepatic artery is ligated, by inhibiting the growth of anaerobic organisms which otherwise might flourish and produce lethal enzymes such as lecithinase.

Two Pertinent Questions

Although there is evidence that bacteria can lurk in normal tissues and might therefore play a part in the economy of the normal animal, such an idea is foreign to modern thought and is usually ignored. Nevertheless it is not possible that the breakdown of insulin in the normal or in the diabetic animal or patient might result in part from the activity of bacteria present in normal tissues? Is it possible that insulinase might be in part at least of bacterial origin? Certainly proteolytic enzymes are known to be present in many bacteria, including *Cl. welchii*, while the exacerbating effect of infection on clinical diabetes is well recognized. Although no conclusive answer can be given to these questions, the possibility can reasonably be envisaged that the antidiabetic sulphonamides might exert a significant effect by diminishing the number of bacteria, and therefore the amount of proteolytic enzymes, in the tissues, particularly those of the liver. An objection that might at once be raised to this view is that the antidiabetic action and the antibacterial effectiveness of the sulphonamides are not quantitatively related. In particular D 860, which is effective in many diabetic patients, is not obviously antibacterial.

However, when we are dealing with bacteria surviving in normal tissues under presumably special conditions, the question of the accession of the drug to the microbe may well be of paramount importance. A substance with a hydrocarbon non-polar grouping at both ends might have special advantage in this respect and be enabled to bring weak antibacterial action to bear with vigorous effect at the needed site of action. Furthermore, the possibility that the substance which is effective in the tissues is a metabolite of that which we have given to the patient or animal, and not the administered drug itself, should not be ignored in such an instance.

There is evidence that the antidiabetic sulphonamides not only depress the catabolism of insulin but also stimulate the secretion of insulin by the β -cells of the pancreatic islets. Such an action might depend on the stimulation of the secretion of glucagon or other hyperglycaemic substances by the α -cells of the pancreatic islets (cf. Young, 1955), and if such an action occurred the changes in the α -cells observed by some investigators to follow the administration of sulphonamides might be accounted for.

There is at present no simple solution to hand of the problem of the mechanism of action of the antidiabetic sulphonamides. But clearly the observations made in Montpellier in 1942 foreshadowed much that is of growing interest and importance to-day.

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A CLINICAL TRIAL OF BZ 55

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Two groups of German workers have recently reported the successful control of most elderly or middle-aged patients suffering from mild diabetes by BZ 55 (N-butyl-N'-sulphanilylurea) (Franke and Fuchs, 1955; Bertram *et al.*, 1955). It is, however, difficult to assess the therapeutic value of the drug from these reports because the data given are inadequate. When exact figures for diets are stated they seem unduly high by British standards. Certainly many of the patients in whom control was successfully achieved with BZ 55 appeared to have the type of diabetes which would usually have responded to dietary restriction alone, without the use of insulin or an insulin substitute (*British Medical Journal*, 1955).

It was therefore felt that further carefully planned and fully documented clinical trials were necessary to establish the place of these sulphonamide compounds in the management of diabetes.

Selection of Patients

We considered that orally administered BZ 55 would have its main practical use as a complete substitute for parenteral insulin. Since the German work emphasized that such a complete substitution was only rarely possible in the young diabetic, we limited this initial study to patients over the age of 45 suffering from mild diabetes who were not overweight by more than 10% of their ideal weight (Metropolitan Life Insurance Company, Statistical Bureau, 1943, quoted by Dunlop *et al.*, 1953), but who, on a fully restricted diet, continued to show significant hyperglycaemia and glycosuria, and to experience diabetic symptoms in the absence of insulin therapy.

From the diabetic out-patient clinic 65 active patients (5 male, 60 female) who appeared to be of this type were selected and observed as out-patients for periods varying from one to six weeks. None of these patients had had any active focus of infection, although many had had retinopathy and neuropathy of the diabetic type. Only five were not currently receiving insulin, but they were inadequately controlled by diet alone. Control in those receiving insulin was good or moderate.

At the first visit each patient was impressed with the necessity of adhering strictly to the diet which they were at that time supposed to be taking, and the administration of insulin was stopped. Thereafter each was seen once or twice weekly, when the blood-glucose concentration was estimated, 24-hour and fasting urine samples were tested for glucose and ketone bodies, and weight and symptoms were recorded.

It was possible to complete the trial of the drug in only 44 of the 65 patients initially selected. Of the 21 patients withdrawn from the trial, either in the out-patient adaptation period or after admission to hospital,

seven developed severe ketosis consequent on the withdrawal of insulin, necessitating its further administration. One of these, previously well controlled on 24 units of insulin zinc suspension, was admitted to hospital almost comatose only three days after discontinuing insulin, while another became seriously ketotic on the second day, both of them emphasizing the possible dangers of stopping the administration of insulin even in cases of apparently mild diabetes. Three were rejected because their blood-glucose concentrations four hours after a meal consistently exceeded 480 mg. per 100 ml., and, on the other hand, 10 were discarded when it became clear that adequate control was achieved by dietary restriction alone. In another patient the development of a severe drug fever necessitated the prompt withdrawal of BZ 55 before data were complete.

It can be seen from Tables II and III that all the 44 patients finally included in the analysis required treatment with insulin or an insulin substitute in addition to dietary measures.

Methods

The first 22 patients were studied in hospital for twenty days, and constitute Group I. The remaining 22 patients were in hospital for eight days only, and form Group II.

On admission to hospital all patients were assessed for a control period of seven days in the case of Group I and three days in the case of Group II. BZ 55 was started on the eighth and the fourth day respectively, and the effect of continued dosage was studied for the remainder of the patients' stay in hospital.

The reduction in hospital stay for Group II was made, firstly, because it was clear from experience obtained with Group I that the patients had, with an occasional exception, adhered to their diets during the out-patient adaptation period, so that surprisingly steady levels of hyperglycaemia and glycosuria occurred in the control period in hospital (Figs. 1 to 6); and, secondly, because we were satisfied that the response to therapy could for clinical purposes be accurately assessed by the fifth day of treatment.

The design of the trial was to some extent governed by clinical considerations. Thus, although most factors were kept constant throughout for all patients, the diets were individually prescribed and the dosage of BZ 55 was adjusted according to the clinical response.

Each patient continued to receive the diet which had been taken as an out-patient. The total calculated daily calories, carbohydrate, fat, and protein were kept constant throughout the trial. The same meal each day contained a constant calculated quantity of these proximate principles.

All patients were ambulant, and daily activity was kept as unaltered as possible throughout the trial. Each patient was weighed at the same time daily in the same clothes.

Venous blood was withdrawn by one or other of us each day at 8.30 a.m. (patient fasting), at 4 p.m. (three and a half to four hours after lunch), and at 8.45 p.m. (two hours after the main evening meal). These times were chosen as being best fitted to demonstrate the daily profile and excursion of glycaemia. The specimen taken at 8.45 p.m. reflected the postprandial rise in blood glucose. The blood-glucose content was estimated by one of us (J. D. B.), using the Nelson (1944) modification of the Somogyi method.

24-hour urine collections were obtained daily (8.30 a.m.–8.30 a.m.). The glucose content was estimated by Benedict's quantitative method and nitrogen by the micro-Kjeldahl method by one person.

In the majority of patients, glucose tolerance was measured in the control period either by the standard oral procedure, using a loading dose of 50 g. of glucose (16 patients), or by the intravenous technique (14 patients) (Duncan, 1956). In patients whose response to BZ 55 was satisfactory the test was repeated after five to ten days of

treatment. Due allowance for the glucose given in these tests was made in the daily diet.

Haemoglobin, red blood cell count, white blood cell count, platelet counts, and differential white-cell counts were estimated in the first 22 patients. In the remainder it was possible to estimate only haemoglobin and white blood cell counts. In all, the following tests of liver function were made: plasma albumin and globulin, total serum cholesterol, thymol turbidity, colloidal gold flocculation, and serum bilirubin. Observations were also made on plasma electrolytes, non-protein nitrogen, and CO₂ combining power. In seven patients 24-hour urine A.S.F.S. (acid-stable formaldehyde-steroids) were determined (Tompsett and Smith, 1954), and in six patients tracer doses of radio-iodine were given for assessment of thyroid activity. All these observations were repeated during treatment with BZ 55.

In the first 12 patients treatment with BZ 55 was started with 3 g. (six tablets) given by mouth before breakfast. In

32 patients the dose was 4.5 g., and in addition blood was withdrawn at hourly intervals for five hours thereafter and its glucose and BZ 55 content were determined. The patient remained in bed and food was withheld during the period of the test. It was hoped that the response to this single dose might be of value in predicting the patient's subsequent response to the continuous administration of BZ 55.

Further dosage was dependent upon the response of the patient. If it was satisfactory, the dose was gradually reduced over three or four days to 1.5 g. (Figs. 2 and 3), but when the response was inadequate it was continued at 4.5 g. daily for several days (Figs. 4 and 5).

The BZ 55 concentration in the blood was estimated by the method of Bratton and Marshall (1939), pure BZ 55 being used for the preparation of standards.

Patients whose response was considered to be clinically satisfactory were discharged on a daily maintenance dose of BZ 55 varying from 1 to 1.5 g. They are being seen

TABLE I.—Clinical Data of the 44 Patients in Whom the Trial of the Drug was Completed

	Group I Patients (22)				Group II Patients (22)			
	Responsive (16)		Unresponsive (6)		Responsive (19)		Unresponsive (3)	
	Mean	Range	Mean	Range	Mean	Range	Mean	Range
Age at trial (years)	62.4	50-71	62.2	55-74	62.1	45-73	58.2	55-59
" diagnosis (years)	57.4	44-69	59.0	53-73	54.9	35-67	52.5	43-56
Duration of diabetes (years)	5	0-19	3.2	0-10	7.2	0-18	5.7	2-12
Ideal weight (kg.)	65.4	60-77	69.8	63-78	65.3	58-78	64.8	60-73
Weight at trial as percentage of ideal weight	90.2	79-104	85.3	83-95	92.3	76-104	87.2	75-106
Previous daily insulin requirement (units)	18.5	Nil-36	20.3	12-32	21.5	Nil-44	26.7	24-32
Diet { Calories	1,666	1,100-2,400	2,083	1,600-2,400	1,600	1,100-2,400	1,833	1,200-2,200
Carbohydrate (g.)	151.2	100-200	180.5	140-220	149.5	110-200	160	120-180

TABLE II.—Group I Patients (22)

	Responsive and Clinical Successes* (16)		Unresponsive and Clinical Failures* (6)		Responsive and Clinical Successes† (16)	
	Mean	Range	Mean	Range	Mean	Range
F.B.G. { Control period	221	142-274	258	171-329	—	—
Treatment " "	109	71-148	245	158-310	—	—
Difference " "	-112	-71/-157	-13	-30/+25	115	67-163
Av.B.G. { Control period	255	187-307	332	258-399	—	—
Treatment " "	142	92-185	320	231-366	151	86-198
Difference " "	-113	-78/-151	-12	-33/+15	-104	-71/-157
Pp.B.G. { Control period	312	220-388	421	304-495	—	—
Treatment " "	204	113-259	406	274-464	214	117-260
Difference " "	-108	-74/-153	-15	-31/+16	-98	-65/-155
Difference F.B.G./Pp.B.G. { Control	91	46-136	163	70-212	—	—
Treatment " "	95	42-146	161	70-214	99	48-142
24-hr. urine glucose { Control	49.2	22-124	100.8	49-157	—	—
Treatment " "	3.5	0-30	96.3	34-153	9.4	0-49
24-hr. urine nitrogen { Control	13.7	10.5-17.8	14.9	8.6-19.8	—	—
Treatment " "	11.6	9.6-15.0	15.0	9.0-21.1	—	—

* Values for treatment period=mean from 5th to 12th day inclusive. † Values for treatment period=mean from third to fifth day inclusive. F.B.G.=Fasting blood glucose (8.30 a.m. specimen). Av.B.G.=Average daily blood glucose (mean of 8.30 a.m., 4.30 p.m., and 8.45 p.m. specimens). Pp.B.G.=Postprandial blood glucose (8.45 p.m. specimen). Blood glucose in mg./100 ml. Urine glucose and nitrogen in g.

TABLE III.—Group II Patients (22)

	Responsive (19)				Unresponsive (3)	
	Clinical Successes (16)		Clinical Failures (3)			
	Mean	Range	Mean	Range	Mean	Range
F.B.G. { Control period	203	133-267	309	284-332	273	253-300
Treatment " "	115	65-149	236	222-245	273	241-300
Difference " "	-88	-68/-146	-73	-62/-92	0	-12/+13
Av.B.G. { Control period	234	190-281	331	324-337	319	302-342
Treatment " "	147	89-196	257	253-263	319	297-355
Difference " "	-87	-62/-146	-74	-67/-80	0	-17/+13
Pp.B.G. { Control period	297	225-362	374	333-401	426	385-448
Treatment " "	215	126-257	299	266-339	429	388-463
Difference " "	-82	-66/-146	-75	-64/-96	+3	-7/+15
Difference F.B.G./Pp.B.G. { Control	94	40-160	65	32-117	153	85-191
Treatment " "	100	40-162	63	21-117	156	88-196
24-hr. urine glucose { Control	37.8	20.0-76.0	71.8	65.5-76.0	75.3	67-84
Treatment " "	5.4	10.0-16.0	34.0	29-41	76.3	69.5-88

Values for treatment period=mean from third to fifth day inclusive. Blood glucose in mg./100 ml. Urine glucose and nitrogen in g.

regularly at intervals of one to two weeks at a special clinic by one or other of us. Each patient is weighed and brings a 24-hour urine collection, the glucose content of which is determined. A sample of blood is withdrawn and estimated for glucose and BZ 55 content, the patient having fasted since breakfast, taken at least four hours previously. Initially Haematological examinations are done at intervals. Initially the patients were instructed to test fasting and evening urine specimens for a few weeks after discharge, but this practice was later discontinued and dummy tablets have been substituted in 12 patients to date. After a period on "dummy therapy," when it became clear that control of the diabetes was deteriorating, they were again given BZ 55. Both substitutions were made without the patients' knowledge. Many, however, were quick to recognize a return of diabetic symptoms while taking dummy tablets.

Comparison of Responsive and Unresponsive Patients

Clinical Features

The clinical data for both groups are presented in Table I. All our patients were over the age of 45 at the time of the trial, and within this middle-aged or elderly group age did not seem to have any bearing on the patient's response to BZ 55. Within the ranges observed in this series, the duration of clinical diabetes, the age of the patient when the diagnosis was made, the daily dose of insulin previously administered were unrelated to the result obtained with BZ 55. The presence of degenerative diabetic changes, or a family history of the disorder, were also without influence upon the result.

The total calorie and carbohydrate content of the daily diet was higher in the unresponsive group. This was due to the fact that on the whole these unresponsive patients were more underweight in relation to their ideal weight than the responsive group.

In seven of the nine unresponsive patients significant ketonuria had previously been recorded. Ketonuria had also been noted in 5 of the 35 responsive patients, but only at the time of diagnosis or in the presence of infection or considerable stress. We formed the strong impression that patients who are prone to develop ketonuria easily do not respond well to BZ 55.

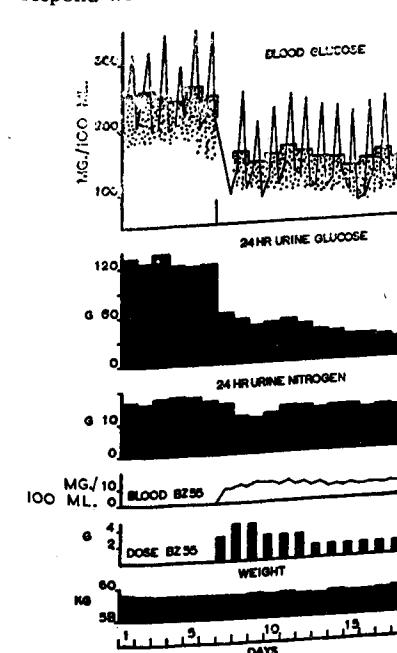


FIG. 1.—Case 2: man aged 64. Note steady values of blood and urinary glucose during control period; immediate response to BZ 55 but no change in daily profile of glycaemia.

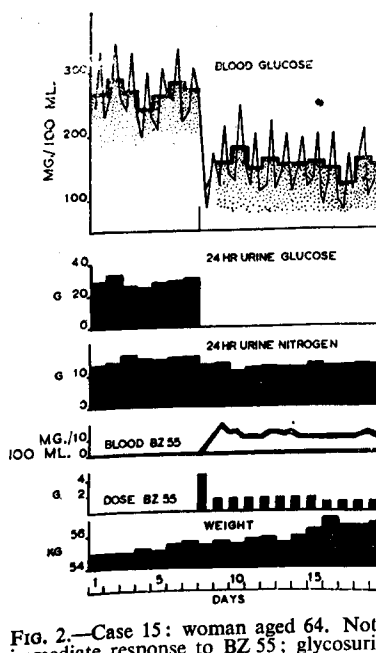


FIG. 2.—Case 15: woman aged 64. Note immediate response to BZ 55; glycosuria completely abolished because of higher renal threshold than Case 2; increase in weight mainly due to full diet not being taken as out-patient.

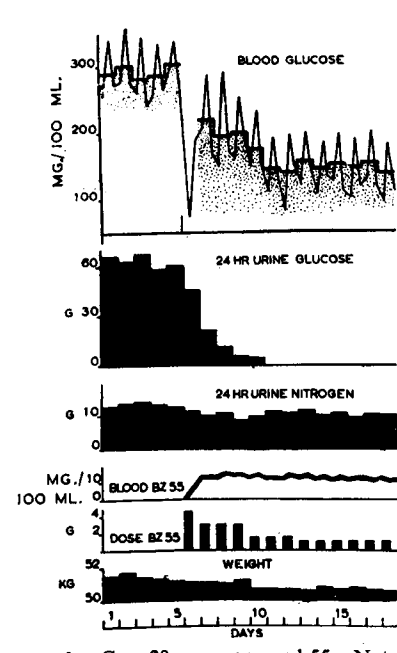


FIG. 3.—Case 20: woman aged 55. Note extreme response to single-dose test causing hypoglycaemia; slower response to continued treatment.

Effect on Hyperglycaemia and Glycosuria

The summarized results for both groups of patients are presented in Tables II and III. From a consideration of the blood-glucose levels and degree of glycosuria found in each patient during the control period it is apparent that all these patients really required insulin. We were impressed by the fact that the level of fasting blood glucose was not a true expression of the impairment of glucose tolerance. Thus, in this series, relatively low fasting blood-glucose levels were combined with poor glucose tolerance, as indicated by a considerable postprandial hyperglycaemia and a relatively heavy glycosuria (Fig. 4). Conversely, high fasting levels were not infrequently associated with a surprisingly good glucose tolerance (Fig. 5; Fig. 6, Case 36). In some of the patients having high blood-glucose values, particularly when the disorder was of long standing, the renal threshold for glucose was elevated so that the small amount of glycosuria present was often misleading (Fig. 2).

Group I

Of the 22 patients in this group, 16 responded favourably to the drug. A fundamental observation on the character of the response was that the amount by which the blood-glucose values were reduced by treatment was virtually the same for each of the three daily determinations for any one patient. Thus there was no appreciable change in the difference between the fasting and postprandial blood-glucose levels before and during treatment (Figs. 1-6). (Mean difference in control period, 91 mg. per 100 ml.—range 46-136 mg.; during treatment, 95 mg. per 100 ml.—range 42-146 mg.) We were therefore unable to confirm the finding of Bertram *et al.* (1955) that the daily profile of glycaemia was narrowed. The mean absolute fall in fasting blood-glucose concentrations for the responsive patients was 112 mg. per 100 ml. (range 71-157 mg.). When the fall is expressed as a percentage of the fasting blood-glucose value, the mean was 50.6% (range 40-61%) (Fig. 8).

In this group all the responsive patients were adequately controlled clinically in that symptoms were abolished, blood-glucose levels were satisfactory, and glycosuria was reduced by at least 75% of the control values. It was considered that adequate control had been achieved when the fasting

blood-glucose concentration did not exceed 150 mg. per 100 ml., the postprandial value was below 260 mg. per 100 ml., and the average daily blood-glucose level was less than 200 mg. per 100 ml. (Figs. 1-3). It will be seen that the mean values for the group as a whole were much lower than these limits. Some patients who had particularly high blood-glucose concentrations before treatment tended to have a high renal threshold for glucose. Thus glycosuria and symptoms were often abolished with treatment in spite of the persistence in a few cases of relatively high blood-glucose levels. Data for three of the patients successfully controlled by BZ 55 are shown in Figs. 1-3.

Six patients in this group were unresponsive to the drug. The mean absolute fall in their blood-glucose levels was only 13 mg. per 100 ml. (range -33 to +25 mg.). When expressed as a percentage of the fasting blood glucose the mean fall was 5% (-7.5 to +10%) (Fig. 8). All these

patients continued to show blood-glucose values exceeding the limits defined for adequate clinical control. Data for two of the patients unresponsive to BZ 55 are shown in Figs. 4 and 5.

In Group I there was no difficulty in assessing the response of any one patient. In all cases it was quite obvious by the fifth day whether or not they were responsive to the drug. Analysis of the response at the fifth day shows that usually it was not significantly less than that at the twelfth day (Table II). The hypoglycaemic effect was therefore rapid and definite (Figs. 1 and 2). The response improved significantly after the fifth day in only three cases, but even in these the absolute fall in fasting blood-glucose levels was greater than 60 mg. per 100 ml. by the fifth day (Fig. 3). This contrasts with the experience of Bertram *et al.* (1955), who found that in 11 of their 28 patients a significant effect was delayed to between the fourth and thirteenth days.

Group II

The effect of BZ 55 on 16 of the 22 patients in this group was of the same character and magnitude as that seen in the responsive patients in Group I. The mean absolute fall in all blood-glucose values was greater than 60 mg. per 100 ml. (range 62-146 mg.). Expressed as a percentage of the control fasting blood-glucose concentration, the mean fall was 43.4% (range 38-55%) (Fig. 8). During treatment each of these patients showed a reduction in glycosuria of at least 75% of the control value, and all of them satisfied our criteria for adequate clinical control.

Three patients showed an absolute reduction in all blood-glucose levels greater than 60 mg. per 100 ml. (mean 74 mg.; range 62-96 mg.). However, their blood-glucose values during the control period were significantly higher than those of the previous 16 patients (Table III). Thus, if the reduction is expressed as a percentage of the control value, it is in all cases less than 30% (mean 23%; range 21-27%) (Fig. 8), and glycosuria was reduced by less than 75% (mean 47%; range 45-54%). These three patients obviously responded to the drug to some extent, but they could not be

classed as clinical successes according to our criteria of adequate clinical control, in spite of high dosage with BZ 55. Data for two of these patients are shown in Fig. 6.

In three patients the drug was entirely ineffective although again BZ 55 was given in high dosage. The mean rise in their blood-glucose concentration was 1 mg. per 100 ml. (range -17 to +15 mg.) and glycosuria increased by 1 g. daily.

The seven patients who developed ketonuria are not included in this analysis. Four of them were admitted to hospital for the trial. Three developed ketonuria during the control period, and this continued in spite of high dosage with BZ 55, so that insulin had to be administered. When, as a result, hyperglycaemia was less severe and ketonuria absent the patients were subjected to a further trial of BZ 55, again without effect. The remaining patient developed severe ketonuria after five days of treatment with BZ 55, which was therefore replaced by insulin.

Blood-Glucose Values in the Control Period

It can be seen from Tables II and III that both the mean fasting blood-glucose values and the difference between the fasting and postprandial blood-glucose levels of the unresponsive group were considerably higher than those of the

responsive group. There is, however, no clear-cut distinction in this respect between the two groups, hence those values are of little use in predicting response or otherwise in the individual case.

Attempt to Predict Response

Of the 44 patients selected for their probable response, there were 35 who responded to continued dosage with BZ 55, but only 32 of these responded well enough to be classed as clinical successes. Owing to the difficulty of predicting therapeutic success clinically, an attempt was made to obtain this information by the response to the single dose of BZ 55 previously described.

Of the 32 clinical successes, 25 were tested in this way, and in them the mean fall in blood-glucose levels at five and two hours was 115 mg. per 100 ml. (range 68-185 mg.), and two hours was 115 mg. per 100 ml. (range 68-185 mg.). When expressed as a percentage of the fasting level the mean fall was 53.2% (range 40-73%). The three responsive patients who were not clinical successes had a mean fall in blood-glucose levels at five hours of 148 mg. per 100 ml. (range 123-177 mg.). When expressed as a percentage of the fasting level the mean fall was 47.0% (range 44-51%).

Eight of the nine patients who did not respond to continued dosage with BZ 55 were tested. In this group the mean fall was 78 mg. per 100 ml. (range +1 to 135 mg.). When expressed as a percentage of the fasting blood-glucose level the mean fall was 30% (range 0-47%). Three of them level the mean fall was 30% (range 0-47%). During this test there was no difference between the blood sulphonamide levels reached by the responsive and unresponsive groups. Thus the value of the test in predicting an individual response is limited to the fact that no patient who showed a fall of less than 35% responded clinically to the drug in continued dosage. A fall of over 40%, on the other hand, did not necessarily mean of directly related to that obtained with continuous dosage in any individual case.

Factors Affecting Response

Fasting Blood Glucose.—In responsive patients who were also clinical successes the fall in fasting blood-glucose was roughly proportional to the fasting blood-glucose concentration in the control period. In the unresponsive group, however, there was no such relationship. The three responsive patients who were clinical failures occupied an intermediate position (Fig. 7). If the absolute fall is expressed as a percentage of the control fasting blood glucose, the patients group themselves in the same way (Fig. 8).

Difference between Fasting and Postprandial Blood Glucose.—The degree of fall in both groups bears no relation to this value.

Blood Sulphonamide Level.—The dosage of the drug was determined by its clinical effect upon the blood-glucose concentration, and varied widely from patient to patient. In any one patient following a known dose, the concentration of BZ 55 in the blood remained remarkably constant, but in different patients given the same dose considerable variation in the blood levels occurred. The levels produced in both the responsive and unresponsive groups were of the same order, although the latter received much larger quantities of the drug. For each responsive patient there seemed to be a minimal therapeutic blood level which again varied from patient to patient.

Other Observations

Urinary Nitrogen Excretion.—It was not practicable to undertake absolute nitrogen balances in such a number of patients. The daily urinary nitrogen excretion was, however, estimated in 22 patients over 20 days. Since the daily diet was kept constant and the number of observations was large, some significance may be attached to the results. From Table I it can be seen that in the 16 responsive patients in Group I the mean control 24-hour urinary nitrogen was

13.7 g., whereas the mean value from the fifth to the twelfth day of treatment was only 11.6 g. This change is statistically significant ($P=0.005$). In this connexion it may also be of interest to note that in the unresponsive patients there was no change in the urinary nitrogen excretion, the values being 14.9 g. for the control period and 15.0 g. for the period of treatment.

Glucose Tolerance

Three measurements of glucose tolerance have been employed.

(1) The difference between the fasting and postprandial blood-glucose concentration was used as a rough index of glucose tolerance. From Tables II and III it can be seen that there is no appreciable change in this value in the responsive or unresponsive groups as the result of treatment with BZ 55 (Figs. 1-6).

(2) Oral glucose-tolerance tests before and during treatment were carried out on 10 of the successfully treated patients. At the time of the test the mean fasting blood glucose in the control period was 247.6 mg. per 100 ml., and during treatment 146.5 mg. per 100 ml. It can be seen from Fig. 9 that BZ 55 was without effect either

on glucose tolerance or on the rate of its absorption. (3) Intravenous glucose-tolerance tests before and during treatment were performed on 11 of the successfully treated patients. At the time of the test the mean fasting blood-glucose concentration in the control period was 221.8 mg. per 100 ml., and during treatment 108.5 mg. per 100 ml. The mean increment index (Duncan, 1956) for the control test was 1.46 (S.D. 0.3) and during

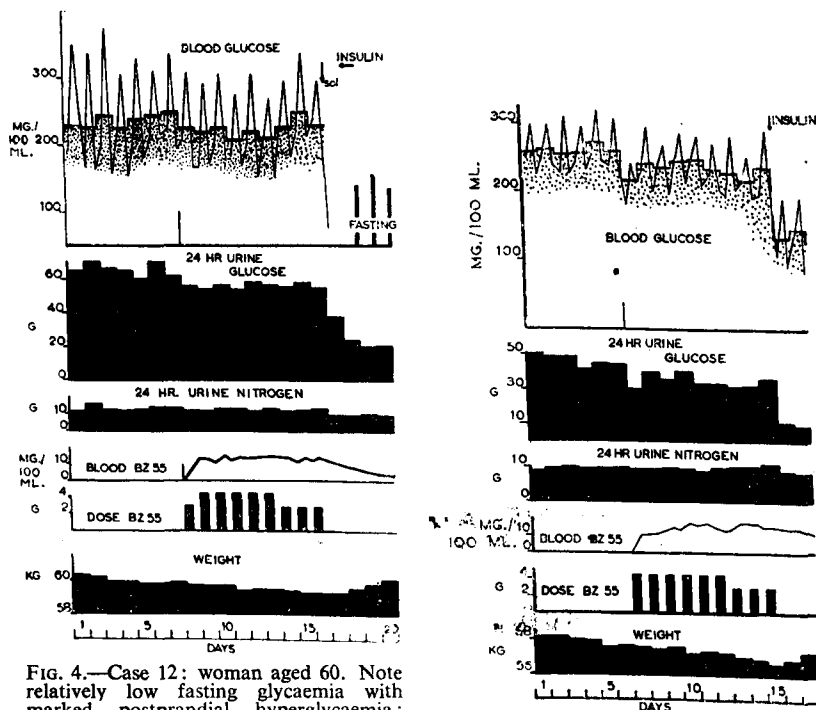


FIG. 4.—Case 12: woman aged 60. Note relatively low fasting glycaemia with marked postprandial hyperglycaemia; lack of response to BZ 55 but sensitivity to insulin; slow fall in blood BZ 55 concentration following cessation of treatment.

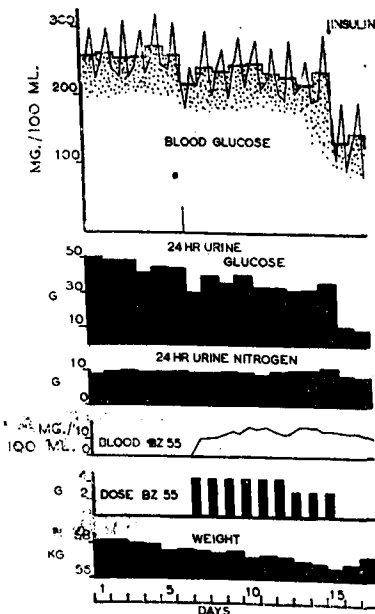


FIG. 5.—Case 8: woman aged 65. Note high fasting glycaemia but small postprandial effect; minimal response to BZ 55 but sensitivity to insulin.

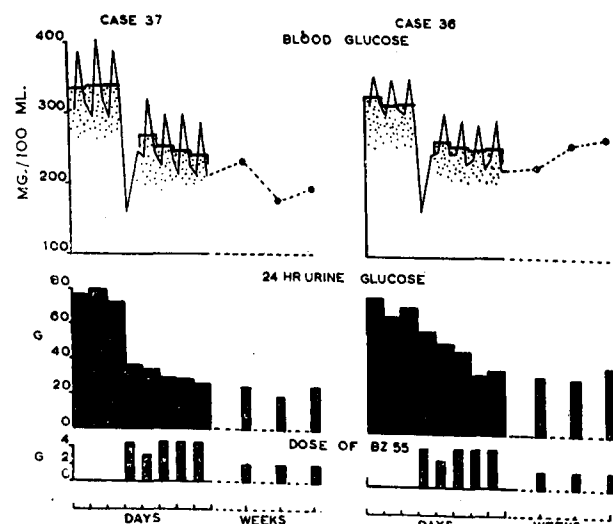


FIG. 6.—Case 37: woman aged 67. Case 36: woman aged 66. In spite of good response to single-dose test and significant response to continued high dosage with BZ 55, neither patient satisfied criteria of successful clinical control.

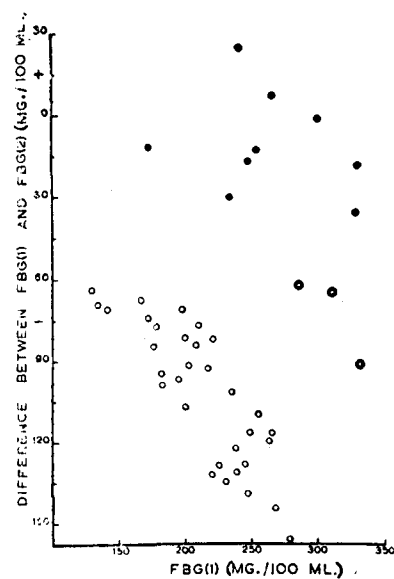


FIG. 7.—Graph relating fasting blood glucose to absolute reduction in fasting blood glucose obtained by treatment with BZ 55. F.B.G. (1)=Mean of values in control period. F.B.G. (2)=Mean of values during treatment.

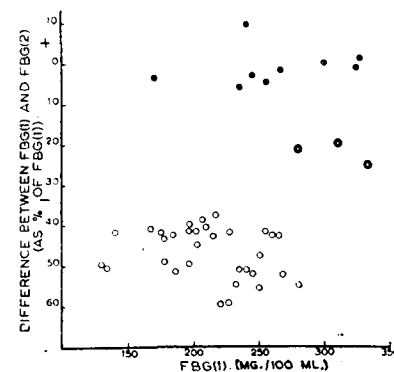


FIG. 8.—Graph relating fasting blood glucose (1) to reduction in F.B.G. obtained by treatment with BZ 55, the reduction being expressed as a percentage of F.B.G. (1). F.B.G. (1)=Mean of values in control period. F.B.G. (2)=Mean of values during treatment. (Symbols as for Fig. 7.)

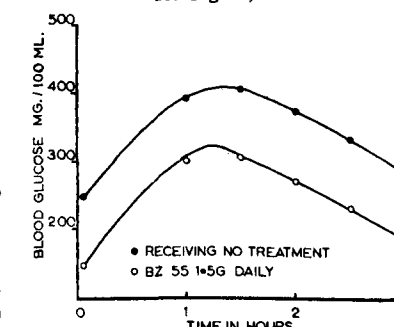


FIG. 9.—Mean of oral glucose-tolerance curves obtained in 10 responsive patients before and during treatment with BZ 55.

treatment 1.45 (S.D. 0.3). It is therefore clear that BZ 55 is without effect on glucose tolerance. We are reporting these observations in detail elsewhere.

Insulin Sensitivity.—We were unable to confirm that "unresponsive patients reacted poorly to insulin" (Franke and Fuchs, 1955). All our unresponsive patients were given a test dose of 20–30 units of soluble insulin in the fasting state, and all showed a profound drop in blood glucose, three becoming clinically hypoglycaemic (Fig. 4). All these patients are now very well controlled on small doses of insulin.

Weight.—While in hospital no very significant changes in weight were observed in the responsive patients.

Side-effects

A few patients complained of mild headache, malaise, and drowsiness when receiving the higher initial doses of the drug. When the dose was reduced to maintenance levels these symptoms disappeared.

In one patient a definite drug fever occurred on the fourth day, necessitating temporary withdrawal of the drug. The hypoglycaemic response had, however, been so good in this patient that after four weeks of out-patient observation, when no insulin was given, the administration of BZ 55 was once again cautiously started in daily doses of 0.5 g. No untoward effects occurred, and control has since been most satisfactory (Fig. 10, Case 45).

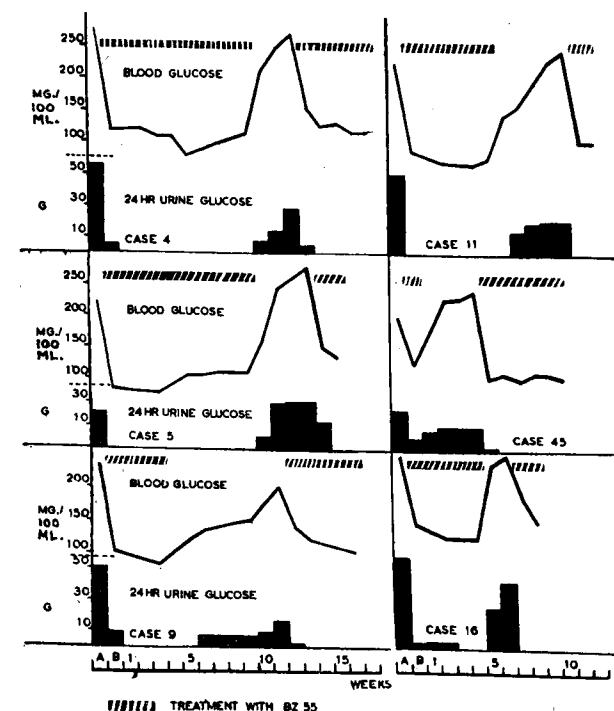


FIG. 10.—Data of six out-patients in whom courses of BZ 55 were interrupted with a return of hyperglycaemia and glycosuria. Values during periods A and B are the mean of those obtained in hospital during the control and treatment periods respectively. The blood-glucose concentrations refer to the fasting values.

In three patients a sulphonamide rash was seen, which, however, spontaneously regressed.

We have so far observed no alteration in the liver-function tests, serum electrolytes, or urinary A.S.F.S. as the result of treatment. There was some depression of iodine uptake by the thyroid in the six patients so tested during the initial two weeks of treatment, which, however, returned to normal during maintenance therapy (Kinsell *et al.*, 1956). One patient, who had for years been receiving 1 gr. (65 mg.) of thyroid daily for myxoedema, became increasingly hypothyroid after two months' treatment with BZ 55, but improved again when the dose of thyroid was doubled.

In the series as a whole there was a definite granulocytopenia in the initial two weeks of treatment. In the majority the count returned to normal despite continuance of BZ 55 in maintenance dosage, but in a few leucopenia has persisted. The lowest white-cell count recorded was 2,000 per c.mm.

A more disturbing feature has been the depression of the blood platelets. One patient reported with spontaneous purpura after only 10 days' treatment with BZ 55, and was found to have a platelet count of 60,000 per c.mm. The count returned to normal and the Hess test became negative within a week of discontinuing treatment. A test dose of 1.5 g. of the drug for two days resulted in a recurrence of thrombocytopenia and a positive Hess test. Another patient then presented with spontaneous purpura, and in this case a leucopenia was also present, the white-cell count being 2,300 per c.mm. This patient is at present being investigated in hospital.

Consequent on this experience platelet counts have been made on 30 out-patients, in none of whom the daily maintenance dose of BZ 55 had exceeded 1.5 g. The technique used was that of Oettle and Spriggs (1951), which gives a normal range of 250,000 to 350,000 per c.mm. Six of these 30 patients have been found to have counts under 180,000 per c.mm., the lowest value being 90,000 per c.mm., associated with strongly positive Hess tests, bringing the total of patients with thrombocytopenia to eight. Three of these had had platelet counts made during the control period before BZ 55 was given, all of which were at the lower limits of normal. Three other patients, although not thrombocytopenic, have shown a substantial fall in platelet counts in comparison with their control figures, and one of these has experienced severe menorrhagia. Among the patients who showed no reduction in platelets, four showed a slightly positive Hess test, a not unusual finding in elderly diabetics, particularly those with retinopathy (Beaser *et al.*, 1944).

Thus the haematological findings so far suggest that BZ 55 has a toxic action on the platelets, and, to a less extent, on the white blood cells. The red cells appear to be unaffected. A more detailed haematological investigation is at present being undertaken and will be fully reported at a later date.

Follow-up

Since discharge from hospital all the clinically responsive patients have been seen regularly. Five have been observed for 18 weeks, 2 for 16, 8 for 10, 4 for 8, 7 for 5, and 6 for 4 weeks. While receiving BZ 55 they have continued to be free of diabetic symptoms and have felt well. Blood-glucose levels and BZ 55 concentration in the blood have remained remarkably steady and satisfactory, and glycosuria has been absent or minimal. A slow but definite increase in weight has been recorded in most patients during this out-patient period of observation. Two patients on a maintenance daily dose of 1 g. of BZ 55 reported symptoms typical of hypoglycaemia which disappeared when dosage was reduced to 0.5 g. daily.

Dummy tablets have been substituted for BZ 55 in 12 patients. In all these the blood-glucose level and glycosuria started to increase within two weeks of stopping the drug, subsequently reaching the levels observed prior to treatment—10 within one month after stopping BZ 55 and 2 by the end of eight weeks. In most cases the hyperglycaemia and glycosuria were associated with a return of diabetic symptoms. The rate at which each of these patients became uncontrolled corresponded to the rate at which their diabetes became uncontrolled after withdrawal of insulin prior to the trial. At this point treatment with BZ 55 was reinstituted and good control was again achieved in all within one week (Fig. 10).

It was notable that an increase or a decrease in glycosuria lagged behind corresponding changes in blood-glucose concentration, which suggests that the drug may have some effect on the renal threshold for glucose. The three patients in Group II who showed a response to BZ 55 but were

classified as clinical failures were continued on 2 g. daily as out-patients and have been observed for three weeks. All three must continue to be classed as clinical failures, though in one there has been some diminution in glycaemia and glycosuria (Fig. 6).

Discussion

There can be no doubt that BZ 55 has a remarkable hypoglycaemic action in some diabetic patients. From our observations this would seem to be due to a reduction in the fasting blood-glucose value. Glucose tolerance is unchanged and there is no alteration in the daily profile of glycaemia, though the absolute values are set at a lower level and glycosuria is reduced or disappears. How this level and glycosuria is reduced or disappears remains unknown, hypoglycaemic action is brought about remains unknown, and this preliminary clinical study was not designed to elucidate this point.

The number of patients likely to benefit from the administration of BZ 55 is limited. The evidence suggests that the drug is of little or no value in the treatment of the young type of diabetic and absolutely contraindicated for those with a marked tendency to develop ketosis. On the other hand, though the mild diabetes of obese patients may not respond satisfactorily to the drug, there should be no substitute for dietetic restriction in the control of such patients. There remains a limited group of middle-aged or elderly non-obese patients suffering from comparatively mild diabetes who, in spite of dietetic treatment, require small or moderate doses of insulin, and for these BZ 55 may provide a welcome alternative. From a group of 55 patients of this type only 33 were adequately controlled by the drug. This is a smaller proportion of successful cases than has been claimed by other workers (Franke and Fuchs, 1955), who, however, may well have used BZ 55 as a substitute for dietary restriction.

When our clinical failures are considered, some are found to have been completely refractory to the drug; in some the response was insignificant; and in a few, although a good response occurred as evidenced by a fall of 60 to 90 mg. per 100 ml. in the blood-glucose concentration, this was insufficient to establish clinical control owing to the very high initial blood-glucose levels. Patients who readily became ketotic proved unsuitable subjects for this treatment. They seldom responded to it, and the drug itself was without effect on diabetic ketosis.

In those patients in whom treatment with BZ 55 resulted in satisfactory clinical control the reduction in glycaemia was of the order of 100 mg. per 100 ml. (range 65–160 mg.). Besides having their blood-glucose levels reduced to satisfactory figures and their glycosuria abolished or greatly reduced, these patients were rendered free from diabetic symptoms. They felt well and put on weight, and there seemed little doubt that some improvement in nitrogen balance occurred. When dummy tablets were substituted for BZ 55 deterioration began to take place within a short space of time, so that in these patients there did not seem to be any place for intermittent treatment, which has been suggested by Franke and Fuchs (1955).

A high incidence of toxic effects was observed in this series—skin reactions, drug fever, slight granulocytopenia, and particularly thrombocytopenia, associated in two cases with spontaneous purpura.

It may well be questioned whether convenience alone justifies the replacement of a well- tried and safe parenteral preparation by an oral substitute in the case of a small percentage of diabetics, especially when its toxic potentialities are considered and when the dangers of its misuse in unsuitable cases are appreciated. Even in patients who might seem to be suitable for such treatment selection is possible only by trial and error, and in those who prove unresponsive ketosis may develop rapidly on withdrawing insulin. Further, in patients who are ordinarily well controlled by BZ 55 an intermittent infection may produce dangerous ketosis which is unaffected by the drug.

BZ 55 will almost certainly prove to be a valuable research weapon which may help to elucidate some of the obscure problems of diabetic metabolism. Nevertheless, we believe that it would be premature at the present time to make it generally available for therapeutic use. This should await the results of further study in special centres to establish the pharmacological action of the drug, to assess its long-term toxicity, and to crystallize more completely the indications and contraindications for its use in any individual patient.

Summary

BZ 55 proved to be an effective substitute for insulin in 33 of 55 middle-aged or elderly diabetic patients.

The drug was without effect on ketosis or on those patients who readily developed ketosis.

The difficulties in selecting the responsive patient and the dangers of withdrawing insulin in the unresponsive patient are emphasized.

The character of the hypoglycaemic response has been analysed with particular reference to the daily profile of glycaemia, glucose tolerance, and its relationship to fasting blood-glucose values.

From follow-up studies it is concluded that maintenance treatment with BZ 55 requires to be continuous and not intermittent.

Minor toxic effects were encountered in several patients, and there appears to be a possibility that thrombocytopenia may occur with alarming frequency.

BZ 55 should not be given as a substitute for dietary restriction. If this principle is observed the number of patients in whom it can replace insulin is more limited than reports to date have suggested.

We are indebted to many people for nursing, dietetic, biochemical, and medical assistance, and particularly to our patients, whose co-operation enabled the study to be undertaken. Our thanks are due to the British Insulin Manufacturers for supplies of BZ 55.

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The work of the department of obstetrics in Adeyo Hospital, Nigeria, which serves three-quarters of a million people, is described in the "Clinical Report" of the department of obstetrics, University College, Ibadan, for the period April 1, 1953, to December 31, 1954. The report is by Drs. J. B. Lawson and U. G. Lister and contains 25 tables analysing the work of the department. Ibadan is the largest city in tropical Africa; more than half the population are Mohammedans, and the majority are polygamous. The diet is grossly deficient in proteins needed for a pregnant woman, and anaemia of pregnancy is the most serious complication encountered. The patients themselves are suspicious of scientific medicine; native medicines are often the cause of major disorders. Of a total of 5,985 patients, 5,582 were delivered in hospital. There were 76 maternal deaths (only 3 of which were considered to be not ultimately preventable), 409 stillbirths, and 333 neonatal deaths. The department's facilities were "at an appallingly low level," but a mile away a new hospital has been built where there will soon be 110 obstetric beds.

TRIAL OF AN ORAL HYPOGLYCAEMIC AGENT IN DIABETES

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During an investigation in man of the chemotherapeutic properties of some new sulphonamides, Franke and Fuchs (1955) reported that one, N-butyl-N'-sulphanilyl-urea (BZ 55), produced hypoglycaemia. Following this observation the compound was examined clinically in diabetics by Franke and Fuchs and by Bertram, Bendfeldt, and Otto (1955). Pharmacological observations were described by Achelis and Hardebeck (1955).

Subsequently, another hypoglycaemic agent, N-(4-methyl-benzosulphonyl)-N'-butyl-urea (D 860) was discovered, on which joint clinical and pharmacological studies were described by Bänder *et al.* (1956). This preparation is not a sulphonamide and has no bacteriostatic activity, but its hypoglycaemic properties are similar to those of BZ 55.

It was evident from German data that these compounds successfully controlled hyperglycaemia and glycosuria in some diabetics, many of whom were overweight. This latter fact suggested to us that in this country some of their successful cases might have been treated by diet alone.

In view of this we decided to undertake a detailed in-patient study on a group of 45 diabetics, from which we attempted to obtain information on the effect of stopping insulin under conditions of constant diet. If hyperglycaemia and glycosuria persisted BZ 55 was administered orally to ascertain its value as a substitute for injected insulin. In addition, information was sought on the possibility of establishing a short-term test which might enable us to predict the usefulness of this drug in long-term therapy.

Studies of free and conjugated sulphonamides in blood and urine were undertaken in an attempt to find correlation between these levels and therapeutic activity.

Methods

Selection of Cases.—Although an attempt was made to get a representative cross-section of the diabetics attending the hospital clinic, numbering just over a thousand, the necessity of spending two weeks in the wards meant a preponderance of middle-aged or elderly female diabetics in those who were admitted. The majority (34) were out-patients already receiving insulin, the need for which had previously been established. Eleven others had not been receiving insulin. Seven of these were newly diagnosed diabetics who would normally have received insulin. Four others have had diabetes for several years, controlled by diet alone; but increasing glycosuria, hyperglycaemia, and loss of weight had latterly suggested their need for insulin. A group of six

young and brittle diabetics were admitted for a few days only and took part in a short-term test.

Design of Trial.—On admission each patient was given a diet suitable for his or her physique and metabolic needs, prepared in a diet kitchen. For out-patients of long standing this was a continuation of the diet to which they were accustomed. These diets have been maintained since the patients were discharged. Apart from the group of young diabetics, patients were kept under observation in the wards for at least two weeks, and were then followed up twice weekly in a special out-patient clinic. For the first five days after admission patients were maintained without insulin on diet alone. Once the initial control period had been completed, a two-day test was performed. On these two days no breakfast was given, but on the second day BZ 55, in a dose of 50 mg./kg. body weight, was administered by mouth. This sequence enabled us to assess the effect simply of the omission of breakfast. In a first group of 12 patients, blood and urine sugar and sulphonamides were estimated hourly for six hours, while in subsequent tests samples were obtained every three hours under the same conditions. The patients were kept in hospital and maintained on BZ 55 for at least a further five days. If there was evidence that hyperglycaemia and glycosuria were diminishing, the diabetics were continued to be maintained on BZ 55 as out-patients for at least two weeks. In those who failed to respond even to an increased dosage, insulin therapy was resumed.

Dosage.—The initial dose was 50 mg./kg. body weight for each case—that is, 2.5 to 3.5 g. a patient—and was given in the morning. Except for the young and brittle cases, patients received a dose of 2 g. on the following morning, followed by 1 g. daily for at least five days as in-patients, and then as out-patients. Where control was poor, 3 g. daily was begun on the eighth day and continued for five days. In some, rapid loss of weight and ketosis necessitated an earlier resumption of insulin therapy, which also eventually became necessary in those patients in whom trebling of dose had been attempted.

Body Weight.—Patients were weighed daily; this was continued when they attended as out-patients.

Laboratory Tests.—On admission of patients the following examinations were performed to exclude relevant disease and for later reference: urine tests for albumin and casts; haemoglobin estimation, white-cell count and differential; and serum bilirubin, thymol turbidity, and alkaline phosphatase.

Urine Sugars and Sulphonamides.—Each day 24-hour specimens of urine were collected, the volume was measured, and the total sugar was estimated by Benedict's quantitative method (King, 1951). When BZ 55 was given, the amounts of free and conjugated sulphonamides were estimated by the method of Bratton and Marshall (1939). Urine was also tested four-hourly for sugar and acetone and charted in the usual way.

Blood Sugar and Sulphonamides.—Samples of venous blood were obtained at least three times daily, including a fasting, pre-lunch, and post-lunch specimen, and the sugar was estimated by the method of Hagedorn and Jensen (1923). When BZ 55 was administered the levels of free and conjugated sulphonamides were also estimated by the method of Bratton and Marshall. All estimations were continued on out-patients whenever they attended, bringing with them a 24-hour specimen of urine in a winchester provided.

Results

The patients were divided into two groups, successes and failures, depending upon their response to BZ 55. The blood-sugar levels of those in the successful group fell to within normoglycaemic limits following the administration of the drug, either whilst the patients were in hospital or during the subsequent follow-up as out-patients, and glycosuria almost or completely disappeared during the corresponding period of observation. Within the group of failures

the blood-sugar levels either were not reduced following the administration of BZ 55 or were reduced, but not to within the normoglycaemic range, and the amount of glycosuria was still significant.

Within these two classifications the data were studied statistically under the following headings: (1) Previous history of diabetes. (2) The mean change in blood sugar, glycosuria, volume of urine excreted, body weight, and sulphonamide levels during up to five days in hospital after treatment with BZ 55 compared with the corresponding period in hospital before treatment, during which the patient received no insulin. (3) The two-day test referred to under "Methods," in which the patient received BZ 55 for the first time.

In all the analyses which follow, the maximum amount of data available has been used. For example, it was obviously impossible to continue the administration of BZ 55 to the young and brittle diabetics beyond the first dose in the two-day test because of ketosis and the consequent risk of coma. In such instances the results can be included only when considering data from the two-day test or from previous history of diabetes.

Sex, Present Age, and Duration of Diabetes.—Table I shows the results from 45 cases. An analysis of variance revealed neither regression of age on the duration of dia-

TABLE I.—Distribution of Sex, Present Age, and Duration of Diabetes

Present Age (Years)	Successes (19)		Failures (26)	
	Males (3)	Females (16)	Males (10)	Females (16)
21-40	0	0	4	2
41-60	1	3	3	6
61-80	2	13	3	8
Mean age and range (years) ..	65 (51 to 77)		55 (22 to 80)	
Duration of Diabetes (Months)	Successes		Failures	
0-12	9		6	
13-60	6		5	
61-120	1		7	
121-240	3		2	
>240	0			
Mean duration and range (months) ..	50 (0 to 192)		104 (0 to 324)	

betes nor any significant difference in the duration of the disease in successes and failures. This is not surprising in view of the wide range of the duration of diabetes within each group. In the successful cases the mean age is slightly higher ($P < 0.05$) than in the failures. Since the majority of patients in this study were elderly female diabetics the significance of the age factor would probably have been increased if a larger number of young diabetics could have been included, since none of the young brittle diabetics responded at all to BZ 55.

Family History and Complications.—There was evidence of diabetes in the families of 3 out of 16 successful cases and in 3 out of 25 of the failures. The complications are shown in Table II. These data are collected from too small

TABLE II.—Number of Cases Showing Complications

	Successes	Failures
Retinopathy	4	5
Nephritis	1	1
Claudication	0	2

a number of patients for a significant statistical assessment, but there does not appear to be any difference in the distribution of complications between the two groups.

Insulin Requirements.—Table III shows the mean daily dose of insulin given to patients in both the successful and unsuccessful groups at the time when the present study was

started, and the mean change in insulin requirements from the time when the disease was first diagnosed.

TABLE III.—Correlation Between the Daily Requirements of Insulin Just Prior to the Test with BZ 55 and the Amount of Insulin Required When the Diabetes was First Diagnosed

	Daily Dose of Insulin Just Prior to the Test with BZ 55		Change* in Daily Dose of Insulin from Time when Diabetes was First Diagnosed until Just Prior to Test with BZ 55		No. of Cases
	Mean (Units)	Range (Units)	Mean (Units)	Range (Units)	
Successes ..	13.3	0 to 32	-9.8	-54 to +6	16
Failures ..	40.8	0 to 120	+10.7	-24 to +90	25

* —, Decrease in insulin requirements. +, Increase in insulin requirements.

A statistical analysis revealed that the insulin requirements of those patients in the group of failures were significantly greater ($P = 0.001$) than the requirements of those in the successful group prior to the administration of BZ 55, and the successful patients needed slightly less insulin at this time and the unsuccessful patients slightly more ($P = 0.05$) than they did when the diabetes was first diagnosed.

Present Age, Duration of Diabetes, and Deviation from Ideal Body Weight.—The ideal body weights of 38 patients were determined, using the table of Kemsley (1951-2), and are shown in Table IV. There was no significant difference

TABLE IV.—Deviation of Actual Body Weight from the Ideal Body Weight

	Deviation* from Ideal Body Weight (lb. and kg.)		No. of Cases
	Mean	Range	
Successes ..	-3 (-1.36 kg.)	-44 to +42 (-19.96 to +19.05 kg.)	15
Failures ..	-11 (-4.99 kg.)	-46 to +16 (-20.86 to +7.26 kg.)	23

* —, Underweight. +, Overweight.

between the mean deviations in body weight for the two groups, nor was there any correlation between the deviation from ideal body weight and the duration of diabetes or present age when the data in Table I were analysed with those of Table IV.

Deviation from Ideal Body Weight Before Administration of BZ 55 and the Change in Body Weight Whilst in Hospital following its Administration.—One possible action of BZ 55, if it restores a normal metabolism, would be its effect on the body weight of the patient where an obese patient might be expected to show a decrease in weight and a thin patient an increase. The data from 37 cases were available in which daily observations on body weight were made carefully in the period before and after the administration of BZ 55 while the patients were in hospital. Table V shows

TABLE V.—Deviation from Ideal Body Weight Prior to BZ 55 Administration and Change in Body Weight Following its Administration

	Deviation from Ideal Body Weight lb. (kg.)	Change in Body Weight oz. (g.)	No. of Cases
Successes { Mean Range	-3 (-1.36 kg.) -44 to +42 (-19.96 to +19.05 kg.)	-14 (-397 g.) -13 to +54 (-368 to +1,531 g.)	15
Failures { Mean Range	-16 (7.26 kg.) -49 to +16 (-22.25 to +7.26 kg.)	-7 (-198 g.) -88 to +44 (-2,495 to +1,247 g.)	12

the results obtained. There was no correlation between the change in body weight after BZ 55 and the deviation from the ideal body weight for either group, nor was there any significant difference between the two groups in either change in body weight or deviation from ideal weight. The lack of significance, however, could be due to too small a

number of cases or too short a period of observation of body weight after BZ 55.

Effect of BZ 55 on Fasting (6 a.m.) Blood-sugar Levels.—The results of the mean 6 a.m. level of blood sugar for the group of successes and failures, averaged over five days without insulin, together with the mean reduction in blood-sugar level averaged over the five days following the administration of BZ 55, are summarized in Table VI, and

TABLE VI.—Effect of BZ 55 on Fasting (6 a.m.) Blood-sugar Levels

	6 a.m. Blood-sugar Level Before BZ 55 (mg./100 ml.)		Reduction in Blood-sugar Level After BZ 55 (mg./100 ml.)		No. of Cases
	Mean	Range	Mean	Range	
Successes	215	132 to 275	73	15 to 132	16
Failures	267	123 to 421	29	-60* to 150	18

*—, Increase in blood-sugar level.

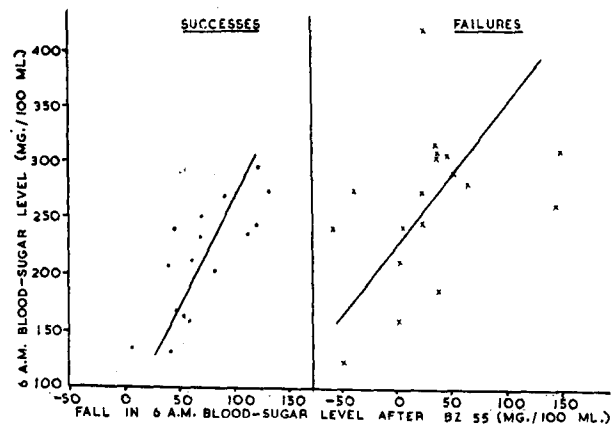


FIG. 1.—Effect of BZ 55 on fasting blood-sugar level.

expressed graphically in Fig. 1. The correlation between the 6 a.m. mean blood-sugar level before treatment and its reduction after treatment is statistically significant ($P < 0.01$), and the mean 6 a.m. blood-sugar level is higher among the group of failures than among the group of successes ($P < 0.05$). When the regression on initial blood-sugar level is allowed for, the fall in the 6 a.m. blood-sugar level after BZ 55 is significantly greater ($P < 0.01$) in successes than in failures.

There is therefore, in general, a fall in the resting blood-sugar level of the failures after BZ 55 administration, but it is less pronounced than that observed in the successes, and, in view of the higher mean initial levels in the former, their blood sugar levels are not reduced to within the normoglycaemic range.

Effect of BZ 55 on the Postprandial (2 p.m.) Blood-sugar Levels.—The results of the mean 2 p.m. level of blood sugar for the two groups of patients averaged over five days without insulin, together with the mean reduction in blood-sugar level averaged over the five days following BZ 55 administration, are summarized in Table VII. An analysis of variance revealed no correlation between the fall in blood sugar after BZ 55 and the mean level before administration, which is in contradistinction to the results for fasting (6 a.m.) levels. The average blood-sugar level at

TABLE VII.—Change in Postprandial Blood-sugar Levels (2 p.m.) After Administration of BZ 55

	2 p.m. Blood-sugar Level Before BZ 55 (mg./100 ml.)		Reduction in Blood-sugar Level After BZ 55 (at 2 p.m.) (mg./100 ml.)		No. of Cases
	Mean	Range	Mean	Range	
Successes	272	165 to 376	87	171 to 37	15
Failures	354	176 to 474	-182*	197 to -182	18

*—, Increase in blood-sugar level.

2 p.m. before treatment is lower for the successful group than for the failures ($P = 0.01$), and the reduction in blood sugar is greater in the former group than in the latter ($P = 0.01$).

Mean Rise in Blood-sugar Levels from 6 a.m. to 2 p.m. Before and After Administration of BZ 55.—This analysis was undertaken to determine the effect of BZ 55 in controlling the postprandial rise in blood-sugar levels. The average of the mean initial blood-sugar levels at 6 a.m. before and after treatment, and the corresponding average of the mean difference between the 2 p.m. and 6 a.m. blood-sugar levels are shown in Table VIII. There is no regression

TABLE VIII.—Mean Rise in Blood-sugar Levels from 6 a.m. to 2 p.m. Before and After the Administration of BZ 55

	6 a.m. Blood-sugar Level (mg./100 ml.)		Increase in Blood-sugar Level at 2 p.m. (mg./100 ml.)		No. of Cases
	Before BZ 55	After BZ 55	Before BZ 55	After BZ 55	
Successes	Mean 211 Range 132 to 298	Mean 140 Range 89 to 197	Mean 55 Range 0 to 164	Mean 46 Range 3 to 107	15
Failures	Mean 267 Range 123 to 421	Mean 238 Range 119 to 396	Mean 83 Range -3* to 162	Mean 118 Range -140* to 408	18

*—, Decrease in blood-sugar level.

of the postprandial rise in blood-sugar level on the 6 a.m. level; the mean 6 a.m. level is lower after BZ 55 administration (successes, $P = 0.001$; failures, $P = 0.05$); the mean blood-sugar level of the failures is higher at 6 a.m. than that of the successes ($P = 0.001$). The most important finding, however, is the lack of a significant difference between the postprandial rise before and after treatment with BZ 55 and the fact that this rise is greater in the group of failures than in the group of successes ($P = 0.01$). Furthermore, the postprandial rise is more variable in the group of failures after treatment with BZ 55 than before ($P < 0.002$). These findings suggest that BZ 55 exerts no action on the utilization of exogenous glucose and that it therefore may control the mechanisms of gluconeogenesis, glycolysis, or glycogenolysis.

Acute Effect of BZ 55 on Blood-sugar Levels of Overnight Fasted Patients whose Fasting is Continued from 6 a.m. to Midday.—The methods previously outlined for the two-day test were used and the mean 6 a.m. level of blood sugar following the administration of BZ 55 is recorded in Table IX. There is a positive regression of the reduction of blood sugar after BZ 55 on the initial 6 a.m. level, which is shown in Fig. 2. When the reduction in blood-sugar level is corrected for the initial 6 a.m. level it is greater in the successful group than in the failures ($P = 0.001$).

In addition the reduction in blood-sugar levels in the two-day test—that is, from 6 a.m. to midday—is greater than the mean reduction in fasting blood-sugar levels in the five days after administration of BZ 55 for the same patients.

TABLE IX.—Acute Effect of BZ 55 on Blood-sugar Levels of Fasted Patients from 6 a.m. to Midday

	6 a.m. Fasting Blood-sugar Level on Day BZ 55 was given (mg./100 ml.)		Amount by which Blood-sugar Level was Reduced 6 Hours after Administration of BZ 55 (Midday) (mg./100 ml.)		No. of Cases
	Mean	Range	Mean	Range	
Successes	224	129 to 303	116	49 to 197	15
Failures	290	119 to 450	123	-15 to 249	14

Effect of BZ 55 on Glycosuria.—The mean of the amounts of glucose in 24-hour samples of urine (6 a.m. to 6 a.m.) for the five days prior to the administration of BZ 55, and the amount by which the glucose excretion is reduced in a corresponding period after treatment with BZ 55, are summarized in Table X. There is a positive regression of the reduction of glycosuria on the mean level before treatment

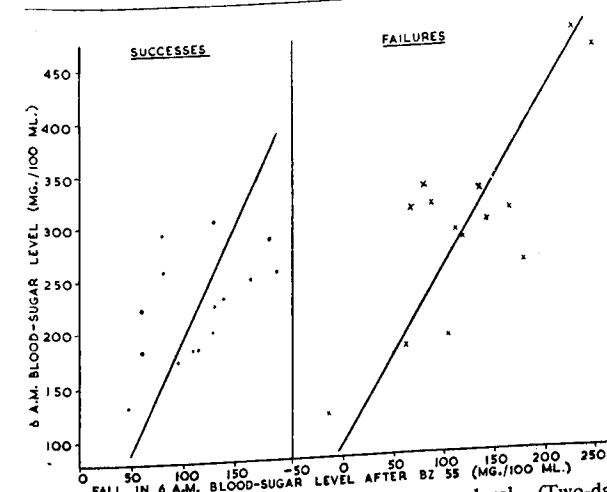


FIG. 2.—Effect of BZ 55 on 6 a.m. blood-sugar level. (Two-day test.)

with BZ 55 ($P = 0.001$), and when the reduction of glycosuria is corrected for the mean initial level it is more pronounced in successful cases than in unsuccessful cases ($P = 0.01$). The regression is shown in Fig. 3, and the high degree of correlation for the successful group is clearly evident. In nearly every instance there is virtually no glycosuria in the successful group following treatment with BZ 55.

TABLE X.—Effect of BZ 55 on Glycosuria

	Amount of Glucose Excreted in 24-hour Samples of Urine before BZ 55 Administration (g.)		Reduction in Amount of Glucose Excreted in 24-hour Samples of Urine after BZ 55 Administration (g.)		No. of Cases
	Mean	Range	Mean	Range	
Successes	30.4	1.3 to 82.6	23.8	1.3 to 77.0	15
Failures	61.3	26.8 to 116.3	19.8	-16.5* to 57.1	15

*—, Increase in amount excreted.

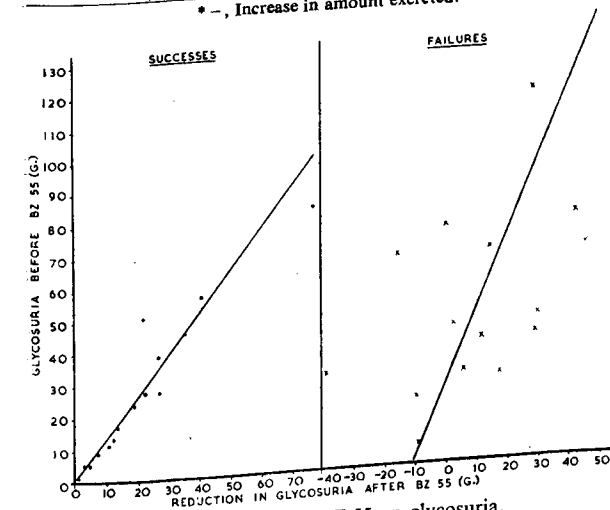


FIG. 3.—Effect of BZ 55 on glycosuria.

Change in Volume of Urine Excreted and in Glycosuria Following Administration of BZ 55.—There is a reduction in the mean volume of urine excreted in both the successes and the failures which is not statistically significant (see Table XI). This is not surprising in view of the wide range in the volumes of urine excreted. There is no correlation between the change in urine volume and reduction in glycosuria in the successful group, but there is a significant correlation in the group of failures ($P = 0.001$). These differences in correlation are evident in Fig. 4. In the group of failures, therefore, the smaller the volume of urine excreted in 24 hours after BZ 55 the less sugar will that sample

contain. The lack of correlation in the group of successful cases may be due to too small a number tested and a narrower range in quantity of urine excreted.

TABLE XI.—Change in Volume of Urine Excreted and in Glycosuria Following Administration of BZ 55

	Change in Volume of Urine Excreted after BZ 55 (ml.)		Reduction in Glucose Content of Urine after BZ 55 (g.)		No. of Cases
	Mean	Range	Mean	Range	
Successes	-199	-943 to 350	21.4	1.3 to 77.0	15
Failures	-248*	-1,080 to +463	12.8	-38.6† to 57.1	13

*—, Decrease in volume. †—, Increase in amount (g.).

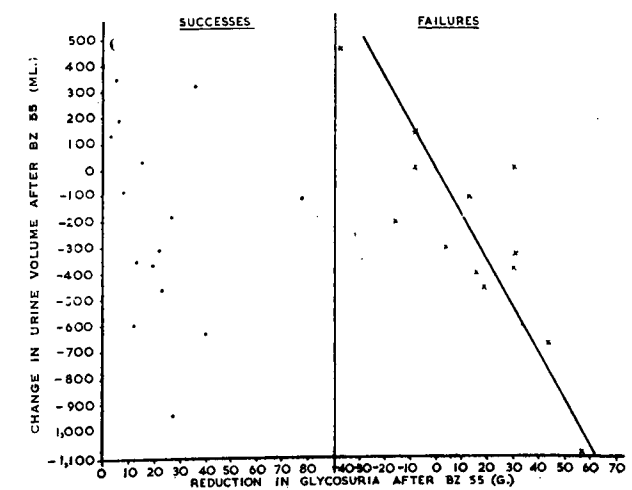


FIG. 4.—Relationship between the change in volume of urine excreted and glycosuria after BZ 55.

Blood and Urine Sulphonamide Levels.—On the first group of 12 patients the blood sulphonamide levels on the day of the two-day test were estimated at hourly intervals after the dose of BZ 55; they showed a steady rise up to six hours in each patient. The blood sulphonamide levels at one hour and six hours after the treatment with BZ 55 are shown in Table XII. It can be seen that there are no differences between the levels of the successful cases and those of the failures. On all the other patients the blood sulphonamide levels were estimated on the day of the two-day test at six hours after the dose of BZ 55. The average level for free sulphonamide at this time was 11.9 mg. per 100 ml. for successes and 11.4 mg. per 100 ml. for failures, whilst the corresponding levels for conjugated sulphonamide were 0.8 mg. and 0.9 mg. per 100 ml. respectively. There was

TABLE XII.—Blood Sulphonamide Levels on the Day of the Two-day Test

Time		6 Successful Cases		6 Failures	
		Blood Sulphonamide (mg./100 ml.)		Blood Sulphonamide (mg./100 ml.)	
		Free	Conjugated	Free	Conjugated
1 hr. after BZ 55	Range	5-10	Nil	5.2-8.7	Nil
	Mean	6.9		7.0	
6 hrs. after BZ 55	Range	9.5-11.7	0.8-2.5	9.5-11.7	0.8-2.3
	Mean	10.65	1.48	10.6	1.56

TABLE XIII.—Excretion of Total Free and Conjugated Sulphonamide in 24-Hour Specimens of Urine in Patients Receiving a Maintenance Dose of 1 g. BZ 55 Daily

	Mg. of Sulphonamide Excreted 24 Hours		Ratio Free: Conjugated	No. of Cases
	Free	Conjugated		
Successes	468	180	2.60	13
Failures	325	348	0.93	10

no significant difference between the levels in either group. On maintenance doses of BZ 55 the blood sulphonamide levels six hours after 1 g. of BZ 55 ranged from 7.7 to 12.5 mg. per 100 ml. (mean 11.7 mg.), and eight hours after, from 8.7 to 23 mg. per 100 ml. (mean 13.6 mg.).

The total amount of free and conjugated sulphonamide excreted in 24-hour specimens of urine was also estimated

steadily on 1 g. a day. Trebling of dose to 3 g. daily did not reverse this trend; she began to complain of thirst and polyuria. Insulin was reinstituted, with rapid improvement. This was an example of failure to replace insulin by BZ 55 as shown in Fig. 7.

Discussion

The fasting blood-sugar level would appear to be an important factor in assessing the effect of BZ 55. In none of our successful cases was this more than 275 mg. per 100 ml. While these patients were in the ward, on a measured diet but without insulin, they showed raised blood sugars and considerable glycosuria. There was, however, no acetonuria; thirst and polyuria were slight. They might thus be described as mild diabetics, and a maintenance dose of 1 g. daily was successful during the period of observation in keeping their blood level normoglycaemic and the urine free of sugar.

BZ 55 proved ineffective in the control of diabetics who easily developed acetonuria. The fasting blood sugars ranged from 123 to 421 mg. per 100 ml. In some patients substitution of the morning dose of insulin by BZ 55 had led by the afternoon to rising blood sugars, acetone in the urine, and symptoms of thirst, necessitating administration of insulin. These were young diabetics normally difficult to control. In the remainder of the failed cases the test dose of BZ 55 caused a significant drop from the fasting blood-sugar level, but subsequent maintenance therapy failed to prevent hyperglycaemia and glycosuria, and in some there was gradual onset of thirst, polyuria, and loss of weight. Trebling the dose of BZ 55 did not reverse this trend.

Failure to control these severe or moderately severe diabetics on oral therapy alone does not exclude the possibility

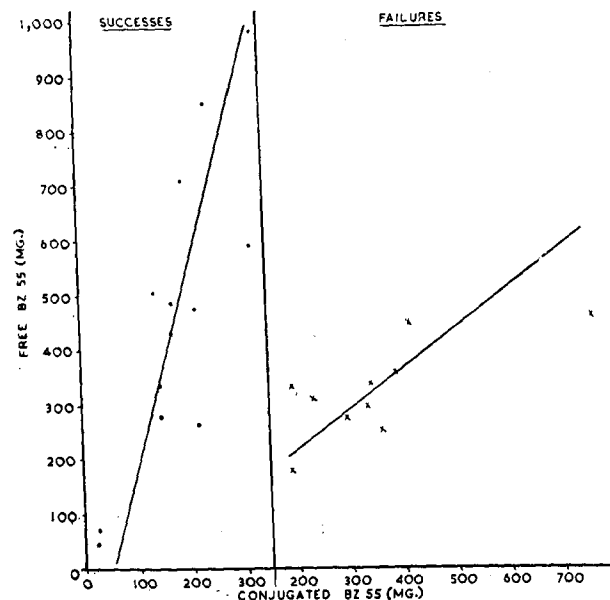


FIG. 5.—Excretion of free and conjugated BZ 55 in 24-hour specimens of urine when patients are receiving a maintenance dose of 1 g. of BZ 55 daily.

for patients during the in-patient period when they were receiving a maintenance dose of 1 g. of BZ 55 each day. On analysis, the results, presented in Table XIII, show that there is a significant positive correlation between the amount of free and conjugated sulphonamide excreted ($P=0.01$); the excretion of conjugated sulphonamide is higher in failures than in successes ($P<0.01$) and the difference between the excretion of free sulphonamide in either group is not significant. The evidence for the regression is shown in Fig. 5.

Complications of Treatment

Skin reactions occurred in 5 out of 45 cases. In four cases BZ 55 was then replaced by N-(4-methyl-benzosulphonyl)-N'-butyl-urea (D 860), and the rash, a typical maculopapular sulphonamide rash, in each case gradually disappeared. No other complications have occurred in our series so far.

Examples of Successful and Failed Cases

Case A.—A woman, aged 72. Diabetes was first diagnosed in November, 1955, following gradual onset of thirst, polyuria, lassitude, and loss of weight. On 20 units of insulin zinc suspension her urine was sugar-free. During the trial period in the ward without insulin her urine showed heavy glycosuria; her fasting blood sugars were over 200 mg. per 100 ml. and her postprandial blood sugars over 300 mg. per 100 ml. She was, however, symptom-free and had no acetonuria. The test dose of BZ 55 led to a marked drop in the blood sugar, and subsequently a maintenance dose of 1 g. daily cleared the urine of sugar and lowered her blood-sugar levels. This was an example of a successful replacement of insulin by BZ 55 as shown in Fig. 6.

Case B.—A woman aged 57. Diabetes was diagnosed six years previously, following a history of thirst and polyuria. Her diabetes had been controlled on 30 units of protamine zinc insulin daily. She was admitted to the ward and her insulin discontinued for five days. During this period she showed heavy glycosuria and acetonuria. BZ 55 was administered and caused some fall in the blood sugar the first day, but after that blood and urine sugars rose

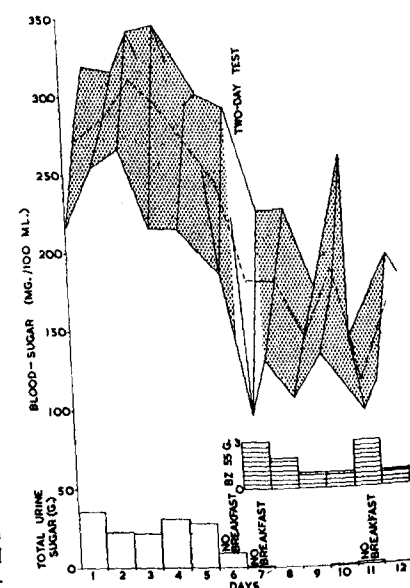


FIG. 6.—Details of Case A, a woman aged 72. (Success.)

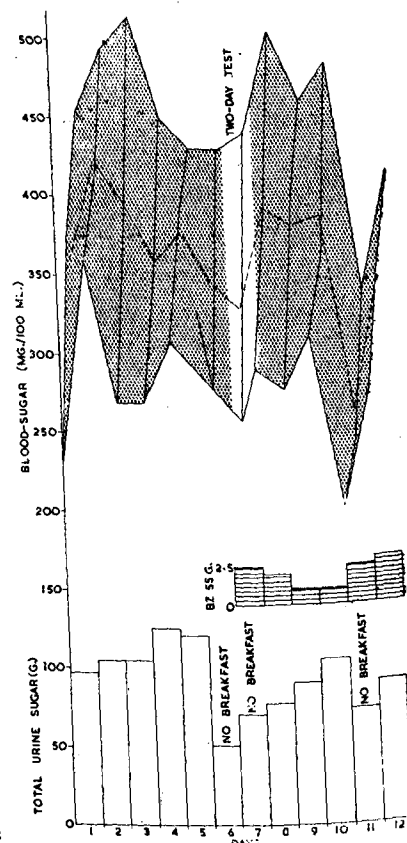


FIG. 7.—Details of Case B, a woman aged 57. (Failure.)

that BZ 55 given in conjunction with insulin might reduce the amount of insulin required or might lead to an easier control in unstable patients; these problems were not investigated.

The response of patients to BZ 55 was not related to the duration of their diabetes or to the incidence of complications. In the group of successes, however, there was generally a history of diminishing insulin requirements, and had, if the failures the need for insulin was greater, and had, if anything, increased with the progression of the disease. It may be that in the successful cases with mild diabetes BZ 55 acted either by stimulating the secretion of endogenous insulin or by preventing its destruction, while in the failed cases there was insufficient endogenous insulin.

In 39 cases the initial dose of BZ 55 produced hypoglycaemia which was greater than that produced by any subsequent dose. This suggests that following the initial dose the available insulin, or the mechanism regulating its use, was quickly exhausted in those diabetics who subsequently failed to respond.

BZ 55 exerted no control in either group over the postprandial rise in blood sugar. Its action is therefore probably on the mechanism controlling the utilization of endogenous glucose. With that in view, in all patients maintained on BZ 55 stress has been laid on the importance of adhering to the dietary regime.

German workers have indicated that BZ 55 and D 860 are most likely to be successful in obese diabetics. The present study showed the mean deviation in body weight present in successful cases to be slightly lower than the ideal weight, with only one case of gross obesity. This indicates that the drug can act as successfully in underweight patients as in those who are normal or overweight. During their period as in-patients, body weight did not alter significantly once BZ 55 therapy had begun.

Kinsell *et al.* (1956) found in two severe diabetics that the greater part of the sulphonamide excreted in the urine was conjugated in the patient treated successfully by BZ 55, whereas the greater part of the urinary sulphonamide was free in the patient who failed to respond. The present investigations were at variance with this, since it was found that the excretion of conjugated sulphonamides was higher in the failed cases than in the successes.

Skin reactions occurred in 11% of the cases, but gradually disappeared when the patients were transferred to D 860. In view of these toxic manifestations, and the possibility of other adverse effects which may appear, particularly in the blood or liver, caution must be exercised before deciding to treat a patient with these drugs. Finally, it must be stated that the mode of action of BZ 55 remains unknown, as does its influence on the complications in the vessels, kidneys, and eyes which occur in long-term diabetes.

For these reasons BZ 55 must not be regarded as having reached therapeutic status in the management of the diabetic patient.

Summary

The response to the administration by mouth of BZ 55 tablets was studied in a group of 45 diabetics normally requiring insulin. These studies were undertaken under conditions of controlled diet on in-patients.

Diabetics in whom the drug was successful often had a history of diminishing insulin requirements. In no instance was the fasting blood-sugar level greater than 275 mg. per 100 ml., and the fasting range was from 123 to 275 mg. per 100 ml.

Diabetics in whom the drug failed tended to have a higher insulin requirement than the previous group. The fasting blood sugars ranged from 123 to 421 mg. per 100 ml. and there was a tendency to acetonuria.

BZ 55 does not exert any influence over the postprandial rise in blood sugars, either in the group of successes or in the failures.

There is no difference in levels between free and conjugated sulphonamides in the blood between successes and failures. In the urine there is more excretion of conjugated sulphonamides in the failed cases than in the successful ones.

Five patients (11%) developed skin reactions due to the drug.

Our thanks are due to Dr. K. Thomson for his help in the wards; to Mrs. Collins for the supervision of the diets; to Mr. Garfield for unstinting support with the biochemistry; to the ward staffs; and to Messrs. J. V. Smart, T. Hobson, R. Neville, P. Roberts, D. Sutton, and J. Trethewey, of the Biological Control Laboratories, the Wellcome Foundation, for invaluable assistance with the biochemical and statistical analyses. We also thank the British Insulin Manufacturers for supplies of BZ 55 and Professor Ehrhardt, of Hoechst A.G., for D 860.

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CLINICAL TRIAL OF THE NEW ORAL HYPOGLYCAEMIC AGENT BZ 55

BY

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The discovery of the hypoglycaemic action of certain sulphonamide preparations, and their use in the treatment of diabetes, has recently been the subject of a number of publications on the Continent, notably in Germany (Bertram *et al.*, 1955; Franke and Fuchs, 1955; Loubatières, 1955; Quilley, 1955). The drug most commonly used has been N-butyl-N'-sulphanilylurea (BZ 55, "nadsan," "carbutamide"), and the preliminary results obtained in a clinical trial of this substance in the Diabetic Department at King's College Hospital are briefly described.

In the absence of reliable information on the clinical type of diabetes and on the influence of diet in the cases treated in Germany and elsewhere, it was decided first to give BZ 55 to a small series of representative diabetics, with the object of correlating such broad clinical distinctions as age, severity, insulin requirement, and duration of the diabetes with responsiveness to the drug. From the results so obtained it was hoped that a group or groups of patients could be selected for treatment in the out-patient department; this policy was largely dictated by lack of beds.

Clinical Material

Representative Group.—A group of 21 patients were selected to cover a wide range of age, weight, and severity and duration of diabetes for the purpose outlined above; eight of these were in-patients.

Selected Group.—A group of 17 patients were treated in the out-patient department, the criteria for selection being based on results obtained in the representative group.

Methods

Diet control consisted of measured carbohydrate, with free protein and fat, and was accurate in hospital. Out-patients had previously received detailed instruction in diet, and, because none were gaining weight, they were presumed to be adhering to it within reasonable limits. Since a new treatment often leads to more rigid adherence to diet than usual, the patients were first studied for a control period of two weeks while receiving dummy tablets. In some subjects receiving insulin the dose was not changed during the trial; in the others insulin was discontinued at least one week before BZ 55 was given. All patients were weighed twice weekly. On the first and second days of the trial patients were given respectively 2.5 and 1.5 g. of BZ 55, the dose on subsequent days being 1 g. In patients who failed to show a satisfactory response by the seventh day the maintenance dose was gradually increased.

The total excretion of glucose in 24 hours was estimated daily in in-patients and twice weekly in out-patients. Capillary blood-sugar estimations were made by a modified Nelson technique at least three hours after breakfast, and at the same time on each occasion. In the group of 17 out-patients night and early morning specimens of urine were tested for sugar and acetone bodies, and the blood sugar was estimated at varying times after breakfast, but not less than two hours.

Results

Representative Group.—The results obtained in the group of representative diabetics are summarized in Table I. The response to BZ 55 was recorded as good, moderate, or no response, according to whether the glycosuria disappeared completely, was reduced in amount, or was unaffected. In nine cases the response was good, in six moderate, and in

six there was no response. In the nine cases classified as good the age of onset varied from 46 to 70 years, in the six moderate from 45 to 75, and in five of the six with no response from 9 to 46, the remaining failure being 65. Seven of the nine successes never required insulin, one was on 12 units and one on 48 units. In the moderate group four needed no insulin, the remaining two having been on 24 and 34 units respectively. Of the six who showed no response three had never had insulin, one being a child of 12 with diabetes of recent onset and severe ketosis; the remaining three needed relatively large doses of insulin. The cases with heavy ketonuria failed to respond to BZ 55. Of the 15 patients who showed a good or moderate response to BZ 55, the minimum age of onset of diabetes was 45, and maximum duration 22 years. Only four cases required insulin, the maximum period of insulin therapy being 18 years. No case showed ketonuria even after withdrawal of insulin.

Selected Group.—The results obtained in the group of 17 selected out-patients are summarized in Table II. All patients in this group developed diabetes after the age of 40, the range being 41 to 76; none showed significant ketonuria without insulin, and none were grossly overweight. In all cases diet alone failed to control glycosuria. In this group there was a good or moderate response to BZ 55 in every case, the final blood sugar being less than 180 mg. per 100 ml. in 11, between 180 and 200 mg. in three, and between 201 and 250 mg. in the remaining three cases. Insulin was replaced in three patients and avoided in two suffering from poor vision. Eight patients had previously been on insulin, the dosage varying between 12 and 88 units; the response was good in four and moderate in four, including the only two previously on large doses of insulin.

Toxic Reactions.—Transient giddiness occurred in five patients within two hours of the initial dose of BZ 55 and

TABLE I.—Effect of BZ 55 in 21 Representative Diabetics

Case No.	Sex	Diabetes		Diet G. Carb.	Insulin	Ketosis	BZ 55		Weight in lb.		Blood Sugars (mg./100 ml.)		Urine Glucose (g./Day)		Remarks
		Age at Onset	Duration (Years)				Max. Daily Dose	Total Days	At Start	Alteration	Initial	Final	Initial	Final	
No Response															
1*	M	14	25	250	92 u. S.I. cont.	0	2 g.	27	123	+3	173	212	39.4	69.7	Skin rash
2*	M	36	7½	250	72 "	0	3 "	29	173	+2	93	141	37.3	63.2	
3*	F	9	5/12	180	0	0	2 "	9	63	0	275	477	47.4	68.1	
4*	F	12	0	180	0	+++ (FeCl ₃)	1 "	7	84	0	380	331	183	157	
5	F	46	2/52	150	0	"	3 "	20	150	-6	279	262	Not done		Glycosuria and ketosis throughout
6*	M	65	3½	180	44 u. I.Z.S. discont.	0	4 "	23	163	+1	251	276	42	57.5	
Moderate Response															
7	F	57	3	90	0	0	1 g.	21	232	+5	341	131	196	6.3	Persistent giddiness on 2 g. daily
8	M	46	3/12	120	0	0	2 "	31	168	+4	302	152	122	12	
9	M	45	1½	120	0	0	3 "	62	160	+1	298	172	91.8	12.2	
10	F	75	2/52	100	0	0	1 "	28	138	+1	391	186	81.6	5.4	
11*	F	48	22	140	Since 1938 I.Z.S. 24 u. discont. I.Z.S. 34 u. discont.	0	2 "	56	118	+2	294	146	55.1	6.6	
12	M	60	3½	160	0	0	2 "	14	162	+2	379	218	105	65	
Good Response															
13	M	46	2/52	130	0	0	2 g.	1	178	+2	288	144	20	0	Initial ketosis cleared with diet
14	F	70	7	120	0	0	1 "	28	130	+2	298	165	43	0	
15	M	62	5	120	0	0	1 "	3	153	0	228	75	18.4	0	
16	M	68	2½	120	0	0	1 "	28	155	0	183	135	8.1	0	
17*	M	70	1/12	160	0	0	2 "	25	151	+3	292	106	69	0	Persistent giddiness
18	F	70	1/12	90	0	0	1 "	4	135	+1	217	110	55	0	
19	F	51	10½	100	0	0	2 "	22	153	0	284	154	74.3	0	
20	F	70	1½	160	I.Z.S. 12 u. discont. 48 u. discont.	0	1 "	3	119	0	230	166	35.9	0	
21*	F	67	3½	90	0	0	2 "	28	150	Oedematous	320	145	30.8	0	Recovering from heart failure

* Patient in hospital.

lasted for about 15 minutes, but did not recur. Severe giddiness which persisted until the drug was stopped or the dose reduced occurred in three cases. In two cases there was an irritant erythematous rash which rapidly disappeared on stopping treatment. One out-patient developed a severe papular sulphonamide rash with some purpuric haemorrhages, and typical sulphonamide drug fever occurred in one case.

Sensitivity Test.—In view of the uncertainty of the clinical response to BZ 55 in diabetes it was decided to investigate the hypoglycaemic action of a single dose of the drug in a small series of patients. It was hoped that this type of sensitivity test might provide a useful guide in the selection of patients for treatment with BZ 55. The test was carried out on 16 patients and consisted in estimating the blood sugar in the fasting state and again four hours after a single dose of 50 mg. of BZ 55 per kilogram of body weight. A control test without BZ 55 was carried out on 11 of the 16 patients. The results of this investigation are shown in Table III. In patients known to respond to BZ 55 there was a significantly greater fall with than without the drug ($P=0.001$). A fall of less than 30% was observed in 9 out of 11 control tests. After BZ 55 the fall exceeded 40% in eight patients; in two of the remaining three a dose of 2 g. of BZ 55 had been required to produce a satisfactory response.

Arteriovenous Difference.—This test of sensitivity to BZ 55 offered a convenient opportunity to investigate the effect of the drug on the peripheral utilization of glucose. Simultaneous capillary and venous blood-sugar estimations were carried out during the period of maximum hypoglycaemic response to BZ 55, but no significant increase in arteriovenous difference was demonstrated; this would seem to indicate that BZ 55 does not increase the peripheral utilization of glucose.

TABLE III.—Results of a BZ 55 Sensitivity Test in 16 Subjects

Case	Fall in 4 Hours' Fasting		Fall in 4 Hours after BZ 55		Known Reaction to BZ 55
	Initial B.S. Level (mg./100 ml.)	Fall %	Initial B.S. Level (mg./100 ml.)	Fall %	
1	250	26.4	254	52.0	Good
2	260	20.0	272	44.8	"
3	242	21.9	187	56.2	"
4	284	11.3	360	42.0	"
5	275	16.8	329	35.0	Larger dose needed
6	279	11.2	342	29.8	Good "
7	237	8.9	226	19.5	
8	173	32.4	205	60.5	
9	236	25.4	250	57.2	
10	318	37.1	264	46.6	"
11	143	25.2	157	45.2	"
12			446	72.4	"
13			205	47.8	"
14			218	49.1	"
15			274	18.2	Nil
16			320	20.3	"

Discussion

From the results obtained in the first series of 21 diabetics, to some extent representative in respect of age, duration, and severity of diabetes and insulin requirement, certain broad conclusions may be drawn regarding the type of patient in whom the drug may be expected to have some hypoglycaemic action. The presence of significant ketonuria either in patients treated by diet alone or after the withdrawal of insulin was consistently associated with complete failure to respond to BZ 55. In general it appeared that young diabetics and those requiring more than small doses of insulin show little or no response, nor was there reliable evidence that the administration of BZ 55 to such patients decreased their insulin requirement; two young diabetics actually passed more sugar when the drug was

TABLE II.—Effect of BZ 55 in 17 Selected Out-patients

TABLE II.—Effect of BZ 55															
Case No.	Sex	Diabetes		Insulin	Ketosis	BZ 55		Weight in lb.		Glycosuria (Benedict)		Blood Sugar (mg./100 ml.)		Indication for BZ 55	Remarks
		Age of Onset	Duration (Years)			Daily Dose	Days	Control	Change	Initial	Final	Initial	Final		
1	M	44	14	P.Z.I. 16 u. since 1944 discont.	Sl. tr. (Rothera)	1 g.	7	229	+1 {	N + + M +	Tr. Tr.	225	152	Urinary infection	Infection cleared
2	F	44	7	P.Z.I. 14 u. previously	0	1 "	14	158	-1 {	N + + + + M + + + + +	Tr. 0	269	110	Pruritus	Pruritus cleared
3	M	41	4	N.P.H. 30 u. discont.	0	0.5 "	7	176	0 {	N tr. M 0	0 0	157	104		
4	F	41	6	P.Z.I. 28 u. discont.	0	1 "	14	155	-2 {	N + + + + M tr.	+ 0	205	125		
5	F	76	6	0	0	1 "	14	115	0 {	N + + + + M + + + + +	Tr. Tr.	334	200		
6	F	61	7	I.Z.S. 32 u. previously	0	1 "	14	170	+4 {	N + + + + M + + + + +	+ 0	301	176	Refused insulin	
7	F	67	6	0	0	1 "	14	126	+2 {	N + + + + M + + + + +	Tr. +	350	214	"	
8	F	60	3	I.Z.S. 72 u. previously	0	1 "	14	177	+2 {	N + + + + M + + + +	0 Tr.	306	243	Pruritus	Pruritus cleared
9	F	52	7	0	0	1 "	14	147	+3 {	N + + + + M + + +	0 0	328	197		
10	F	63	1	0	Tr. Rothera	1 "	14	137	+3 {	N + + + + M + + + +	+ 0	309	131	Nocturia	
11	F	55	13	0	"	1 "	23	134	+4 {	N + + + + M + + + +	+ + + + Tr.	290	200	Refused to diet	
12	F	49	7	I.Z.S. 12 u. cont.	0	0.5 "	14	123	+3 {	N 0 M 0	0 0	326	179	Dislikes insulin	Giddiness on 1 g. daily
13	F	60	7	S.I. 88 u. previously	Tr. persisted	1 "	35	162	+3 {	N + + + + M + + + + +	+ + + Sl. tr.	315	227	Pruritus	Pruritus improved
14	F	46	1/52	0	++ Rothera cleared	1 "	14	196	0 {	N + + + M + + + +	0 0	175	94	Slight ketosis	Generalized irritant rash
15	F	66	5½	0	0	2 "	7	123	-1 {	N + + + M + + + + +	Tr. V. sl. tr.	283	112	Loss of weight	Weight increased
15a	Second course			0	++ Rothera cleared	1 "	14	121	+3 {	N + + + + M + + + + +	Tr. S. tr.	252	172		
16	M	41	18	0	0	1 "	35	177	+3 {	N + + + + M + + + +	+ + +	245	157		
17	M	56	6	0	0	1 "	14	175	+3 {	N + + + + M + + + + +	0 0	226	103		

the fall in blood sugar on BZ 55 is of the same order as in the first group, in no case is it significant. This is due to a greater fluctuation in blood-sugar levels in the insulin-treated group. Further analysis of this group is, of course, impossible until the numbers have been increased.

Case 15 is of interest. This patient was reasonably well controlled on 44 units insulin zinc suspension (I.Z.S.) daily. The reduction of this to 36 units resulted in ketosis developing within 24 hours. After she had been on 44 units of I.Z.S., with BZ 55 in addition, insulin dosage was reduced once more to 36 units. The patient was seven days on this regime without ketosis developing. The stoppage of BZ 55 on the eighth day was followed by ketosis on the ninth day, when the BZ 55 blood level was 4.6 mg. per 100 ml.

With the therapeutic use of BZ 55 in Cases 17-20, glycosuria was cleared in Cases 17 and 20 and, subjectively

and by urine tests, control was better in Case 19. There was no apparent response to the administration of BZ 55 in Case 18.

No constant effect of BZ 55 on the arteriovenous difference of blood sugar was found. A decrease in the difference occurred as often as an increase.

No change in weight was noted in spite of improvement in control.

Toxic Effects.—Two widespread and fairly typical sulphonamide skin rashes occurred. One cleared with the administration of antihistamines, and the other with the cessation of the drug. Two patients were mildly nauseated on high dosage.

Discussion

Statistical analysis of the data derived from the 10 patients in group 1 would lead to the following conclusions. BZ 55 would appear to have a "normalizing" effect on the blood-sugar levels of these mild diabetics, and the higher the initial fasting blood-sugar levels found the greater the effect. The effect does not seem to be due to an increased sensitivity to insulin.

The study of the effect of BZ 55 on the arteriovenous difference of blood sugar, and other unpublished observations we have made on serum inorganic phosphorus levels, would support this conclusion. In the more severe diabetics the fall in fasting blood sugar on BZ 55 was not statistically significant, and a larger group will have to be studied.

We can deduce no evidence in support of the contention that the drug is active only in overweight diabetics. The duration of the diabetic state has no correlation with the responsiveness of the patient. It is already evident from our limited experience of the drug that, although a satisfactory fall of blood-sugar and urine-sugar levels will occur in hospital on a carefully controlled diet, patients can relapse on a more liberal out-patient regime. In three of our patients it is now evident that 2 g. of BZ 55 is required daily to maintain a satisfactory clinical response. We have as yet no definite proof of the development of tolerance.

The fact that BZ 55 has already been shown to have toxic effects (Duncan, Baird, and Dunlop, 1956), and that it is also of course an antibacterial substance, is a challenge to the synthetic chemist to produce something better. Whether this compound proves ultimately to have a place in therapeutics or not, a laboratory tool of great importance is now available, and already new vistas in the intermediate metabolism of carbohydrate are appearing.

Summary

Results are reported of a clinical trial of BZ 55 on 20 diabetic patients, 14 of whom were in hospital. Ten mild diabetics, not satisfactorily controlled by diet alone, were studied under basal conditions and then on BZ 55 therapy and the same diet. Detailed measurements of blood and urine sugar were made, as well as of the blood level of BZ 55 and the daily weight. Three out-patients were studied similarly but in less detail. A further three patients who required insulin to prevent ketosis were studied in hospital when taking insulin and when taking BZ 55 in addition, the diet remaining constant. A fourth group of four patients were given BZ 55 simply as a therapeutic agent, in one case in addition to 128 units of insulin, and the effects were judged by the relief of symptoms and the results of qualitative tests for urinary sugar.

Statistical analysis of the data of the first group of 10 mild diabetics showed that the BZ 55 had a normalizing

effect on the fasting blood-sugar levels. The higher the initial fasting blood sugar the greater was the hypoglycaemic effect obtained. The four patients receiving BZ 55 in addition to insulin had better control than when receiving insulin only, but the series is too small to achieve significance. Studies of arteriovenous blood-sugar differences and of the changes in serum inorganic phosphorus levels provided no evidence that BZ 55 increased the effectiveness of the peripheral action of insulin.

We are grateful to Mrs. H. M. McGregor and Miss L. Constable for their biochemical estimations.

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HYPOGLYCAEMIC SULPHONAMIDES IN TREATMENT OF DIABETES

BY

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Recent reports from Germany (Bertram *et al.*, 1955) have suggested that certain relatively non-toxic sulphonamides with a hypoglycaemic action may be of value in the treatment of diabetes mellitus. Because of the interest which has been aroused by these reports, the following preliminary account is being published. It deals with experience in a diabetic clinic where 24 patients have been treated with N-butyl-N'-sulphanilylurea (BZ 55, "carbutamide") for periods up to seven months.

The German workers found that this compound was most effective in middle-aged "stable" diabetics: stable, in this context, meaning that if patients were not receiving insulin although they were hyperglycaemic they did not develop ketosis, and if they were using insulin it could be stopped without any immediate rise of blood sugar or the development of ketosis. Diabetics of this type are often obese, and, believing obesity to be undesirable in diabetics, it is the practice in this clinic to endeavour to control the condition with a low-calorie diet with less than the usual proportion of carbohydrate. In most cases if the diet is followed for a few weeks weight is lost, the blood sugar falls, and symptoms and glycosuria disappear. In a few, although the weight comes down, hyperglycaemia, glycosuria, and occasionally some symptoms persist. In the past it has been necessary to use insulin to achieve normoglycaemia in these patients; recently we have been assessing the possible use of oral BZ 55 as an alternative.

Selection of Patients

Patients were selected for trial with BZ 55 on the lines indicated above. Of the 24 patients, nine were men. Ages ranged from 38 to 82 years (mean, 63), and the diabetes had been recognized for from 1 to 42 years (mean, 10). Nine patients had developed their diabetes before they were 45 years of age. Ten had received insulin at some time, and in six of these it was being taken in doses of 10 to 84 units a day up to the time of the trial of BZ 55. All except two of the patients had glycosuria when BZ 55 was started, six had mild diabetic symptoms, most commonly polyuria, and five had diabetic retinitis. No patient had at any time

had any significant degree of ketosis, although mild ketonuria had previously been observed in two. Thirteen patients were underweight when treatment was started; the majority of the others were only slightly overweight. Prior to treatment, three blood-sugar estimations were made on consecutive weeks ("random blood sugar"—that is, taken during the clinic between 10.30 a.m. and 12 noon after a normal breakfast—method of Kingsley and Reinhold (1949) modified). The means of these pre-treatment blood sugars are shown in Fig. 1. Patients who were on insulin had this stopped and were put on a low-calorie and restricted carbohydrate diet. BZ 55 was not started until the blood sugar exceeded 200 mg. per 100 ml.

Technique of Treatment

In most cases treatment was started with 2.5 g. the first day, 1.5 g. the next day, and 1 g. a day subsequently. In a number of cases BZ 55 was preceded by two weeks on inert tablets. During the control period and first few weeks of treatment the patients were on a low-calorie and restricted carbohydrate diet (1,250 calories, 100 g. of carbohydrate, in 12 patients; 1,500 calories, 125 g. of carbohydrate, 5 patients; 1,750 calories, 150 g. of carbohydrate, 7 patients). When it

became clear that the tablets were controlling the blood sugar, diet was increased in the underweight patients. Initially the patients were seen at weekly intervals for clinical assessment, weighing, blood and urine sugar tests, and estimation of blood sulphonamide (method of Bratton and Marshall, 1939). The maintenance dose ranged from 0.5 to 2 g. a day (Fig. 1). Two patients have been treated for seven months, four for six months, and most of the remainder for three months or more.

Results

Diabetic symptoms when present have been relieved and many of the patients claim to have felt better as their blood sugars have come down. No alteration has been observed in the retinitis. The reduction of blood sugar is shown in Fig. 1; with two exceptions the level is now satisfactory. In one of these the dose of BZ 55 (0.5 g. a day) is probably too low; the other patient has a blood sugar of 238 mg. per 100 ml. although she is taking 2 g. of sulphonamide daily. Lack of control in this case is thought to be due to unsatisfactory dieting. Only two patients continue to have glycosuria—one the uncontrolled patient just mentioned, and the other on account of a low renal threshold. BZ 55 was discontinued temporarily in six

TABLE II.—Effect of BZ 55 on Insulin-maintained Diabetics

Case No.	Treatment		Mean F.B.S.	n	t	P	Significance
	BZ	Insulin					
14	Before	80 u. I.Z.S.	136	6	1.94	0.08	—
	On	80 u. I.Z.S.	90	6			
15	Before	44 u. I.Z.S.	320	5	1.70	0.1	—
	On	36 u. I.Z.S.	211	8			
16	Before	84 u. I.Z.S.	274	6	1.54	0.15	—
	On	64 u. I.Z.S.	181	7			

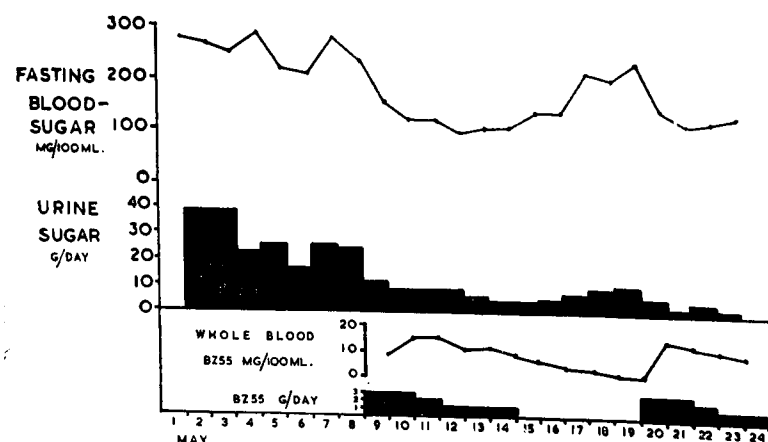


FIG. 3.—Case 1. Height 63 in. (160 cm.), weight 118 lb. (53.5 kg.). Effect on fasting blood sugar of stoppage and subsequent readministration of BZ 55, with concurrent BZ 55 blood levels.

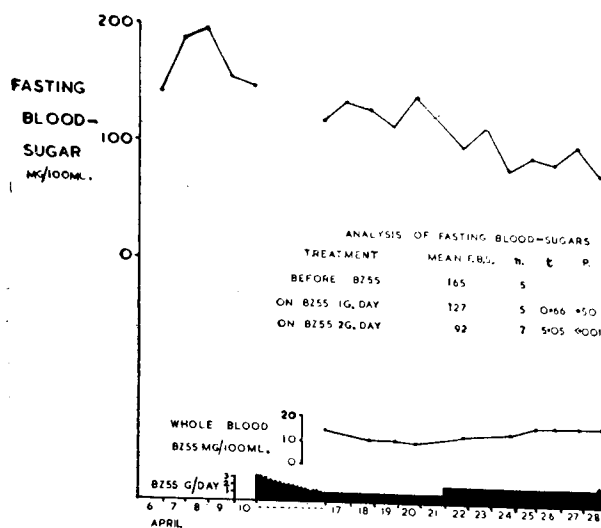


FIG. 4.—Case 3. Effect on fasting blood sugar of doubling the dose of BZ 55, with concurrent BZ 55 blood levels.

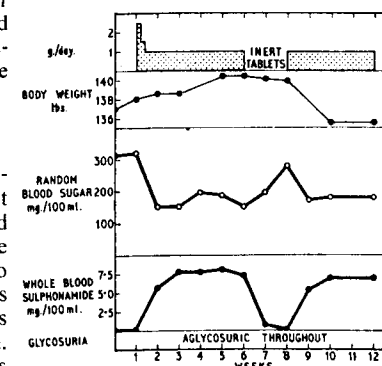


FIG. 2.—Man aged 56. Diabetes 12 years. No insulin. Diet 1,250 calories (92 g. carbohydrate). High renal threshold. Diabetic retinitis. Response to BZ 55 and effect of substituting dummy tablets for two weeks.

patients and permanently in two, and within two weeks the blood sugar rose significantly (Fig. 2).

Eleven of the patients who were underweight before treatment have gained weight, six of the others have lost weight, and the remainder show no significant change. Whole-blood sulphonamide levels in patients taking 1 g. a day have been 5.2–9 mg. per 100 ml. (mean 6.7 mg. per 100 ml.)—expressed as sulphanilamide (to convert to whole-blood BZ 55 this should be multiplied by 1.7). Estimations on bigger doses suggest that the increase of blood level is less than expected and not directly proportional to the dose.

Side-effects.—Treatment had to be stopped after three and four weeks respectively in two cases on account of a widespread irritating rash. In one case there was a mild scaly eruption on the forehead which disappeared despite continued treatment. One patient developed mild hypothyroidism after five months' treatment with 1 g. a day; this has responded satisfactorily to treatment with L-thyroxine.

Discussion

Most middle-aged stable diabetics lose their symptoms if they keep to a low-calorie and restricted carbohydrate diet. In some, however, although the symptoms disappear, glycosuria and hyperglycaemia persist. Preliminary results suggest that in these cases the blood sugar can often be brought down with BZ 55. If the hyperglycaemia is the cause of such complications as retinitis and nephropathy, its control is of great importance to the patient. It will be of considerable benefit if this can be done by oral medication instead of insulin injections, which these patients, in the absence of symptoms, are not unnaturally reluctant to start. If, however, these complications are due to some other metabolic disturbance of the diabetes, there is no certainty that it will be influenced by the hypoglycaemic sulphonamides, and little is gained by prescribing them. Furthermore, it is still not known how these drugs work, and they may well prove to have dangerous toxic properties.

The hypoglycaemic sulphonamides are not "oral insulins" and have no place in the treatment of "insulin-deficient" diabetics. Diet remains the mainstay of treatment for the middle-aged diabetic with any tendency to obesity. The hypoglycaemic sulphonamides would seem to be indicated in only a comparatively small group. Until their value has been proved and their possible hazards more fully explored they cannot be recommended for widespread use.

Summary

A preliminary account is given of the use of a new hypoglycaemic sulphonamide in the treatment of diabetes mellitus.

Twenty-four stable middle-aged diabetics were chosen for treatment. Satisfactory reduction of the blood sugar was obtained in 23, but two had to be taken off the drug on account of a generalized rash.

We wish to thank the staff of the Routine Laboratories of the Courtauld Institute of Biochemistry of the Middlesex Hospital for the blood-sugar and blood sulphonamide estimations; Boots Pure Drug Company, of Nottingham, and Eli Lilly and Company, of Basingstoke, for supplies of BZ 55; and the Clinical Research Committee of the Middlesex Hospital for a personal research grant (to J. D. N. N.).

ADDENDUM.—Since this report was written the one patient who was responding poorly has developed a severe neutropenia. After ten weeks' treatment in which the dose ranged from 1 to 2.5 g. a day (total amount given 123 g.) she was found to have a white-cell count of 2,100 per c.mm. with only 10% polymorphonuclear leucocytes. There was a mild fever at this time which responded to penicillin. She has now been off the tablets for two weeks and the blood count shows 5,700 white cells per c.mm. with 33% neutrophils.

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THE VALUE OF BZ 55 IN CONTROL OF DIABETES

BY

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It has been reported that BZ 55 is capable of controlling the glycosuria of a middle-aged obese diabetic, but that it is ineffective in the young acute thin type of individual, the type which generally requires insulin, without which ketosis is very apt to occur. The obese diabetic in this country is generally treated by dietary restriction alone, and excellent results are commonly obtained as the weight is reduced to the "ideal." Nevertheless, one encounters from time to time the patient who has brought down the weight to the desired level, and who, although often devoid of diabetic symptoms, still shows hyperglycaemia and glycosuria, which eventually calls for the administration of insulin. Such patients would appear to be the type ideal for testing the efficacy of BZ 55. Bertram *et al.* (1955) concluded that success with this preparation was most likely to be obtained in the patient developing diabetes after the age of 45, who had not suffered from the disease for more than 10 years, and who, if treated with insulin, had not taken this for a period exceeding two years.

Accordingly, for the purpose of our investigation into the efficacy of BZ 55 in controlling hyperglycaemia and glycosuria we selected 23 patients who were over 45 years of age at the time of onset of the disease and who were now approximately the "ideal" weight. Of these 23 patients, 12 had formerly been obese (more than 20% above ideal weight), and 9 of these 12 had never received insulin. Another 11 patients had never been overweight, and eight of these had never had insulin. At the start of the trial no patient had ketonuria, but this had been noted at some time previously in seven patients, in three of whom this had been of considerable degree. In addition to these 23 patients, two younger diabetics were included in this study: one, who had recently developed the disease, in the hope that with the use of this preparation insulin might be avoided; the other, an unstable diabetic, to discover whether the insulin requirements might be reduced. The age and sex of the patients and the duration of diabetes are shown in Table I.

TABLE I

Type	Male	Female	Age (Years)	Duration of Diabetes		
				< 1 Year	< 10 Years	> 10 Years
Previously obese	4	8	56–79	3	4	5
Never overweight	4	7	50–70	3	6	2
Young	0	2	19–30	1	1	—

Methods

As many of the patients were devoid of symptoms it was thought unjustifiable to admit these to hospital for the purpose of this investigation, and a large proportion of our cases were studied as out-patients. They were all familiar with their prescribed diet, which provided, in measured quantities, adequate carbohydrate to satisfy their require-

ments. With such a diet the co-operation of patients is usually not difficult to obtain, particularly when they know that they are taking part in a study of this nature. However, for the first two weeks they were given dummy tablets ("A" tablets), and thereafter they had, for a further course of two weeks, tablets of similar appearance but each containing 0.5 g. of BZ 55 ("B" tablets). In each case the initial dose was five tablets, reduced to three on the second day, and thereafter two daily were taken. Blood-sugar estimations were done at noon on the 4th, 7th, 11th, and 14th days of each course. During the last six days of each course, 24-hour collections of urine were made, in each of which the amount of sugar and of creatinine, the latter as a check on the accuracy of the collection, was determined. With in-patients a similar procedure was adopted, but the control period on dummy tablets was restricted to six days, and throughout this time and the subsequent course of B tablets, daily blood-sugar and urine-glucose estimations were carried out.

Results

The results obtained in this trial of BZ 55 have been classified according to the degree of success. Those patients in whom the mean blood sugar at noon was reduced to less than 180 mg. per 100 ml. and who showed marked improvement in the urinary output of glucose were regarded as "successes." When the glycosuria was greatly lessened, although the noon blood sugar was relatively little affected and was above 180 mg. per 100 ml., the result was classified as a "partial success." The results obtained from the study of the 23 patients aged over 45 are summarized in Table II.

TABLE II

Result	No. of Cases	Previous Build		Previously Taking Insulin	Mean Noon Blood Sugar (mg./100 ml.)		Daily Urinary Glucose (g.)	
		Obese	Non-obese		"A" Tabs.	"B" Tabs.	"A" Tabs.	"B" Tabs.
Success	11	4	7	0	230	145	29	5
Partial success	6	5	1	1	276	227	49	12
Failure	6	3	3	6	282	262	48	61

It will be observed that 11 of these patients showed a completely satisfactory response. In some cases this was dramatic, the glycosuria virtually disappearing within 24 hours of the initial dose. It is noteworthy that none of these patients had ever received insulin, although, particularly in the case of the seven who had never exceeded the ideal weight, insulin treatment might well have become necessary.

The response to treatment with BZ 55 of the group classed as "partial success" was unsatisfactory, and, despite the quite appreciable reduction of glycosuria, these cases should probably be regarded as failures. Certainly the blood sugar, even if lowered in some instances, remained at an undesirably high level, and it is significant that four of the six cases showing this type of response are now getting insulin, and this will probably be required by the remaining two. Attention should be drawn to the fact that all of the group of six unquestionable failures had previously received insulin, although half of them had had this for less than two years. Sex and age distribution and duration of diabetes were similar in all three groups, and did not appear to account for differences in response to the drug.

One factor which appeared to militate against a satisfactory response to BZ 55 was the presence of sepsis. One patient who had a severe infection in the urinary tract failed to show any improvement with the drug, but after recovery from this the trial was repeated and the response was found to be excellent, the blood sugar averaging 150 mg. per 100 ml., and glycosuria became minimal. In another case with considerable sepsis of a leg, no response was obtained when BZ 55 was given at an initial trial, but after the sepsis had cleared up the mean blood sugar, with a

subsequent trial, fell from 276 to 204 mg. per 100 ml., and urinary sugar from 22.6 to 7.2 g. a day, and so was classified as a partial success.

A history of severe ketonuria in the past may be of significance. As mentioned above, this had been noted in three patients in this series. All of these failed to show any response to treatment with BZ 55.

The two younger patients to whom BZ 55 was given failed to show any improvement. In one who was a very unstable diabetic the drug did not diminish the insulin requirements. The other patient, a woman aged 30, had been diabetic for only two months, and, having heard of an oral remedy, was opposed to taking insulin; she showed no improvement in either blood-sugar level or urinary glucose output with BZ 55.

In no case was there any manifestation of toxic effects as a result of the administration of BZ 55.

Discussion

The results given above confirm previous reports that BZ 55 is efficacious in controlling the hyperglycaemia and glycosuria in certain diabetic patients. It is important to discover the type of case that might be expected to show a satisfactory response, but it is equally important to know whether the administration of this preparation might be fraught with danger. It has been suggested that observation of blood-sugar levels for four hours after a test dose of 4 g. of BZ 55 will show whether or not a patient is likely to derive benefit from the drug. We have tried this test in a number of patients, but our results have been equivocal, and more experience with the test is necessary before it can be relied on for this purpose. The definition given by Bertram *et al.* (1955) of the type to be considered suitable for treatment with BZ 55 is not quite adequate. Four of our patients who responded well had been diabetic for much longer than 10 years, while three of the failures had received insulin for less than two years. One would agree, however, that it is the older patient, over 45 years of age, who is most likely to respond.

Our results suggest, although the number of our cases is small, that a patient is more likely to benefit if never previously treated with insulin. Patients taking insulin might, of course, be regarded as more severe cases, and their failure to respond to treatment with BZ 55 attributed to this, but Bertram *et al.* (1955) reported that response to the drug was independent of the severity of the disease. The size of dose of insulin does not appear to be a criterion, as we had one patient, previously well controlled with only 16 units of insulin zinc suspension, who rapidly developed ketonuria and heavy glycosuria on stopping this and transferring to BZ 55. Moreover, when insulin is required we have not found that BZ 55, given in addition, has any insulin-sparing effect.

At the present time it appears that this preparation may be of value in the treatment of elderly diabetics who, if they have been obese, still show glycosuria after reduction to "ideal" weight, or those who, although never overweight and have never had ketonuria, are still uncontrolled by diet. It is unsuitable for the younger acute diabetic, who may rapidly develop ketosis if insulin is abandoned in favour of BZ 55.

Summary

A trial of BZ 55 in 25 diabetic patients is reported. In 23 patients, all over age 45 when they developed diabetes, and all approximating to the "ideal" weight, very successful control of hyperglycaemia and glycosuria was obtained in 11. The remaining 12 patients failed to respond satisfactorily. In two younger patients the drug proved completely ineffective.

BZ 55 proved ineffective in two patients while they were suffering from sepsis, but produced considerable effect when this was overcome.

No satisfactory explanation is given for success or failure with this drug, but it is pointed out that all patients in this series who showed no response had previously received insulin.

Ketosis may develop rapidly on the substitution of insulin by BZ 55 in patients who require the former for their control.

We wish to acknowledge our indebtedness and thanks to Mr. A. P. Kenny, of the Biochemical Department, Victoria Infirmary, Glasgow, for undertaking the blood-sugar and urine-sugar estimations, and to British Insulin Manufacturers, who kindly provided us with the A and B tablets.

REFERENCE

Bertram, F., Bendfeldt, E., and Otto, H. (1955). *Dtsch. med. Wschr.* 80, 1455.

A WARNING NOTE

In view of a recent report from America of a small number of cases of severe agranulocytosis and also of several cases of thrombocytopenia in this country, it is the considered opinion of the authors of the papers on BZ 55 appearing in this issue of the "British Medical Journal" that the drug in question should at present be used only under careful hospital supervision.

This view is shared by the majority of those who have had experimental and clinical experience of the use of BZ 55 in this country.

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J. D. N. NABARRO, Middlesex Hospital.

W. G. OAKLEY, King's College Hospital.
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VACCINATION AGAINST WHOOPING-COUGH

RELATION BETWEEN PROTECTION IN CHILDREN AND RESULTS OF LABORATORY TESTS

A REPORT TO THE WHOOPING-COUGH IMMUNIZATION COMMITTEE OF THE MEDICAL RESEARCH COUNCIL AND TO THE MEDICAL OFFICERS OF HEALTH FOR CARDIFF, LEEDS, LEYTON, MANCHESTER, MIDDLESEX, OXFORD, POOLE, TOTTENHAM, WALTHAMSTOW, AND WEMBLEY*

In a previous report (Medical Research Council, 1951) the results were given of a series of controlled trials made to assess the prophylactic value of pertussis vaccine in children 6 to 18 months old. Five batches of vaccine from three different manufacturers were tested. Each batch gave substantial protection, but the two batches supplied by the Michigan Department of Health gave much greater protection than the others.

In 1948, before the previous trials were completed, further field investigations were begun in conjunction with laboratory studies to determine whether the protective effect of vaccines in children could be assessed by a laboratory test. Two series of trials were made—one from October, 1948, to March, 1951, using British vaccines, and the other from early 1951 to mid-1954, using British and American vaccines. The second series was planned not only to give information on the relation between field and laboratory results, but also to determine whether British manufacturers could produce good vaccines by methods similar to those of the Michigan Department of Health and to determine whether a vaccine prepared from culture in liquid medium was as effective as one from culture on solid medium. A description of all the vaccines used in the two series of trials is given in Table I.

INVESTIGATIONS IN THE FIELD

General Plan

The previous trials (M.R.C., 1951) were made on a strictly controlled basis to investigate whether pertussis vaccines were of any value in protecting against the disease. Half the children whose parents volunteered to have them injected were given vaccine and the rest were given injections of an inoculum which looked like pertussis vaccine but which did not contain *Haemophilus pertussis*. This procedure could not be continued after it was known that each of five different batches of vac-

cine used gave substantial protection, and it was decided that in all subsequent trials every child should be given pertussis vaccine, and that the results with one batch of vaccine should be compared with those with other

**Whooping-cough Immunization Committee:* Sir Samuel Bedson, F.R.S. (chairman), Dr. P. Armitage, Dr. W. C. Cockburn, Dr. E. T. Conybeare, Professor R. Cruickshank, Professor A. W. Downie, F.R.S., Professor A. Bradford Hill, F.R.S., Dr. J. O. Irwin, Dr. Pearl Kendrick, Dr. J. Knowelden, Professor J. W. McLeod, F.R.S., Dr. H. J. Parish, Mr. A. F. B. Standfast, Dr. G. S. Wilson, Dr. J. Ungar, Dr. D. G. Evans (secretary).

Medical Officers of Health: Dr. J. Greenwood Wilson and Dr. W. Powell Phillips, Cardiff; Dr. I. G. Davies, Leeds; Dr. A. W. Forrest, Leyton; Dr. C. Metcalfe Brown, Manchester; Dr. A. C. T. Perkins, Middlesex; Dr. J. F. Warin, Oxford; Dr. G. Chesney and Dr. J. Hutton, Poole; Dr. G. Hamilton Hogben, Tottenham; Dr. A. T. W. Powell, Walthamstow; Dr. E. Grundy, Wembley.

Field Workers: Dr. I. A. Bolz and Miss M. R. Elliott, Cardiff; Dr. G. R. Baxter and Mrs. E. R. Beard, Leeds; Dr. A. R. Fox and Miss R. M. Edward, Leyton; Dr. B. J. Griffiths and Miss O. I. Howell, Manchester; Dr. Beryl Anscombe, Dr. A. M.-M. Payne, and Miss C. H. Rudkin, Oxford; Dr. Joan Moignard, Miss M. D. Smith, and Miss W. E. Bennett, Poole; Dr. A. T. W. Powell and Mrs. H. M. Johnston, Walthamstow; Dr. J. C. McDonald, Miss M. M. Wall, and Miss E. E. Wilden, Tottenham and Wembley.

Laboratory diagnostic tests were made by: Dr. G. J. G. King and Mr. E. C. Young, Bournemouth; Dr. J. Marks and Professor Scott Thomson, Cardiff; Dr. H. D. Holt, Mr. G. V. Heimer, and Mr. J. Hollingsworth, Colindale; Professor J. W. McLeod, F.R.S., Dr. D. E. Nicholson, Dr. G. C. Turner, and Miss B. B. Waller, Leeds; Dr. W. W. Walther and Mr. K. R. Podger, Leyton; Dr. Mary O. Adams and Mr. A. G. Harbour, Manchester; Dr. W. H. H. Jebb, Oxford; Dr. F. Marsh, Mr. E. F. Browning, Mr. P. Lovell, and Mr. G. Hoy, Walthamstow.

Laboratory tests for antigenic potency were made by: Mr. A. F. B. Standfast, Lister Institute; Dr. Margaret Pittman, U.S. National Institutes of Health, Bethesda; Dr. Pearl Kendrick and Dr. Grace Eldering, Michigan Department of Health; Dr. A. E. Francis and Mr. H. Proom, Wellcome Research Laboratories; Dr. D. G. Evans and Dr. F. T. Perkins, M.R.C. Laboratories, Hampstead; Dr. J. Ungar, Glaxo Research Laboratories, Dr. Mary O. Adams, Manchester; Dr. Naomi Datta, Colindale.

The field trials were put in train and supervised by Dr. W. C. Cockburn.

The analysis of the field and laboratory results were made and the report prepared by Dr. P. Armitage, Dr. W. C. Cockburn, Dr. D. G. Evans, Dr. J. O. Irwin, Dr. J. Knowelden, and Mr. A. F. B. Standfast.

batches tested at the same time in the same area. There were therefore no unvaccinated control groups, but in some of the trials records were kept of the incidence of pertussis in the siblings of vaccinated children when the vaccinated children and the siblings were known to be exposed to infection by a primary case in the family. This was the main difference between the new and the earlier studies; otherwise the procedure in the field was similar to that described in the 1951 Report.

Children in the 1948-51 trials were allocated to a vaccine group in succession as their names were received. In the 1951-4 trials, when only two vaccines were tested in each area at one time, children born on odd days of the month were allocated to one group and children born on even days to the other. After the injections had been completed, arrangements were made for each child to be visited monthly for about 24 months. Special visits were paid when it was known that a child was being exposed to pertussis or had symptoms which might be those of the early stages of the disease. Swabs were taken from vaccinated children with coughs and also so far as possible from infective cases to which vaccinated children were exposed. The doctors and nurse-investigators visiting children during the follow-up period did not know which vaccine a child had received.

Trials Made Between 1948 and 1951

Seven separate trials were made in six areas—Cardiff, Leyton, Manchester, Oxford, Poole, and Walthamstow; two were made in Manchester and one in each of the other areas. The vaccines used—V1, V2, V3, V3b, V4, V5, V5a, V6, and

V7—were prepared by different methods from the same strains of *H. pertussis* (Table I). In each trial three vaccines were tested in parallel. Vaccines V1, V2, and V3 were tested in Cardiff, Poole, Leyton, and Walthamstow, vaccines V3b, V4, V5a, V5, V6, and V7 in Manchester, and vaccines V2, V3b, and V4 in Oxford.

Children 6-18 months old were given three doses of vaccine intramuscularly with an interval of one month between injections. The first two doses were each 0.5 ml., the third 1 ml., and the total dose, in terms of the U.S.A. opacity standard, was approximately 70,000 million organisms. Consent forms were received from the parents of 11,093 children in all areas; 9,794 (88%) of the children completed the course of three injections.

Reactions and Untoward Sequelae

In the trials with plain suspension vaccines—V1, V2, and V3—940 children, about 20% of the total, were visited 24-48 hours after each injection, and degrees of redness, swelling, and general malaise, and other reactions were estimated. According to the trial area, one-half to one-third of the children had no local or general reaction. Of those who had reactions, all but nine had mild malaise of 24-48 hours or redness or swelling about an inch (2.5 cm.) in diameter. Three of the nine children with more serious reactions had malaise severe enough for them to be kept in bed for 24-48 hours and six had screaming attacks in the evening of the day of injection; between the screaming attacks the children were said to be pale and limp. These episodes were not confined to any one of the three injections; some occurred after the first, some after the second, and some after the third. Three of the nine children were given subsequent injections without ill effect. In the Manchester trial with the alum-precipitated vaccines V3b, V4, and V5a, 194

TABLE I.—Vaccines and Dosage Schedule

Batch No.	Date of Prep.	Medium for Growth	Killing Agent and Concentration	Alum-precipitated or Plain	Preservative and Concentration	Strains of <i>H. pertussis</i>	Other Details of Preparation	No. of Organisms (Millions/ml.)	Dosage Schedule	
									Doses at Monthly Intervals (ml.)	Total Dose in Millions of Organism
V1	Sept., 1948	BG with horse blood	Formalin 0.5%	Plain	Phenol 0.5%	2128	48-hr. growth	35,000	0.5, 0.5, 1	70,000
V2	" "	" "	" "	" "	" "	2128	Similar method to V1	35,000	0.5, 0.5, 1	70,000
V3	" "	" "	" "	" "	Thiomersalate 0.01%	2128	24-hr. growth	35,000	0.5, 0.5, 1	70,000
V3b	" "	" "	" "	Alum pptd.	" "	2128	Same batch as V3 but alum pptd.	35,000	0.5, 0.5, 1	70,000
V4	July, 1948	Cohen and Wheeler	" "	" "	" "	2128	Whole fluid from 20-hr. growth; culture shaken	35,000	0.5, 0.5, 1	70,000
V5	April, 1949	BG with horse blood	" "	" "	Phenol 0.5%	2128	Same method as for V1 but alum pptd.	35,000	0.5, 0.5, 1	70,000
V5a	Oct., 1948	" "	" "	" "	" "	2128	" "	35,000	0.5, 0.5, 1	70,000
V6	April, 1949	" "	" "	" "	Thiomersalate 0.01%	2128	Same method as for V3 but alum pptd.	35,000	0.5, 0.5, 1	70,000
V7	Mar., 1949	Cohen and Wheeler	" "	" "	" "	2128	Same method as for V4	35,000	0.5, 0.5, 1	70,000
V8	Dec., 1949	BG with sheep blood	Thiomersalate 0.01%	Plain	" "	18925; 16945; 10536; 18334	Michigan method	20,000	1 1 1	60,000
V9	June, 1950	" "	" "	" "	" "	83E; 252; L46; C26573; 2891; 2893	" "	20,000	1 1 1	60,000
V10	Nov., 1950	" "	" "	" "	" "	83E; 252; L46; C26573; 2891; 2893	" "	20,000	1 1 1	60,000
V11	Aug., 1950	Cohen and Wheeler	" "	" "	" "	18925; 16945; 10536; 18334	Whole fluid from 72-hr. growth; culture not shaken	30,000	1 1 1	90,000
V12	Sept., 1951	BG with human blood	Thiomersalate 0.02%	" "	Thiomersalate 0.013%	293; 324; 360; 357; 358; 332; 343	Michigan method but with human blood in BG	20,000	1 1 1	60,000

BG = Bordet-Gengou medium.

TABLE II.—1948-51 Trials. Similarity of Groups

	Areas and Vaccines											
	Cardiff, Poole, Leyton, Walthamstow			Manchester			Manchester			Oxford		
	V1	V2	V3	V3b	V4	V5a	V5	V6	V7	V2	V3b	V4
No. of children followed up	1,709	1,701	1,648	910	943	941	414	396	417	230	241	244
Percentage of males	50	50	51	52	51	51	54	54	51	53	55	54
Average age (months)	13	13	13	15	15	14	15	15	15	14	14	14
Average duration of observation per child (months)	20	20	20	27	27	27	23	23	22	25	25	25
Infectious diseases* during follow-up	644	584	629	483	528	492	161	139	151	71	126	84
Total No. of illnesses	0.38	0.34	0.38	0.53	0.56	0.52	0.39	0.35	0.36	0.31	0.52	0.34
Average No. of illnesses per child	0.93	0.93	0.98	0.76	0.84	0.77	0.89	0.85	0.90	0.99	1.15	0.98
Average No. of other children per household under 14 years of age												

* Measles, chicken-pox, mumps, rubella.

children, 7% of those followed up, were similarly visited after each injection. One severe reaction was noted, in a child who developed extensive redness and swelling after the third injection.

Particular attention was paid to the occurrence of convulsions in all children vaccinated in all areas. Four children had convulsions within 72 hours after an injection. One of these children was given a subsequent injection without ill effect. None of the children showed evidence of permanent cerebral damage.

None of the children developed poliomyelitis within four weeks after injection.

Similarity of Groups

To determine whether the vaccine groups in each trial were essentially alike certain attributes were examined.

TABLE III.—1948-51 Trials. Number of Cases of Pertussis and Attack Rates per 1,000 Child-months of Observation

Area	Vaccine	No. Followed Up	Duration of Observation (Child-months)	Cases of Pertussis	Attack Rate per 1,000 Child-months
Cardiff, Poole, Leyton, Walthamstow	V1	1,709	34,850	247	7.1
	V2	1,701	34,359	276	8.0
	V3	1,648	33,234	190	5.7
Manchester	V3b	910	25,002	101	4.0
	V4	943	25,692	164	6.4
	V5a	941	25,667	112	4.4
	V5	414	9,420	35	3.7
	V6	396	9,003	36	4.0
Oxford	V7	417	9,304	37	4.0
	V2	230	5,741	55	9.6
	V3b	241	6,023	28	4.6
	V4	244	6,143	44	7.2
Totals		9,794	224,438	1,325	5.9

TABLE IV.—1948-51 Trials. Number of Cases of Pertussis and Percentage Attack Rates by Type of Exposure

Area	Vaccine	Home Exposures			Other Exposures			No. of Cases After No Known Exposure	Total Cases
		No. of Exposures	No. of Cases	Attack Rate (%)	No. of Exposures	No. of Cases	Attack Rate (%)		
Cardiff, Poole, Leyton, Walthamstow	V1	93	73	78	197	62	31	112	247
	V2	88	75	85	203	57	28	144	276
	V3	109	66	61	216	46	21	78	190
Manchester	V3b	47	28	60	178	31	17	42	101
	V4	54	42	78	184	51	28	71	164
	V5a	51	31	61	190	35	18	46	112
	V5	18	11	61	44	10	23	14	35
	V6	21	12	57	40	10	25	14	36
Oxford	V7	16	9	56	42	11	26	17	37
	V2	14	14	100	51	13	25	28	55
	V3b	18	7	39	70	6	9	15	28
	V4	18	11	61	76	10	13	23	44
Totals		547	379	69	1,491	342	23	604	1,325

Table II records the results of the tests for similarity; it is clear that with each set of three vaccines the groups were similar.

Incidence of Pertussis

The results of all trials are given in Tables III and IV. Altogether 1,325 cases of pertussis were diagnosed, and in 68% the diagnosis was confirmed bacteriologically. By all three methods of comparing the vaccines—the attack rate per 1,000 child-months (Table III) and the percentage attack rates for “home exposures” and “other exposures” (Table IV)—no striking differences in protective effect were seen. Some slight differences did, however, exist, and these are referred to later.

Since there were no unvaccinated control groups in these trials, an absolute estimate of the value of the vaccines could not strictly be made. In the previous trials (M.R.C., 1951) the attack rate in “home exposures” in the unvaccinated control groups was 87%. Similar high attack rates in susceptible children exposed in their own homes have been reported by others (Wheeler, 1936; Kendrick and Eldering, 1939; Court *et al.*, 1953). In the present study, taking all vaccines together, 547 children were exposed in their own homes; of these, 379 (69%) developed the disease. This attack rate is much nearer the 87% in the unvaccinated than the 18% in the vaccinated groups in the previous study. Furthermore, only one vaccine, V3b in the Oxford trial, gave a home exposure attack rate of less than 50%, and this was based on only 18 home exposures (Table IV). All the vaccines in this new series of trials were therefore poor.

Trials Made Between 1951 and 1954

11 trials were made in this series, in Cardiff, Leeds, Manchester, Oxford, Poole, Tottenham, and Wembley (Tottenham and Wembley were considered as a combined area). The Michigan Department of Health provided a vaccine—V8—in

sufficient quantity for it to be used as a reference vaccine against which the other vaccines could be compared. In each trial half the children were given the reference vaccine V8 and the remainder were given either one of three British vaccines—V9, V10, or V12—made by methods similar to those used by the Michigan Department of Health, or vaccine V11, which was prepared by the State of New York Department of Health from liquid medium culture (Cohen and Wheeler, 1946) using the same strains of *H. pertussis* as were used in the preparation of V8 (Table I). In each area except Oxford, two trials were made. Each vaccine except V9 was tested in parallel against V8 in two areas; V9 was tested against V8 in all areas except Oxford (Table V).

In all the areas the parents of 36,811 children 6 months to 3 years old agreed to have them vaccinated. Three intramuscular or subcutaneous injections were given at monthly intervals. Each dose was 1 ml., and the total dose consisted of 60,000 million organisms (U.S.A. opacity standard). Because of reports that convulsions might occasionally occur after pertussis vaccine, particularly in children with a personal or family history of convulsions or epilepsy, children with such a history were not vaccinated, and on account of this 1,601 children were not accepted. In addition, 2,108 children failed to arrive at the clinics for the first injections. Of the 33,102 who had their first injection, 31,557 (95%) completed the course.

When the trials began it was not known how many children might be presented for vaccination, as vaccination was becoming popular in the trial areas, and hence there was some difficulty in deciding whether all or only a portion of the children could be followed up. At first it was thought that it might suffice to follow only vaccinated children in families where there was also an unvaccinated child with no history of pertussis, such potential “home exposure” families being the ones from which it was known by experience that the most accurate information could be obtained. However, the proportion of children from such families was not more than 10%, and to avoid jeopardizing the studies by having too few children under observation it was decided to increase the numbers taken into the follow-up. After the first few weeks of the trial, approximately all the children were followed up in Cardiff, Oxford, Poole, Tottenham, and Wembley, and approximately half the children in Leeds and Manchester. The total number of children followed up was 19,005. In the areas where half the children were followed up, every second child presented for vaccination was chosen, and the others, though not followed up, were given a full course of vaccine.

Reactions and Untoward Sequelae

Local and General

One child in five from the follow-up groups was visited 48 hours after each injection to determine the incidence of local and general reactions. Children chosen for visiting after the first injection were also visited after the second and third injections. Nearly 10,500 visits were made. There was considerable variation in recording between areas, pre-

sumably due to observer differences, but very little difference within areas between vaccines and between the first, second, and third dose. Redness more than 2 in. (5 cm.) in diameter was noted on 6% of visits (not of children) and the child appeared “obviously disturbed by the tenderness” on 0.4% of visits. Other reactions noted were that three children were kept in bed for more than 24 hours, 99 vomited once or oftener within 48 hours after an injection, and 72 were described as “fretful,” “didn’t sleep,” or “had lost their appetites.” Local and general reactions were therefore not serious.

Convulsions

As in the 1948-51 series of trials, special notes were kept of children who developed convulsions after vaccination. Children not in the follow-up were visited after the first and second injections if they failed to return to the clinic for the next injection, and convulsions in these children were recorded if they occurred. The children not in the follow-up, however, were not visited after the third injection. All children known to have had convulsions, whether or not in the follow-up group, were visited at intervals until May, 1955.

A report by Byers and Moll (1948) indicated that in cases of encephalopathy associated with vaccination the first convulsion occurred within 72 hours after an injection. In this series of trials eight children had their first recorded convulsion within 72 hours after one of the three injections. It is impossible to say whether or not the number of cases observed was greater or less than might be expected to occur by chance in this period. Thirty-four children had their first recorded convulsion 4 to 28 days after injection. There is no reason to consider their convulsions were precipitated by the vaccine. Of them, 11 (32%) had more than one convulsion during the period of observation. Of the eight children who had convulsions within 72 hours after injection, three (38%) had more than one attack. The proportions of the two groups are similar and, though based on small numbers, suggest that serious cerebral damage, as manifested by repeated convulsions, did not occur as a result of the injections. None of the children with repeated convulsions showed evidence of gross cerebral damage such as was noted by Byers and Moll, but one child had five convulsions during the period of observation and two had four. These three children had their initial convulsions 12, 17, and 20 days after injection.

In over 30,000 vaccinated children, therefore, there was no definite evidence that convulsions or encephalopathy were directly related to vaccination. As previously stated, children with a personal or family history (the family for the purpose was taken to include only father, mother, sisters, and brothers) of convulsions, epilepsy, hydrocephalus, mental defect, or similar conditions were not accepted in the trial. In addition, children were not injected within a month after attacks of measles, mumps, influenza, chicken-pox, and similar diseases, or smallpox vaccination. These precautions may account for the freedom from cerebral accidents, but it may also be that the risk of

TABLE V.—1951-4 Trials. Similarity of Groups

	Areas and Vaccines							
	All Except Oxford		Leeds, Tottenham, Wembley		Oxford, Poole		Cardiff, Manchester	
	V8	V9	V8	V10	V8	V11	V8	V12
No. of children followed up	3,342	2,975	2,397	2,311	1,254	1,195	2,835	2,696
Percentage of males	51	51	51	54	52	49	53	52
Average age (months)	22	21	18	18	15	16	17	17
Average duration of observation per child (months)	25	25	22	22	22	23	22	22
Infectious diseases* during follow-up	892	795	372	392	108	115	545	501
Total No. of illnesses	0.27	0.27	0.16	0.17	0.09	0.10	0.19	0.19
Average No. of illnesses per child								
Percentage of children with previous history of measles	18	20	8	8	4	5	10	9
Average No. of other children per household under 14 years of age	1.1	1.2	0.92	0.93	0.83	0.92	1.2	1.2

* Measles, chicken-pox, mumps, rubella.

are given in the last two columns of Table 1X.

It should be emphasized that these relative potencies are properties of the vaccines when tested at the same time. For example, V8 is shown as being about seven times as potent as G61. When these two vaccines were tested together, however, V8 was new and G61 was some two to three years old. If each vaccine gradually deteriorated it may be that V8, when new, had about the same potency as G61 when new. In the absence of a standard vaccine known to be stable, the possible deterioration of these vaccines cannot be measured with certainty. However, for almost every vaccine which was tested over a period of more than a year, the ImD_{50} values showed a gradual trend upwards. On the average, this was equal to about 0.2 logarithmic unit a year, equivalent to a loss of potency of 40% per annum. This trend may have been due to a gradual change in the test conditions or to a real deterioration of the vaccines, or both. When comparing the mouse-protection results with those of the field, it has been assumed that the trend was due entirely to deterioration of the vaccines.

The Mouse-Agglutination-Production Test

A number of vaccines were also tested for their ability to produce agglutinin in mice, using the method described by Evans and Perkins (1953, 1954). Groups of mice were given two spaced injections of vaccine separated by an interval of 14 days, and the geometric mean agglutinin titre of the sera was determined 10 days after the second dose. Since the method was introduced late during the field studies, it was not possible to test all vaccines extensively. However, 13 vaccines were tested—one from the previous trials and 12 from the new series. With each vaccine the agglutinin response to a total dose of 10×10^9 organisms was determined, and in the case of five of the vaccines the response to two additional smaller doses, 2.5×10^9 and 0.625×10^9 , was also obtained. Each vaccine was tested in parallel with a reference vaccine which gave only a slight variation in response in the different tests. The detailed results have already been reported (Evans and Perkins, 1953, 1954).

A rough comparison of the vaccines may be made from the results shown in Table XII, in which the response obtained with each of the 13 vaccines to a total dose of 10×10^9 organisms is given.

Production of Agglutinin in Children

Tests were made with 13 of the vaccines to determine their ability to produce specific agglutinin in children. Two independent studies were made. In the first, tests were made by Dr. Mary O. Adams on the sera of children immunized with vaccines V1 to V8 and V12. These sera were taken from children aged 6 to 18 months 2 to 10 months after their third inoculation, and the titrations were made using as antigen a suspension of living *H. pertussis* according to the method described by Evans and Adams (1952). In the second study the tests were made by Dr. Naomi Datta on the sera of children immunized with vaccines V8, V10, V11, and V12. These sera were from 2- to 5-year-old children, and were taken 6 to 10 weeks after the third dose of vaccine. The titrations were made by a method similar to that used by Dr. Adams, except that a killed suspension of *H. pertussis* was used as antigen. Similar results were obtained by both

workers in testing sera from children immunized with vaccines V8 and V12; more than 90% of the sera with these two vaccines gave titres of 16 or more in both studies. It was therefore considered justifiable to compare the vaccines by grouping the results of all the tests in spite of the fact that the tests had not all been made by a standard method (Table X).

TABLE X.—Comparison of Vaccines by the Agglutinin Response in Children

Vaccine	No. of Sera Tested	Sera with Titre of 16 or More		Geometric Mean Titre
		No.	%	
V1	55	2	3.6	4
V2	61	1	1.6	4
V3	52	2	3.8	4
V3b	45	5	11.1	6
V4	39	3	7.7	7
V5	9	0	0.0	4
V5a	30	7	23.3	12
V6	10	1	10.0	5
V7	9	1	11.1	5
V8	267	251	94.0	211
V10	81	73	90.2	208
V11	60	58	96.7	291
V12	126	120	95.2	279

COMPARISON OF FIELD AND LABORATORY TESTS**Field Trials and Mouse-Protection Tests**

A comparison of the prophylactic effect of vaccines in the field is most safely made when the vaccines are tested at the same time in the same centres, otherwise the comparison may be distorted by changes in the field conditions or deterioration of the vaccines. These strict comparisons, made on the home-exposure attack rate for reasons given in the first section of this report, are presented in Table XI alongside the corresponding potencies estimated in the laboratory. Differences in either field or laboratory results which are significant at the 0.05 level of probability are also indicated.

Though field and mouse-protection test results occasionally put vaccines in different orders of potency, there are no definite contradictions; on no occasion was a significant

TABLE XI.—Comparisons of Field and Mouse-protection Results for Vaccines Tested in the Field at the Same Time and in the Same Centre

Vaccine	Results of Field Trials				Results of Mouse-protection Tests	
	Centres	Home Exposures		Significant Differences	Potency in Terms of G61 by Mouse-protection Test	Significant Differences
		Cases/Exposures	Attack Rate (%)			
Group 1: D231 O87860 G174 G61	Manchester*	2/20 8/36	10 22	None	3.93 2.00	None
	Leeds*	7/29 7/23	24 30	None	0.11 1.00	G61 better than G174
Group 2: V3 V1 V2	Cardiff, Poole, Levton, Walthamstow	66/109 73/93 75/88	61 78 85	V3 better than either V1 or V2	0.46 0.15 0.03	V3 better than V1 V1 better than F2
	Manchester	28/47 31/51 42/54	60 61 78	V3b and V5a pooled better than V4	0.90 0.69 1.07	None
	Oxford	7/18 11/18 14/14	39 61 100	V3b and V4 both better than V2	0.90 1.07 0.03	V3b and V4 both better than V2
	Manchester	9/16 12/21 11/18	56 57 61	None	1.03 0.80 0.34	None
Group 3: V9 V8	All areas except Oxford	17/132 24/172	13 14		9.08 7.10	
	Leeds, Tottenham, Wembley	17/84 25/85	20 29	"	7.10 3.82	"
	Oxford, Poole	2/52 3/58	4 5	"	10.55 7.10	V8 better than V10
	Cardiff, Manchester	9/104 15/114	9 13	"	8.47 7.10	None
						"

* These vaccines were not used at the same time, but a large part of the subsequent follow-up periods overlapped.

difference found in one direction in the field and in the opposite direction by the mouse-protection test. Furthermore, in certain comparisons, both field and mouse-protection test results gave significant differences in the same direction. These were: (a) that V3 was better than both V1 and V2, and (b) that both V3b and V4 were better than V2.

The results of Table XI may be supplemented by a rather less rigorous comparison of the field and mouse-protection test results for all vaccines. Table XII shows, for each vac-

TABLE XII.—Comparison Between Results of Field Trials and Laboratory Tests

Vaccine	Results of Field Trials			Results of Laboratory Tests			
	Mean Year* of Inoculation in Children	Home Exposures		Potency by Mouse-protection Test in Terms of G61 in 1947.0		Mean Agglutinin Titre	
		Cases/Exp.	Attack Rate (%)	Log Ratio	Ratio	In Mice	In Children
V11	1952.3	2/52	4	-0.04	0.91	1,259	291
D231	1947.4	3/41	7	0.51	3.24	1,125	NT
V12	1952.4	9/104	9	-0.15	0.71	1,990	279
V9	1951.5	17/132	13	0.06	1.15	2,820	NT
V8	1952.0	59/428	14	-0.15	0.71	708	211
O87860	1947.1	8/36	22	0.28	1.91	NT	NT
V10	1952.2	25/85	29	-0.48	0.33	644	200
G61	1947.5	7/23	30	-0.10	0.79	NT	NT
G174	1948.7	14/47	30	-1.28	0.05	"	"
V3b	1949.0	35/65	54	-0.44	0.36	"	"
V7	1949.5	9/16	56	-0.49	0.32	16	5
V6	1949.5	12/21	57	-0.60	0.25	49	5
V3	1949.5	66/109	61	-0.89	0.13	13	4
V5	1949.5	11/18	61	-0.98	0.10	14	4
V5a	1949.0	31/51	61	-0.56	0.28	NT	12
V4	1949.0	53/72	74	-0.37	0.43	17	7
V1	1949.5	73/93	78	-1.33	0.05	15	4
V2	1949.5	89/102	87	-2.00	0.01	10	4

* 1952.3 means 0.3 of the way through 1952, and so on.
NT=Not tested.

cine; (a) the home-exposure attack rate for all children inoculated with that vaccine, and (b) the estimated potency-ratio by the mouse-protection test of the vaccine, at about the middle of the period during which it was used in the field, in comparison with the potency of G61 at the beginning of 1947. The assumption has been made here that each vaccine deteriorated at a rate of 0.2 log unit of potency each year. Thus vaccine V5a was used during a period centred at about the beginning of 1949. Its log-potency-ratio in comparison with G61 when tested simultaneously is given in Table IX as -0.159. We assume that G61 declined in potency by 0.2 log unit during each of the years 1947 and 1948. Then the log-potency-ratio of V5a at the beginning of 1949, in terms of G61 at the beginning of 1947, will be estimated at $-0.159 - 2(0.2) = -0.56$.

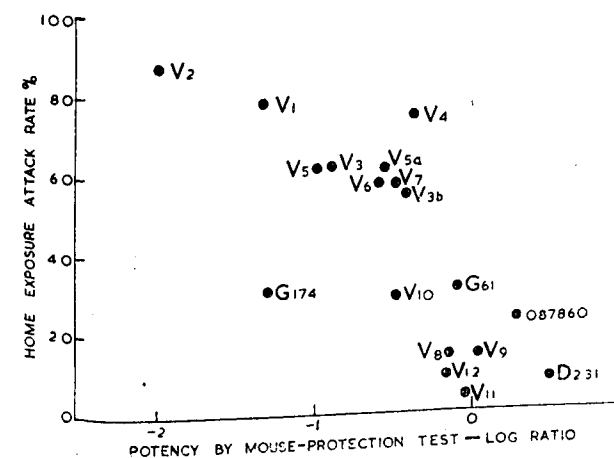


Chart showing the relationship, with 18 pertussis vaccines, between home exposure attack rate in the field and potency as estimated by the mouse-protection test.

The relationship between the home-exposure attack rates and the potency-ratios, estimated by the mouse-protection test, is shown in the Chart. There appears to be good correlation. In interpreting these results it should be remembered that both the attack rates and the potencies are subject to sampling errors which may have exaggerated or detracted from the true correlation, that attack rates are possibly subject to variations from one area or one period of time to another, and that the assumptions that the vaccines deteriorate at a constant rate of 0.2 log unit a year may be invalid. However, as the second column of Table XII shows, the different vaccines within each of the three groups were used in the field over fairly short periods of time. Consequently, a false assumption about the rate of deterioration would affect principally the relative potencies between the three groups rather than those within the groups. Even when attention is restricted to fluctuations within the three groups of vaccines, the correlation between the home-exposure attack rate and the potency-ratio is still significant. These results suggest that the mouse-protection test is of some value in predicting field results.

Field Trials and Agglutinin Tests

Table XII also shows for a number of vaccines the relationship between (a) the home exposure attack rate, (b) the agglutinin produced in mice to a dose of 10×10^9 organisms, and (c) the agglutinin produced in children to their course of immunization. It is evident that there is a close correlation between the production of agglutinin in mice and in children; of the 11 vaccines tested by both methods, 7 gave a poor response and 4 a decidedly higher response in both cases.

It is also evident that there is a general correlation between protection in the field and agglutinin response. Six vaccines which showed substantial protection each gave a good agglutinin response in mice, and four of these also gave a good response when tested in children. On the other hand, nine vaccines which showed poor protection each gave a poor agglutinin response in children, and seven of these also gave a poor response when tested in mice.

CONCLUSIONS

Two series of field trials were made in which 28,799 children were followed up for an average of two years after inoculation with pertussis vaccines. Severe local or general reactions were not encountered and there was insufficient evidence to show that pertussis vaccine precipitated repeated convulsions or initiated serious cerebral damage. In three cases of poliomyelitis which occurred within 28 days after injections, the site of paralysis was confined to the injected limb.

Fourteen batches of vaccine were used; their protective effect was assessed mainly on the basis of home-exposure attack rates. The nine batches of vaccine used in the first series of trials were poor, but the five batches used in the second series gave substantial protection.

As is shown in Table I, the vaccines in the first series were all made from the same strain of *H. pertussis*. They were prepared from 24- or 48-hour cultures on Bordet-Gengou medium containing horse blood or from culture in liquid medium. In all of them formalin was used as the killing agent, but some were preserved with phenol and others with thiomersalate. Between initial isolation and use in the vaccines, the strain had been repeatedly subcultured in the laboratory. The vaccines in the second series were made from a mixture of four, six, or seven freshly isolated strains which had been subcultured on very few occasions before being freeze-dried. Three vaccines were made using Bordet-Gengou medium containing sheep's blood, one using Bordet-Gengou medium containing human blood, and one using liquid medium. All were killed, and preserved with thiomersalate.

It is clear that the vaccines in the first series differed in many ways from those in the second series, but it is not

possible to say which of the differences were responsible for the widely divergent results.

The field studies showed that in the second series three vaccines (V9, V10, and V12) made in this country from strains of *H. pertussis* isolated here were as effective as the reference vaccine (V8) made with American strains and supplied by the Michigan Department of Health, and that the vaccine prepared by the State of New York Department of Health (V11) from the same American strains as the reference vaccine, but grown in liquid medium, was, in a preliminary trial, also as effective as the reference vaccine.

At the same time as the field trials were in progress, laboratory tests were made in which the vaccines were extensively tested for their ability to protect mice against intracerebral pertussis infection. Some of the vaccines were tested for their ability to produce agglutinin in mice, and sera from a number of vaccinated children were titrated for agglutinin.

There was a correlation between protection in children and three laboratory tests: (a) protection of mice against intracerebral infection with *H. pertussis*, (b) production of specific agglutinin in mice, and (c) production of specific agglutinin in children. Though the three laboratory tests gave results parallel with those obtained in the field, it does not necessarily follow that the laboratory tests measure directly the factor or factors responsible for the production of immunity in children. Pillemer and his colleagues (1954) have prepared from *H. pertussis* an antigenic fraction which protects mice against intracerebral infection, but which produces a very poor agglutinin response in mice (Evans and Perkins, 1955). The protective potency of this fraction in children is being tested at present in Liverpool and preliminary results suggest that it is giving protection. The mouse-agglutinin-production test therefore may not be a reliable guide to the value of all vaccines in children. Agglutinin production in children has been accepted by some workers as evidence of protective potency, and the tests reported here support this conclusion. Production of agglutinin, however, is only one of the properties of *H. pertussis* and may be different from, and not always run parallel with, protective potency. In any event it would scarcely be practicable to estimate the agglutinin response in children before each batch of vaccine produced commercially was issued for general use.

Of the three laboratory tests, therefore, the mouse intracerebral challenge test is considered, on the basis of present evidence, as the most satisfactory. It is correlated with protection in children, and in mice it measures protection from infection with a virulent strain of *H. pertussis*. A British standard pertussis vaccine has been established in terms of which the potency of other vaccines may be assayed by means of comparative tests. The standard has been prepared from vaccine V12 (Table I), which gave substantial protection in the field, by freeze-drying in 6% dextran. No instability has been detected in the dried standard, and its use in comparative tests will be the subject of a separate communication (Armitage and Perry, 1956).

In view of these results it would seem wise before the issue of a vaccine for use in children to submit it to the mouse intracerebral protection test to ensure that it has an adequate potency in relation to the British standard vaccine. It is also clear that a vaccine need not necessarily be made by the Michigan method; the results of the present trials show that one produced from cultures made in a liquid medium can give equally good results.

SUMMARY

In two series of field trials, 14 pertussis vaccines were tested for their protective potency in 28,799 children. The vaccines used in the first series of trials were poor, but those in the second series gave substantial protection, which was maintained for at least two and half to three years after vaccination.

At the same time as the field trials were in progress, laboratory tests were made in which the vaccines were tested for their ability to protect mice against intracerebral pertussis infection. Some of the vaccines were also tested for their ability to produce specific agglutinin in mice and in children.

A comparison between the field and laboratory results showed some correlation between the potency of vaccines in protecting children and their ability to protect mice against intracerebral infection. There was also evidence of a correlation between protection in children and ability to produce agglutinin in both mice and children.

It is concluded that in future only those pertussis vaccines which have been shown, by the intracerebral mouse-protection test, to have an adequate potency in relation to the British standard pertussis vaccine should be issued for use in children.

The Whooping-cough Immunization Committee of the Medical Research Council and the medical officers of health in the areas where the trials were made are grateful to the parents who consented to have their children injected. They wish to thank Glaxo Research Laboratories, the Lister Institute of Preventive Medicine, the Michigan Department of Health, the State of New York Department of Health, and the Wellcome Research Laboratories for the free supply of the pertussis vaccines, and the World Health Organization for its interest and for some financial help towards the cost of the second series of trials. They particularly wish to record their indebtedness to Dr. Pearl Kendrick, corresponding member of the Committee, who gave help and advice on the preparation of the vaccines during visits to this country and also by correspondence. The vaccine for the preparation of the British standard pertussis vaccine was generously provided by Glaxo Laboratories.

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Medical Memorandum

Repeated Delayed Splenic Bleeding Into the Lesser Sac

Spontaneous rupture of a normal spleen is a rare occurrence, and only about 100 cases have been reported in the world's literature. The case described below appears to be the first recorded instance where haemorrhage took place almost entirely into the lesser sac of the peritoneum, and is the first example of spontaneous splenic rupture in a case of arterial hypertension.

CASE REPORT

A woman aged 29 was admitted to hospital on April 14, 1951. Two days previously she had been discharged from another hospital, having had an operation there about six weeks before "for bleeding from a mesenteric vessel." On the day of admission she took a laxative for constipation, after which generalized abdominal pain and vomiting began and continued up to the time she was examined (3 p.m.). On direct questioning she admitted that about 24 hours

previously she had had left shoulder-tip pain which had continued for several hours, but it had disappeared at the time of examination. She felt very weak. She said she had some "heart trouble," but that her symptoms of that complaint, chiefly headaches, had been much less noticeable during the past few weeks. Her last menstrual period was in February, 1951. No other symptoms were present. Her doctor sent her to hospital with a diagnosis of ? ruptured ectopic gestation, ? internal haemorrhage.

Two previous pregnancies were normal. She had had occasional bouts of epistaxis, heavy menstrual periods, and excessive bleeding following dental extractions. The previous hospital admission had been advised because of symptoms similar to those presenting now. In addition, whilst an in-patient there, about two weeks previously, she experienced a bout of abdominal pain and vomiting lasting a day or so, which was diagnosed as "gastritis." Her mother had died at 36 years of age from "a stroke."

The patient was a thin, pale woman, anaemic and shocked. The pulse rate was 130 a minute, temperature 97° F. (36.1° C.), respiratory rate 20, blood pressure 90/? mm. Hg. Examination revealed no gross cardiac enlargement; an apical systolic murmur was present. The lungs were normal. In the abdomen, distension was obvious. A healed scar extended from the pubis to half-way between the xiphoid and umbilicus. There was no rigidity, but generalized tenderness was found. Peristalsis was absent. Vaginal examination revealed no abnormality. Later, under general anaesthesia, a mass was palpable in the epigastrium. It was dull, and the dullness was continuous with liver dullness. A provisional diagnosis of intraperitoneal haemorrhage ? due to leaking splenic aneurysm was made.

After resuscitation, operation was undertaken on April 15. Through a midline epigastric incision the mass previously felt was seen to be the stomach pushed forward by a lesser sac full of old blood clot. There was unclotted blood in the greater sac. The spleen was adherent to the diaphragm and not easily mobilized, and it was removed; the splenic vessels had previously been ligated in continuity proximally, lest the site of section be placed distal to a ruptured aneurysm of the splenic artery. The abdomen was closed in layers and a stab drain inserted.

With the spleen were two splenuli and the tail of the pancreas. The weight of the total specimen was 450 g. Most of the upper half of the organ was occupied by old blood clot, which had disorganized the pulp. There was a tear in the capsule on the diaphragmatic surface of the spleen, but no large subcapsular haematoma otherwise. The haematoma surrounded the pedicle. No aneurysm was found. The splenic vein was thrombosed.

Convalescence was protracted owing to the development of a *Staphylococcus aureus* coagulase-positive bacteraemia, which was finally controlled with chlortetracycline. On discharge her blood pressure was 195/140 mm. Hg.

On August 11 she was readmitted because of intractable vomiting. She stated that polyuria and polydipsia had appeared since the operation. She died on September 17.

Post-mortem examination (Dr. E. Milford Ward): Tuberculous meningitis, without evidence of tuberculosis elsewhere, was found. Heart: marked hypertrophy of the left ventricle. Both kidneys were reduced in size. The capsules stripped with difficulty and the surfaces were coarsely scarred. Histologically they showed the picture of chronic non-suppurative pyelonephritis.

COMMENT

This was an interesting clinical problem of diagnosis. Common causes of severe anaemia (Hb 29%) in a female are nutritional, or due to bleeding from the genito-urinary or gastro-intestinal tracts. Other possibilities considered here were splenic infarction from subacute bacterial endocarditis, and polyarteritis nodosa acuta. But no other signs

of endocarditis were present, and muscle biopsy done at laparotomy was negative.

The presence of essential hypertension favoured the possibility of an arterial source of bleeding, such as a leaking aneurysm. Chevallier and Bernard (1944) have shown that vascular arterial lesions are the second commonest cause of haemoperitoneum in women, although occurring 25% less often than in men. It is rare to make a correct pre-operative diagnosis. Of 41 cases previously reported, only 2 were accurately diagnosed.

The occurrence of this case completes the possible anatomic-pathological picture of haemorrhage from the spleen. Recalling the fact that this organ lies in relation to two peritoneal lined cavities, and that a postero-lateral relationship to the kidney brings it into contact with an extra-peritoneal area, there are three possible ways in which symptoms and signs may present: (1) the commonest is bleeding into the greater sac, diagnosis often being confused with other causes of peritoneal irritation; (2) the next most frequent one is rupture into the lesser and greater sacs, a pancreatic lesion being most often diagnosed; and (3) the rarest is extraperitoneal extension into the loin, where a renal lesion is usually suspected. The present case is the first in which major and repeated bleeding took place into the lesser sac.

In several cases of normal spleens undergoing rupture a predisposing cause has been found. Undue mobility due to absence of the phrenico-colic ligament is said to occur in 2% of subjects (Susman, 1927). A vascular abnormality confined to the spleen—namely, angioma—has been once reported (Mondor and Boutron, 1938), but such a spleen is not truly "normal." Various alterations in contour with partial deficiency have also been found, but rupture did not always take place at the site of abnormality. It was impossible to discover a predisposing cause in this case.

The commonest event initiating spontaneous rupture is sudden increase in blood volume in the splenic vein. In the absence of any pertinent history this could not be established here. According to Price (1950) aseptic infarction of the spleen is commoner than realized and is often found in cardiac disease. In the absence of other evidence it must be assumed that this was the primary event in the present subject: an infarct was certainly shown microscopically.

Splenic histology is notoriously difficult to interpret. Wohl (1925) noted that, by the age of 36, 50% of spleens showed evidence of intimal thickening and hyaline change in the Malpighian bodies. Evidence of hypertensive disease is difficult to find unequivocally in this organ and was not found here, although other arteries in the body showed a characteristic histological picture of arterial hypertension.

It could not be established what the initial event producing haemorrhage was, and the relation of coexisting arterial hypertension remains speculative if not entirely coincidental.

I wish to thank Mr. J. C. Barrett for permission to publish this case and also Dr. E. Milford Ward, who reported on the specimens and performed the necropsy.

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To help local authorities in their Clean Food campaigns the Ministry of Health has produced a new coloured poster on the theme "Hands Spread Germs." A series of pictures and slogans emphasizes the importance of covering cuts and sores, fingering food as little as possible, and washing hands thoroughly before preparing food.

Reviews

BIOCHEMISTRY AND PHYSIOLOGY OF
BONE

The Biochemistry and Physiology of Bone. Edited by Geoffrey H. Bourne. (Pp. 875; illustrated. £7 3s.) London: Academic Books Ltd. 1956.

This book comes out at a most suitable moment, since there is now an increasing interest in the subjects of bone diseases and of disorders of calcium metabolism. It consists of a series of articles by well-known authorities, who review in turn a wide range of subjects, starting with anatomical and structural matters and proceeding to the microscopy and ultrastructure of bone. It continues with further considerations of the growth of bone and of the effects of various vitamins and hormones. The articles naturally differ from each other in style and content, some comprising uncritical compendia of the work on the subject with full references, others being more critical and selective and therefore more readable. A good example of the latter is the chapter by F. C. McLean on the parathyroid glands and bone, which should do much to remove the many current misconceptions on this matter. The book does not deal, except in the most cursory manner, with many of the interesting current medical problems of bone disease and its treatment, but nevertheless it should be a useful work of reference for those whose specialty necessarily overlaps other specialties, in particular orthopaedic surgeons, paediatricians, and urogenital surgeons.

C. E. DENT.

COMPLICATIONS OF REGIONAL ANALGESIA

Complications of Regional Anesthesia: Etiology, Signs and Symptoms, Treatment. By Daniel C. Moore, M.D. (Pp. 291 + xv; illustrated. 75s.) Oxford: Blackwell Scientific Publications. 1956.

Regional analgesia for surgery is by and large a rarity in this country. A combination of a critical public, antipathetic surgical opinion, and a high standard of general anaesthesia have contributed to this state of affairs. On the other hand, nerve-blocks for a variety of therapeutic and diagnostic reasons are on the increase. A knowledge of the complications which may follow these procedures is therefore important, and a comprehensive review of these is now available. Drawing from his own large experience and from the literature, Dr. Moore includes not only the local and general complications of nerve-blocks, but also those of spinal and epidural analgesia. In a separate section entitled "Incidental Complications" he gives excellent brief accounts of such complications as atelectasis, amnesia, and retention of urine. This book, with its high standard of writing and illustration, is easily one of the best and most important in its field, the long list of references at the end of each chapter being particularly valuable. In case a comprehensive and scholarly book of this sort may give the wrong impression, the author himself writes as follows in his introduction: "Although this book is entirely devoted to the complications of regional block procedures, this should not be construed to mean that complications following regional nerve blocking occur frequently, or that this type of anesthesia is more dangerous than other types." This book is one of outstanding merit and will repay careful study.

W. W. MUSHIN.

STRESS

Fifth Annual Report on Stress, 1955-56. Edited by Hans Selye, M.D., Ph.D., D.Sc., F.R.S.(Canada), F.I.C.S., and Gunnar Heuser, M.D. (Pp. 815; illustrated. \$20.) New York: MD Publications Inc. 1956.

This *Annual Report on Stress* has the same editors and the same general format as its predecessor. The first 100 pages give the views of Selye on the general physiology and pathology of stress with emphasis on the stress concept as he

sees it in 1955, and a review of the principal lines of research in this field during the same year. The next 100 pages contain an excellent series of review articles by various workers: "Primary Aldosteronism, a New Clinical Entity," by J. W. Conn and L. H. Louis; "Hormonal Influences on Inflammation and Detoxification," by T. F. Dougherty and R. D. Higginbotham; "Stress and Catechol Hormones," by U. S. von Euler; "Adrenal Influences upon the Stomach and the Gastric Response to Stress," by S. J. Gray, C. G. Ramsey, R. Villarreal, and L. J. Krakauer; "Some Questions Relating to the Role of the Adrenal Cortex in the Etiology of Disease," by D. J. Ingle; "Adrenocortical Secretion and Factors Affecting that Secretion," by D. H. Nelson; "Neurosecretion," by E. Scharer; "Some Observations on Psychiatric Stress in Infancy," by R. A. Spitz; and "Cortisone in Relation to Lymphoid Tissue and Immunity," by H. C. Stoerk. The special physiology and pathology of stress occupy the next 340 pages and take the form, now usual in these volumes, of a series of annotations of the results described in the many publications covered. I had some difficulty at first in finding the way through this section, but the table of contents and the index were of use in this respect. The alphabetical list of between 5,000 and 6,000 references, complete with titles, forms one of the most valuable sections. A reference copy of this book should certainly be available in every medical library.

G. W. HARRIS.

SKIN TUMOURS

Tumors of the Skin. By Herbert Conway, B.S., M.S., M.B., M.D., F.A.C.S. (Pp. 267 + xiv; illustrated. 97s.) Springfield, Illinois: Charles C. Thomas. Oxford: Blackwell Scientific Publications. 1956.

The first half of this book is devoted to benign tumours and is well presented, though it is not as complete as one would expect in a work devoted solely to the subject of skin tumours. The text opens, for instance, with sebaceous cysts, but no mention is made of their naevoid and familial features or of the association with intestinal polyposis and cancer. The only treatment mentioned is surgical excision. Angiomata are adequately reviewed, though the author does not seem convinced that true cavernous angiomata can recover spontaneously. In relation to malignant lesions, which take up the latter half of the book, the field is again not covered in detail, as might be expected, and much space is given to illustration of surgical procedures. A good deal more text might usefully have been devoted to fuller clinical descriptions of the ordinary basal and squamous-celled carcinomata and to the causative and predisposing factors. Very much more might have been said of the intra-epidermal and superficial carcinomata. The erythroplasia of Queyrat is mentioned, but not the plasma-celled balanitis which exactly mimics this type of carcinoma but is purely inflammatory. There is no mention of the cranioparietal and telangiectatic carcinomata of skin seen particularly in relation to breast cancer, nor is there adequate discussion of the mode of spread in the skin. It is now well recognized that a lesion described under the terms "molluscum sebaceum," "kerato-acanthoma," or "pseudo-epithelioma" has until the last few years been diagnosed by clinicians and pathologists alike as an acute epithelioma, whereas the condition is benign and clears spontaneously. This disease is not mentioned. The impression is given that all malignant melanomata are gravely malignant. The lentigo maligna, the relatively benign type seen particularly in the elderly, is not discussed.

The approach to the problem of skin tumours is very much that of the surgeon, and especially the plastic surgeon. For the student there is not much more than he will get in the ordinary textbook, and the work is not adequate for the specialist. Nevertheless it is of value to have a consideration of neoplasms in this fashion, and the book will, as the author intends, serve as a ready reference text and as an aid to diagnosis. It is well produced and the numerous illustrations are good.

J. T. INGRAM.

BRITISH MEDICAL JOURNAL

LONDON

SATURDAY AUGUST 25 1956

HYPOGLYCAEMIC SULPHONAMIDES

Ten months ago two groups of German physicians^{1 2} announced that many diabetics could dispense with insulin injections and have their diabetes treated by tablets. The drug used was a sulphonamide, sulphanilyl-*n*-butylurea (BZ 55, "carbutamide," "invenol," "nadisan"). As Professor F. G. Young points out in the opening article in this week's *Journal*, the discovery that some sulphonamides had a hypoglycaemic action was by no means new, for it was originally reported by M. Janbon and his colleagues³ in Montpellier in 1942, and French workers⁴ have been studying the biochemical mechanisms involved since that time. It was in Germany, however, that these drugs were first used on a large scale for the treatment of diabetes. The original reports made it clear that BZ 55 had no place in the treatment of the young insulin-deficient diabetic, but it was claimed that many of the older more stable diabetics could use it instead of insulin injections. Even with this limitation the reports aroused great interest both among diabetic patients and among their doctors. The Hamburg results were brought up to date by a further article from F. Bertram and his colleagues⁵ early this year, and reports from other countries in Europe⁶⁻¹¹ and elsewhere¹²⁻¹⁵ have confirmed the German claims.

In Britain and in the United States there was considerable scepticism. From observation of the German clinics it was clear that too many of their diabetics were treated with insulin, and that dietary control was largely ignored even in the grossly obese; and it was felt that although in Germany these patients might be treated with insulin and could be switched satisfactorily to BZ 55, in a British clinic many would be dieted without insulin and that BZ 55, even if the German claims were sustained, would be indicated only in comparatively few cases. Another reason for scepticism was the uncertainty over the way in which the drugs produced their effect on the blood sugar, and the possibility that long-continued use would lead to undesirable metabolic or enzymatic disturbances. Finally, the record of the sulphonamides as a cause of fatal toxic reactions, blood dyscrasias, and allergic responses is a bad one, and it seemed unlikely that any member of this group of drugs could be given safely for a period of years.

Dangerous side-effects may have to be accepted if the drug in question is the only one that can be used for a seriously ill patient; with mild diabetics, however, there is already a safe physiological remedy available, and any proposed alternative must be equally innocuous.

We publish this week six articles reporting the observations of British workers who have been treating patients with this drug. The reports from Edinburgh (p. 433) and the Whittington Hospital in London (p. 440) are accounts of extensive in-patient trials. Out-patient experience or less comprehensive in-patient studies are reported from King's College Hospital (p. 445) and the Middlesex Hospital in London (p. 451) and from Dundee (p. 448) and Glasgow (p. 452). A total of 193 patients are reviewed; of these about 170 fulfilled the German criteria as being likely to respond to BZ 55 and 125 did so (73%). These studies confirm that the type of patient responsive to this treatment is the middle-aged or elderly diabetic who has never had ketosis and who needs less than thirty units per day of insulin (a few patients on larger doses did respond satisfactorily). The report from the Whittington Hospital suggests that if the fasting blood sugar after stopping insulin is over 275 mg. per 100 ml. satisfactory response is unlikely. In general, grossly obese subjects were excluded from the British trials. One point that the reports bring out is the danger of stopping insulin in what seems to be a suitable stable diabetic not apparently liable to ketosis. Several clinics encountered patients of this type who developed severe diabetic ketosis within a few days, and it is clear that if transfer of an insulin-taking diabetic to sulphonamide therapy is contemplated the patient must either be seen daily after stopping the insulin or admitted to hospital.

¹ Bertram, F., Bendfeldt, E., and Otto, H., *Dtsch. med. Wschr.*, 1955, **80**, 1435.

² Franke, H., and Fuchs, J., *ibid.*, 1955, **80**, 1449.

³ Janbon, M., Lazerges, P., and Metropoliatski, J. H., *Montpellier med.*, 1942, **21-22**, 489.

⁴ Loubatières, A., *Presse méd.*, 1955, **63**, 1701.

⁵ Bertram, F., Bendfeldt, E., and Otto, H., *Dtsch. med. Wschr.*, 1956, **81**, 274.

⁶ Bertram, F., *Svenska Läkt.*, 1956, **53**, 1213.

⁷ Andersson, B., *Presse méd.*, 1956, **64**, 643.

⁸ Boulin, R., *Presse méd.*, 1956, **64**, 646.

⁹ Ravina, A., *ibid.*, 1956, **64**, 646.

¹⁰ Constam, G. R., et al., *Schweiz. med. Wschr.*, 1956, **86**, 699.

¹¹ Scalabrino, R., et al., *Minerva med. (Torino)*, 1956, **47**, 270.

¹² Tolomelli, E., Pellegrini, R., and Poppi, A., *Rif. med.*, 1956, **70**, 180.

¹³ Downie, E., et al., *Med. J. Aust.*, 1956, **1**, 1072.

¹⁴ Kinsell, L. W., et al., *J. clin. Endocr.*, 1956, **16**, 821.

¹⁵ Kinsell, L. W., *Canad. med. Ass. J.*, 1956, **74**, 979.

¹⁶ Leibel, B. S., *Canad. med. Ass. J.*, 1956, **160**, 1285.

¹⁷ Ridolfo, A. S., and Kirtley, W. R., *J. Amer. med. Ass.*, 1956, **163**, 585.

¹⁸ Kinsell, L. W., et al., *Science*, 1956, **123**, 585.

¹⁹ More, R. H., McMillan, G. C., and Duff, G. L., *Amer. J. Path.*, 1946, **22**, 703.

²⁰ *Dtsch. med. Wschr.*, 1956, **81**, 823 and 887.

²¹ *Ibid.*, 1956, **81**, 826.

²² Clarke, W. T. W., *Canad. med. Ass. J.*, 1956, **74**, 998.

²³ Miller, M., and Craig, J. W., *Metabolism*, 1956, **5**, 162.

²⁴ Mirsky, I. A., Diengott, D., and Dolger, H., *Science*, 1956, **123**, 583.

²⁵ Mirsky, I. A., *Diengott, D.*, 1956, **64**, 1261.

²⁶ Moreau, R., et al., *Presse méd.*, 1956, **64**, 1261.

²⁷ Miller, W. L., and Dulin, W. E., *Science*, 1956, **123**, 584.

²⁸ Wittenhagen, G., and Mohnike, G., *Dtsch. med. Wschr.*, 1956, **81**, 887.

²⁹ Achelis, J., and Hardebeck, K., *ibid.*, 1955, **80**, 1452.

³⁰ Best, C. H., *Canad. med. Ass. J.*, 1956, **74**, 957.

³¹ Loubatières, A., de Lacroix, C. F., and Bouyard, P., *Sem. Hôp. Paris*, 1956, **32**, 2358.

³² Ashworth, M. A., and Haist, R. E., *Canad. med. Ass. J.*, 1956, **74**, 975.

³³ Mirsky, I. A., Perisutti, G., and Diengott, D., *Metabolism*, 1956, **5**, 156.

³⁴ Hawkins, R. D., Ashworth, M. A., and Haist, R. E., *Canad. med. Ass. J.*, 1956, **74**, 972.

³⁵ Clarke, D. W., et al., *ibid.*, 1956, **74**, 966.

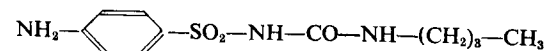
³⁶ Mohnike, G., and Knitsch, W., *Dtsch. med. Wschr.*, 1956, **81**, 891.

³⁷ Vaughan, M., *Science*, 1956, **123**, 885.

Attempts were made to select suitable cases by a test in which the blood sugar is followed for five or six hours after a large oral dose of the drug. The results were disappointing, but it does seem that good selection can be made purely on clinical grounds, one group of workers having 23 successes out of 24 patients.

The most disturbing feature of the British reports is the description of the side-effects observed. Both in this country and abroad sulphonamide rashes have been encountered: the incidence in this British series of cases is about 9%, but the rash invariably cleared when the drug was stopped. Much more serious are the alterations in the blood picture. The original German reports^{1,2} stated specifically that there were no changes in the blood count. From the United States there has been a report¹⁵ of severe leucopenia (1,900 W.B.C. per c.mm.) and from the Middlesex Hospital in this country (p. 451) of neutropenia (2,100 W.B.C. per c.mm.; 10% polymorphs). The Edinburgh workers mention persistent leucopenia, and L. W. Kinsell and his colleagues¹⁶ have seen leucopenia with bigger doses. One patient who developed severe leucopenia was kept on the drug and the blood count returned to normal¹²—a procedure that few would recommend. In Edinburgh thrombocytopenia was found in eight patients and purpura occurred in two. Fatal reactions believed to be due to BZ 55 have occurred in the United States—in one case agranulocytosis was the cause and in another sulphonamide allergy of the type described by R. H. More and his colleagues¹⁷ ten years ago. It is not yet known where the BZ 55 used in these cases was manufactured. The possibility of some impurity cannot be excluded, although it seems unlikely, and we wish particularly to draw attention to "A Warning Note" published at p. 454 in this issue. It is the considered opinion of the signatories of this note that BZ 55 should at present be used only under careful hospital supervision, and some would even go further and recommend the discontinuance of trials until more is known about the toxicity of the drug.

The possible danger attached to the use of BZ 55 has increased the importance of another hypoglycaemic compound recently described (D 860, "rastinon," "orinase").¹⁸ BZ 55 has the formula



D 860 is *p*-tolylsulphonyl-*n*-butylurea



It differs from BZ 55 in having a methyl group instead of an amino group on the benzene ring and might therefore have less tendency to produce blood dyscrasias; this substitution also leads to loss of

all antibacterial action. Clinical reports¹⁹⁻²³ show that it is as effective as BZ 55, with perhaps less tendency to produce skin reactions, and as yet there are no reports of any blood dyscrasias. Because of the loss of the amino group the concentration of the drug in the blood cannot be estimated by the procedure devised by Bratton and Marshall, although a method by which it can be done has been worked out.²⁴ It is excreted in the urine as an oxidation product which may give a false positive reaction in the sulphosalicylic acid test for proteinuria.²⁵ The drug is now undergoing trial at a number of centres in this country, but after the experience with BZ 55 it will be some time before any recommendations can be made.

The mode of action of the hypoglycaemic sulphonamides remains obscure despite a year's intensive research in many countries. German workers have suggested that these compounds damaged the α -cells of the pancreatic islets and stopped the production of the hormone glucagon, which raises the blood sugar.²⁶ The changes in the α -cells, however, are inconsistent, and other possibilities have to be considered. C. H. Best²⁷ has recently reviewed the position. Indirect action through another endocrine gland has been excluded. It seems clear that some insulin must be present for the compounds to have a hypoglycaemic action. The possibility that they increase insulin production, originally suggested by A. Loubatières,²⁸ has been further studied by R. E. Haist²⁹ in Toronto, who gave very large doses of BZ 55 to rats and noted islet hypertrophy. A second theory of their mode of action is that they interfere with insulin destruction, and I. A. Mirsky³⁰ has reported that both BZ 55 and D 860 reduce insulinase activity of the rat liver. The third possibility is that they potentiate insulin by action on enzymes, probably in the liver.³¹ It has been established that the release of glucose from liver slices is reduced by these compounds,³²⁻³⁴ but information about how this is achieved is not yet available.

There can be no doubt that the hypoglycaemic sulphonamides will lower the blood sugar in many mild, stable, middle-aged diabetics. Some of these patients who need insulin to keep their blood sugar at a reasonable level may be able to dispense with injections and take tablets instead. But the action of these compounds differs from that of insulin,²⁴ and although they may lower the blood sugar they need not necessarily correct the other metabolic disturbances of diabetes. The British and American experience suggests that BZ 55 is a dangerous substance unsuitable for long-term control of mild diabetics. D 860 may prove safer, but prolonged trial will be needed. Three questions have to be answered about this compound and other similar ones that may be produced. First, do they ever produce dangerous

side-effects? Secondly, what exactly is their mode of action? If it is by enzyme inhibition, can this be harmful if continued for years? Thirdly, although the blood sugar may be lowered by these compounds, do they correct the other metabolic consequences of diabetes? Will they prevent the development of retinitis and nephropathy? It will take a long time to obtain satisfactory answers to these questions, and until they are answered the hypoglycaemic sulphonamides must be regarded as experimental and used only under strictest supervision.

IMMUNIZATION AGAINST WHOOPIING-COUGH

Five years ago we published the report¹ of the Medical Research Council's Whooping-Cough Immunization Committee on a series of controlled trials of pertussis vaccine. In these trials batches of vaccine from three manufacturers, two American and one British, were put to the final test of efficacy: the incidence of whooping-cough was measured by careful observation over a period of 24 months or more in a group of children 6 to 18 months old and compared with that in a similar group injected only with an anticatarrhal vaccine. The parents of all the children had agreed to their inclusion in the trial and the children were allocated randomly to the groups receiving pertussis or anticatarrhal vaccines, so that neither parents nor the medical staff observing the children knew which vaccine any individual child had received. All the batches of vaccine thus tested provided substantial protection, the attack rates being less and the disease when it occurred milder in the vaccinated than in the control children. Commenting on this report at the time, we wrote: "What is particularly needed now is some laboratory yardstick which will differentiate between good and poor vaccines," and in fact it has been the lack of a satisfactory test to measure the antigenic potency of pertussis vaccines that has delayed official approval of combined diphtheria-pertussis prophylactics. Before the controlled trials were completed further field trials in conjunction with laboratory tests had already been started in an attempt to provide this yardstick, and the report on these combined investigations appears elsewhere in this issue (p. 454). Because of the success of vaccine in the controlled trials it was no longer possible to have a control group given a placebo, and instead two or more vaccines were compared in parallel in each subsequent trial. In each of

the series of seven trials carried out during the years 1948 to 1951 volunteer children were allocated in rotation to groups receiving three British vaccines: in total nine batches of vaccine prepared from the same strain of *H. pertussis* by several different methods were used, and just under 10,000 children kept under observation. In the 1951-4 series of eleven trials five vaccines were used, each prepared from several strains of *H. pertussis*. A large batch from the Michigan Department of Health, whose vaccine gave greatest protection in the original controlled trials, was used in about half the children in each trial. The other half were given one of three British vaccines prepared by the Michigan method or one made by the State of New York Department of Health from liquid-medium culture of the same strains used in the Michigan vaccine. The 19,000 children observed in these later trials were allocated to the group receiving the Michigan reference vaccine or to the group receiving the other vaccines according to whether their birthdays fell on odd or even days of the month. In other respects the conduct of the trials in both series followed the pattern of the earlier controlled trials, and the performance of the vaccines was assessed by measuring the incidence of pertussis in three ways—the attack rate per 1,000 "child-months" of observation, the percentage attack rate in children exposed to infection in their own homes, and the percentage attack rate in children exposed elsewhere.

No large differences were observed between the protection afforded by the vaccines used in the 1948-51 series of trials or between those used in the 1951-4 series. However, all three measures of incidence were substantially lower in the latter trials. For example, the attack rate in the 1948-51 series among children exposed to the disease in their homes was 69% overall, and in only one small trial was less than 50%. In 1951-4 this was 14% overall, with a maximum of 29% in one trial. In all the previous controlled trials combined, the corresponding rate was 87% for unvaccinated and 18% for vaccinated children, suggesting that unless the infectivity of pertussis or the general level of immunity had changed considerably the 1948-51 series of vaccines were poor, whereas all the 1951-4 series were probably giving good protection. Although there was no control group to substantiate this interpretation it was neatly confirmed in the 1951-4 studies. In three of the larger participating areas records were kept of the incidence of pertussis in households in which vaccinated children and their unvaccinated siblings were exposed to infection by a primary case in the family. In 56 such households there were 69 vaccinated and

¹ The Prevention of Whooping-Cough by Vaccination—A Medical Research Council Investigation, *British Medical Journal*, 1951, 1, 1463.
² *Lancet*, 1954, 1, 1257.

62 unvaccinated children exposed to risk. Only fourteen (20%) of the vaccinated developed pertussis compared with 51 (82%) of the unvaccinated.

The laboratory investigations conducted in parallel with these field trials were of three kinds—the mouse-protection test, the measurement of the ability of the vaccines to produce agglutinin in mice (the mouse-agglutination-production test), and the measurement of the ability of the vaccines to produce agglutinin in children. In the first of these tests mice were injected intraperitoneally with graded doses of vaccine, and the level of protection measured by injecting 14 days later a challenge dose of virulent *H. pertussis* intracerebrally. An alternative test by which the challenge dose of bacteria was given intranasally was found to be less sensitive and was abandoned. From the proportion of deaths observed within 14 days of challenge, the dose of vaccine required to protect 50% of animals (ImD_{50}) was calculated. In each test two vaccines were compared simultaneously, one of which was a reference vaccine. The error of this test was found to be large despite careful standardization of reagents, procedures, and the use of mice of inbred stock. In all, 18 vaccines, including some used in the controlled field trials, were tested by this method. The tests were carried out over a period of years, and from repeated tests on the same vaccines the ImD_{50} values suggested a deterioration of about 40% in potency per annum, and this assumption was made when the final order of potency for the vaccines was calculated from the results of this test. The mouse-agglutination-production test was introduced late in the field studies and could not be applied to all the vaccines. Groups of mice were given two injections at a 14-day interval and the agglutinin titre determined 10 days after the second dose. The vaccines were graded according to the agglutinin response to a fixed dose of organisms. Two independent studies were made of the ability of some of the vaccines used in the field to produce specific agglutinin in children. The technical details differed in some particulars, but the results obtained on the same vaccines were similar and the two series were combined in grading the vaccines thus tested.

The results of these three laboratory tests were related to the attack rate among vaccinated children exposed to the disease in their own homes—the most stable measure of performance of a vaccine in the field. The report states that though field and mouse-protection tests occasionally put vaccines in different orders of potency there were no definite contradictions, and the general correlation, though not high, suggested that the mouse-protection test was of some value in predicting the efficacy of a vaccine in pro-

tecting children against pertussis. There was a close correlation between the production of agglutinin in mice and in children, and a definite but less close correlation between the results of these tests and prophylactic potency of the vaccines judged by the field trials.

Although there is correlation between the protection of children in the field and the results of the three laboratory tests, it does not follow that the laboratory tests measure directly the factor responsible for producing immunity in children, and this must influence the choice of test for standardization of commercial vaccines. As a yardstick the production of agglutinin in mice might be favoured had not L. Pillemer and his colleagues² at Western Reserve University prepared from *H. pertussis* an antigenic fraction which protected mice against intracerebral infection but gave a very poor agglutinin response. This antigen is now undergoing test in a field trial in this country. It would plainly be impracticable to estimate the agglutinin response in children before each batch of vaccine produced commercially was issued for general use, and the M.R.C. report therefore recommends that in future only those vaccines which have been shown by the intracerebral mouse-protection test to have an adequate potency should be released. In order to establish a British standard pertussis vaccine for use in such comparative tests, one of the British vaccines which gave substantial protection in the field in the 1951-4 trials has been freeze-dried, and this dried product, unlike the parent liquid vaccine, has shown no instability. Since vaccines made by both Michigan methods and from cultures made in a liquid medium gave equally good results, the report makes no specific recommendations about the appropriate method of manufacture.

AN EXTERNAL DEFIBRILLATOR

A defibrillator—an apparatus for applying an electric current directly to the exposed heart—is now generally accepted as a necessary piece of emergency equipment during cardiac operations, and defibrillation with this instrument combined with cardiac massage has now proved a safe and effective method of treatment. The use of the defibrillator presupposes that the patient is in the operating theatre with the heart exposed or that immediate facilities are available for doing this. Apart from surgical or anaesthetic emergencies, however, ventricular fibrillation may be a cause of sudden death in cardiac infarction, Stokes-Adams disease, and toxic reactions to digitalis, quinidine, or procaine amide. In these conditions facilities for opening the chest, applying the defibrillator, and performing cardiac massage are seldom

² Beck, C. S., Weckesser, E. C., and Barry, F. M., *J. Amer. med. Ass.*, 1956, 161, 434.

⁴ Zoll, P. M., et al., *New Engl. J. Med.*, 1956, 254, 727.

available, though C. S. Beck and his colleagues³ at Cleveland have recently described the revival by these means of a physician who "died" from a heart attack outside a hospital and was having cardiac massage in an operating theatre within five minutes: the ventricles were found to be in coarse fibrillation, and after several unsuccessful shocks defibrillation was at last achieved half an hour after the onset of the attack. The patient made a good recovery.

P. M. Zoll and his colleagues⁴ at Boston have now described the termination of ventricular fibrillation in man by externally applied electric shock. The external defibrillator is built on the same principle as a direct defibrillator, but the strength of the countershock applied is much greater, the voltage used being in the region of 200 to 700 volts instead of 120 to 150 volts in the case of the direct defibrillator. Large copper electrodes, mounted on heavily insulated handles and smeared with electrode paste, are held firmly in place against the chest wall, one to the left of the sternum and the other on the anterior axillary line. The duration of the current applied is fixed at 0.15 second. Defibrillation was successfully achieved with this instrument in four patients. The episodes of ventricular fibrillation occurred in the course of myocardial infarction, after intravenous procaine amide for rapid arrhythmia, in digitalis intoxication, and in Stokes-Adams disease. Although defibrillation was achieved eleven times in these patients, only the patient with Stokes-Adams disease recovered, and he was also the only patient in whom resuscitation was accomplished within two to four minutes of the onset of fibrillation, the interval in the remaining patients being not less than seven minutes.

The external defibrillator represents a real advance in methods of resuscitation, but in spite of its theoretical advantages in the avoidance of a thoracotomy its usefulness will probably prove to be restricted. For successful resuscitation it must probably be applied within less than five minutes of the onset of fibrillation, which presupposes that the instrument is already set up by the patient's bedside and that an electrocardiogram is also immediately available—conditions which are very unlikely to be fulfilled unless the episode of ventricular fibrillation has been anticipated.

OPIUM IN INDIA

Attempts to suppress the abuse of opium and its derivatives and to limit the supply to their indispensable administration for the relief of pain have been made by various International Conventions, from the first in 1912 until the most recent Opium Protocol of the United Nations in 1953. A comprehensive survey of the opium position, both past and present, in India has been made by Sir Ram Nath Chopra,¹ focusing attention on its quasi-medical use as distinct from addiction or legitimate therapy. As early as 1813 the Government of India attempted to restrict the habit of opium eating, but in 1895 a Royal Commission concluded that the consumption of opium by adults and its administration to children were based on an age-long tradition of belief

in its efficacy as a common domestic remedy, and that this generally moderate use had not resulted in any extensive physical or moral degradation. This view was upheld in 1911 by the representative of the British Government, Lord Harding, who stated that it would not be practicable to draw a distinction between the medical and non-medical uses in the distribution and sale of the drug and that it was not necessary to prohibit the manufacture and sale of opium except for medical purposes in British India. In spite of the criticism, both local and international, evoked by this policy it was not until 1946 that the Government of India decided at first to prohibit the smoking of opium and later to discourage its production except for medical and scientific use.

Opium has been extensively used by Hindu and Mohammedan physicians since the fifteenth century, both internally and externally as a "paint" application, for the alleviation of pain such as headache and toothache, and for its astringent qualities in diarrhoea and dysentery. In 1928 an investigation by Chopra and his co-workers into the problem of opium consumption in India showed, surprisingly, that only a small fraction of the population indulged in opium so habitually as to become addicts, and that when addiction did follow it was usually initiated by its use for some disease or ailment. The drugging of infants as a cure for abdominal discomfort, diarrhoea, and teething troubles, and also to keep them quiet while the mother was at work, was undoubtedly very prevalent in certain parts of India up to about 1934. The dosage, said to be equal in weight to a poppy seed— $\frac{1}{16}$ gr. (12-24 mg.)—was generally begun at the age of three weeks to three months, and increased gradually to obtain the desired effect. Most of these children were small, emaciated, and anaemic, with protuberant abdomens, conjunctivitis, corneal ulcers, and purulent otitis media. With adults, the quasi-medical consumption of various preparations and infusions made from the unlanced capsules of the poppy heads has long been a favourite method of indulgence in the drug, particularly the beverage known as "post." The average daily amount of 5 to 10 capsules, soaked in water, strained, diluted, and mixed with sugar, gives a dose of 3-5 gr. (0.2-0.32 g.) of alkaloids, comprising a very small quantity of morphine and large quantities of narcotine, papaverine, and codeine, which appear to act more as stimulants than depressants and are probably responsible for the euphoric effect of this beverage. About 40% of habitués to "post" begin to take it in the hope of curing some ailment or illness, but when addiction is established, even with small doses, mental and physical deterioration follows, with symptoms of chronic poisoning of the nervous system, varying from excitation to eventual complete paralytic breakdown.

The smoking of opium has never presented such a serious problem of addiction in India as in China, and, except for the relatively small number of registered smokers (2,519 in 1954), is now subject to severe restrictions. Quasi-medical consumption has diminished during the last decade, owing partly to the extension of

¹ *Bull. Narcot.*, 1955, 7.

medical relief services, which remove the chief initial cause of the habit and its progress to addiction, but chiefly to the measures taken following the All India Opium Conference of 1949, particularly the recommendation which relates to "effective steps to bring down the per capita consumption to a level not exceeding the League of Nations limit" (12 lb. (5.4 kg.) for every 10,000 of population). These measures have resulted already in a decrease in consumption of about 45%. With strict control of the cultivation of the poppy, enforcement of the Dangerous Drugs Act, and legislation controlling the sale of opium, the quasi-medical use of such preparations as "post" is expected to cease entirely in the near future, and the problem of the consumption of opium in India as it existed before 1948 will no longer exist.

SJÖGREN'S SYNDROME

From 1888, when W. B. Hadden¹ first described the symptoms of what is now known as Sjögren's syndrome, to the review of it in 1956 by M. Thompson and S. Eadie,² the relationship of the ocular abnormality to the arthritic lesions of rheumatoid disease has remained obscure. The early observations of H. Gougerot,³ A. W. M. Houwer,⁴ and H. Sjögren⁵ were made primarily from the ophthalmologist's point of view, and the widespread nature of the lesions was not generally appreciated. Now that the diagnosis is made more often it is generally agreed that kerato-conjunctivitis sicca is the essential clinical feature of Sjögren's syndrome, but well-established cases exhibit dryness of the mouth, parotid swellings, rhinitis sicca, and in two-thirds of the cases a rheumatoid type of arthritis. This variable clinical picture has been further confused by the inclusion of such disorders as Raynaud's phenomenon, skin changes of various kinds, both hyper- and hypoglycaemia, epilepsy and mental changes, achlorhydria and indigestion, to mention but a few. Some of these associations are undoubtedly coincidental, and recently the limits of the syndrome have become more clearly defined.

Of the 18 cases investigated by Thompson and Eadie, 14 (77%) suffered from rheumatoid arthritis, an equal number complained of dryness of the mouth, and 66% showed signs of laryngo-pharyngo-rhinitis sicca. These authors examined 210 patients with rheumatoid arthritis and found the incidence of kerato-conjunctivitis sicca to be 14.3%—a figure which agrees well with that of 13.4% given by S. Holm⁶ and 11% by T. Stenstam.⁷ Indeed, Holm found that kerato-conjunctivitis was a more common complication of rheumatoid arthritis than iritis, the incidence of which was only 1.2%. The question remains whether an association of this order of frequency indicates a pathogenetic connexion between the ocular and arthritic lesions. J. W. Henderson⁸ and P. Ellman and his colleagues⁹ are not entirely convinced that arthritis is an integral part of the syndrome. They point out that clear-cut evidence of Sjögren's syndrome is rare in women with rheumatoid arthritis, which

itself is a common disease. On the other hand, two-thirds of patients with kerato-conjunctivitis sicca have frank arthritis or fleeting arthralgia, and many observers are prepared to consider both groups of symptoms as manifestations of a common rheumatic process.^{6 10 11} Further evidence that this is so is now being brought to light. K. J. Gurling¹² has reported the association of Felty's and Sjögren's syndromes and uncovered in the literature several examples in which the features of both syndromes were present. Thompson and Eadie have also encountered the same combination, and it is of interest that D. H. Collins¹³ reported that the symptoms and signs of Still's disease—another rheumatic disorder in the group of collagen diseases—could develop into those of Felty's syndrome, which is characterized by chronic arthritis, splenomegaly, and leucopenia. Disease of the joints is a feature in all three disorders.

The lack of opportunities for examining post-mortem material has hindered the understanding of the basic pathological changes, most studies being based on biopsy specimens from the conjunctiva and the lacrimal or parotid glands. Although Sjögren⁵ recorded the necropsy findings in one case in 1933, B. C. Cardell and K. J. Gurling¹⁴ could find by 1954 no more than seven single case reports in the literature, to which they added three. They concluded that Sjögren's syndrome was a distinct entity characterized by widespread degenerative and atrophic changes in the conjunctivae, lacrimal and salivary glands, and the submucous glands of the respiratory and upper alimentary tracts, with secondary changes in the particular mucous membranes; and they were impressed by the resemblance of the histological changes in the affected glands to certain non-inflammatory lesions of the thyroid. In the early stages lymphocytic infiltration predominates, giving way after a number of years to parenchymal atrophy and replacement with fibro-adipose tissue containing peculiar epithelial islets. It is worth noting that evidence of polyarteritis nodosa was found in 2 of the 10 cases examined at necropsy. Those with the urge to classify may with some justification place Sjögren's syndrome with rheumatoid arthritis among the diseases of collagen; but this does little to increase our knowledge of this strange and unpleasant disease.

Air Vice-Marshal P. B. Lee Potter has been appointed Director-General of the R.A.F. Medical Services from February, 1957, in succession to Air Marshal Sir James Kilpatrick.

¹ Hadden, W. B., *Trans. clin. Soc. Lond.*, 1888, 21, 176.

² Thompson, M., and Eadie, S., *Ann. rheum. Dis.*, 1956, 15, 21.

³ Gougerot, H., *Bull. méd. (Paris)*, 1926, 40, 360.

⁴ Houwer, A. W. M., *Trans. ophthal. Soc. U.K.*, 1927, 47, 88.

⁵ Sjögren, H., *Acta ophthal. (Kbh.)*, 1933, suppl. 2.

⁶ Holm, S., *ibid.*, 1949, suppl. 33.

⁷ Stenstam, T., *Acta med. Scand.*, 1947, 127, 130.

⁸ Henderson, J. W., *Amer. J. Ophthal.*, 1950, 33, 197.

⁹ Ellman, P., Weber, F. P., and Goodier, T. E. W., *Quart. J. med.*, n.s., 1951, 20, 33.

¹⁰ Littler, T. R., *Ann. rheum. Dis.*, 1951, 10, 405.

¹¹ Reader, S. R., White, H. M., and Elmes, P. C., *ibid.*, 1951, 10, 288.

¹² Gurling, K. J., *ibid.*, 1953, 12, 212.

¹³ Collins, D. H., *Rep. chron. Rheum. dis.*, 1937, 3, 49.

¹⁴ Cardell, B. S., and Gurling, K. J., *J. Path. Bact.*, 1954, 68, 137.

SOME PRINCIPLES AND METHODS OF INTERNATIONAL HEALTH WORK

BY

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Increasing numbers of the medical and related professions of all countries are taking part in the work of the World Health Organization. They do so as W.H.O. consultants and advisers to the large number of countries which seek assistance from the Organization; as members of W.H.O. panels and committees giving the necessary technical guidance to the Organization; as contributors of technical information; and as members of the large number of national institutions contributing to world services concerning epidemiology, health statistics, therapeutic substances, medical education, communicable diseases, and many other subjects.

This relationship is different from that of the full regular staff members. It is also a much more comprehensive relationship. At December 31, 1955, for example, W.H.O. had 152 medical and related scientists on its regular staff. These occupied mostly medical and technical administrative posts, as the Organization does not have its own clinical, laboratory, or other medical institutes. On the other hand, at the same date W.H.O. was using 295 senior consultants, advisers, and demonstrators in 63 countries and territories, and during 1955 appointed 59 specialists to serve on eight of its expert committees. In addition, large numbers of medical and other associated scientists from the majority of countries attended a variety of meetings, conferences, seminars, study groups, etc., sponsored by the Organization. There were representatives from every branch of medicine—clinical, institutional, laboratory, and administrative. Such a relatively large number of medical people helping W.H.O. each year makes some of its arrangements and methods especially important to the medical and related professions.

Constitution of W.H.O.

There is no need here to give the history of international health co-operation or to consider the detail of the W.H.O. constitution or organization. Much of this has been given previously in the *British Medical Journal*.¹ It is perhaps enough to say that the overwhelming need for an international health body developed not only from medical but also from welfare, social, and economic requirements in all countries. The consequent formal association of countries already has a history of over a hundred years, of which W.H.O. is the present expression.

The countries of the world created W.H.O. to do on their behalf such things as providing appropriate international health services; giving technical information and counsel; assisting governments to meet their health needs; and, of especial importance in view of events, co-ordinating international health work. Arrangements were made for universal membership of States. To-day, with 81 Member States and four Associate Members, such universality has almost been obtained (though a certain few governments do not take an active part). The governments also authorized the basis for W.H.O.'s administration, including authorities for staff, finance, regionalization, and relations with other organizations.

It is in the Constitution that the principles are found which explain the arrangements and methods used by W.H.O. The

¹ *British Medical Journal*, 1950, 1, 1021-51.

Constitution is itself based on the concept of an association of sovereign States. If this principle is constantly recalled, the way W.H.O. works will usually be understood. Put conversely, W.H.O. is not a form of supranational organization. As Mr. Hammarskjöld, the Secretary-General of U.N., put it at the Pilgrims' Dinner in London on March 18, 1954, when referring to the United Nations: "We need to think of the institutions of the United Nations not as parliamentary in character but as a framework within which the Governments can, by trial and error, build up traditions of world community. . . ."

The important consequence of this is often overlooked—namely, that an international organization like W.H.O. does not itself directly control or undertake medical and health programmes in countries. It is the national services assisted by W.H.O. that give effect to the field programmes adopted by the World Health Assembly.

Nature of the Organization

The Constitution provides for an intergovernmental policy-making organ—the World Health Assembly. This has an Executive Board of eighteen individuals designated by as many governments, and there is then an administrative machine—the Secretariat—to carry out the instructions of the policy-making bodies. The constitutional character, and the developing mode of operation of these two, the Assembly and the Board, are themselves worthy of study, but for present purposes one emphasis is required. The World Health Assembly is a meeting of governments. It is not a gathering of medical men in a professional congress or conference. It is essential, therefore, and quite legitimate, for the Health Assembly in establishing international health programmes to take note of many factors—economic, administrative, and even political—which a purely medical or technical meeting could perhaps ignore. As W.H.O. is an intergovernmental and not a supragovernmental body its resolutions are normally recommendations to governments for action. It is to be noted, with a few specific exceptions, that even the decisions of the Health Assembly are not automatically binding on governments.

The Secretariat, headed by the Director-General, operates in and from seven offices—the Headquarters in Geneva and the six Regional Offices: temporarily in Geneva (presently to be in Copenhagen) for Europe; Washington, D.C., for the Americas; Manila for the Western Pacific; New Delhi for South-East Asia; Alexandria for the Eastern Mediterranean; and Brazzaville for Africa. The Secretariat is an international civil service. It is not a policy-making body, and it is not its own master.

These are further facts which, if always remembered, would simplify understanding and avoid frustrations among some medical and technical groups associated with W.H.O. It is the governments, not the Secretariat, which prescribe policies, define programmes, and provide the means. However, the young international public service which exists in W.H.O. can claim to have something of the nature of such a national civil service accorded the descriptions: "Permanent, Independent and Influential," and " . . . Growth without Bureaucracy."

It is permanent in the sense that it does not come and go with annual decisions of the Health Assembly. It is independent in its constitutional obligations, set out in Article 35 of the Constitution:

"The paramount consideration in the employment of the staff shall be to assure that the efficiency, integrity and internationally representative character of the Secretariat shall be maintained at the highest level,"

and further elaborated in Article 37:

"In the performance of their duties the Director-General and the staff shall not seek or receive instructions from any Government or from any authority external to the Organization. They shall refrain from

² The British Civil Service, *The Times*, November 23 and 26, 1953.

any action which might reflect on their position as international officers. Each Member (that is, Member State) of the Organization on its part undertakes to respect the exclusively international character of the Director-General and the staff and not to seek to influence them."

In that the W.H.O. Secretariat is not a direct operative civil service it cannot have a direct type of "influence." However, apart from the opportunity for "influence" which follows respect for the honesty and efficiency of any service, the W.H.O. Secretariat has several significant formal rights. For example, Article 32 of the Constitution says: "The Director-General shall be the *ex-officio* Secretary of the Health Assembly, of the Board, of all commissions and committees of the Organization and of conferences convened by it." Further, the Director-General may make proposals for the agendas of the Health Assembly and the Executive Board, and, apart from formal reports to these bodies, he may make statements, oral or written, before them.

A frequent misunderstanding would be avoided if another constitutional provision was remembered. Article 71 reads:

"The Organization may, on matters within its competence, make suitable arrangements for consultation and co-operation with non-governmental international organizations and, with the consent of the Government concerned, with national organizations, governmental or non-governmental."

This contains a remarkable principle pregnant with opportunity. It means that W.H.O. is not limited to "official" interests only, important though these are. It has been given the privilege of associating both official and non-official organizations in international health and medicine. In W.H.O. the professional, medical, and other similar groups of the world, through both their international and their national associations, take their essential part. Thus they may have a direct say, under certain conditions in the governing bodies—the World Health Assembly and the Executive Board—in influencing major policy and administration. This is in addition to the contributions they make to the technical arrangements of the Organization. Such international medical professional bodies as the World Medical Association, International Association of Microbiological Societies, World Federation of Mental Health, International Unions against Cancer, Tuberculosis, and Venereal Diseases, International Dental Federation, International Council of Nurses, and many others in medical, social, and health fields are associated with W.H.O. in this way. To take one example only, the World Medical Association has greatly assisted W.H.O. by its authoritative guidance on a variety of subjects, including industrial medicine, pharmacopoeias, and medical education.

The basically advisory nature of W.H.O.'s relationship with governments on the operative side in connexion with the execution of programmes is one safeguard against some bureaucratic faults. Generally W.H.O. may not exercise central administrative control of, nor direct or supervise, local country activities. It has no right to interfere in any way in the internal affairs of any country or community. There are, however, other tests of the absence of bureaucracy, and these too, I think, can be met.

Some W.H.O. Policies

The work of W.H.O. may be conveniently divided into its direct advisory services to governments requesting assistance, and into certain technical services of general international interest, though there is inevitably an overlap on occasions. In the first group are the projects in most countries covering practically the whole range of public health and medicine. Yaws control in Haiti and the Philippines; trachoma studies in Iran and North Borneo; advice on medical administration in Burma and Panama; nutrition surveys in Brazil and Indonesia; maternal and child health in India and Thailand; assistance to nursing schools in Malaya and Syria; are examples of these services. At December 31, 1955, there were 218 such programmes in 63 countries and territories being assisted by W.H.O. It is

these programmes which at present are of most interest to the medical and other professions, as it is to work in them that most of the consultants and advisers come to serve W.H.O. for short periods.

Certain policies governing these advisory services may therefore be usefully discussed because of their general professional interest. W.H.O. operates a project only on the request of a government, and only by providing assistance to the government. For example, a country desiring help to develop a programme of venereal diseases control submits a request to W.H.O. The consultants sent out by W.H.O. then work by advising and assisting the local services. They do not establish a separate W.H.O. venereal diseases service in the country.

Governments retain entirely the right to express their own wishes regarding the type of international health assistance they desire. This partly explains the disappearance of the original "priorities" established by the First World Health Assembly in 1948. Planning at that early stage being unavoidably somewhat academic, the Assembly had prepared a world programme giving priority to six subjects: malaria, maternal and child health, tuberculosis, venereal diseases, nutrition, and environmental sanitation. Further, countries have increasingly extended their requests to cover integrated health and medical services rather than to limit them to the isolated subjects of the "priorities." To-day, therefore, these "priorities" can no longer be followed in developing the advisory services. However, the Health Assembly and Executive Board have defined certain principles in the selection of requests. Some of these have become fundamental not only in W.H.O. but in many other international organizations when giving technical assistance to governments.

One of these principles is now almost enshrined as a philosophy in all work where governments receive assistance. It is that projects should be designed "to strengthen national health administrations." This may sound like a simple platitudinous phrase. It is not. In the earlier years some people argued that W.H.O. should meet government requests by itself dealing directly with the particular local problems. For example, using this latter method to help a malarious population, W.H.O. would go in and develop its own *ad hoc* malarial organization and conduct a direct anti-malaria campaign. This call for direct so-called practical action had, understandably, much appeal.

However, the importance of self-help and local responsibility; the avoidance of extreme centralization of direction and technical planning, and of remote control; the need to adapt medical arrangements to local social and economic circumstances, and to resist the creation of a large permanent international civil service, were amongst the compelling arguments against the system. These, added to the recognition of national sovereignty, determined the policy that W.H.O. should assist countries by "strengthening national health administrations." This bald statement of the policy has occasionally been misinterpreted. It does not mean that W.H.O. services are available only to a central official governmental service. They can provide assistance through governments to any form of institution, organization, or service fitting into the local pattern. It is fortunate that an early Assembly took a decision to adopt this fundamental principle, which is sound administratively and in harmony with most accepted views on good public health and medical practice.

The abandonment by the Health Assembly of "priorities" has not meant rejection of the need for W.H.O.'s assistance to be distributed sensibly. The Health Assembly and Executive Board require some tests to be applied in both the Central and the Regional Organizations before acceptance of projects. Such criteria³ to be met include, in general terms: international feasibility and acceptability; benefit to the largest possible number of Member States and people; availability of qualified person-

³ *Off. Rec. Wld Hlth Org.*, 1951, 32, 55-63.

nel; preliminary studies and preparations have been made; the ability of the national government to continue and complete the work; full account has been taken of related possibilities of financing and action by other agencies and integration with related projects; and financial feasibility.

Vague though the language of some of these criteria may be, there is enough indication of several important principles to be followed. In the preliminary stages of negotiation on programmes between W.H.O. regional directors and governments and of discussion at the regional committees, some classification of government medical requests thus becomes feasible. Patently unsuitable projects are now rejected—indeed, are being less frequently presented. A country suffering heavy mortality and morbidity from more easily preventable conditions for which "outside" technical assistance is suitable is now not likely to demand as more urgent an electron microscope or a highly specialized hospital.

In certain regions the development of "country projects" is now following a pattern of study and application. An identified health problem often first needs examination internationally by a study group, by one or more experts visiting several countries concerned in the matter, or by simultaneous and co-ordinated studies in selected countries, before methods of dealing with it can be determined. The results of such an examination can then be disseminated on a wider basis through seminars, conferences, symposia. From this phase there often emerges a need for a new type of training suitable to be organized on an inter-country basis where controlled experiments can be arranged on new curricula, team training, etc.

Another general policy influencing the system of advisory services to governments is for W.H.O. to support the training of medical and health workers. This purpose is met in two general ways. Firstly, by a system of international W.H.O. fellowships, and, secondly, by helping countries to establish or improve their own medical training institutions. These two methods, owing much to earlier international experience, have combined to give W.H.O.'s programme of professional and technical education both success and popularity. In 1955 W.H.O. provided 1,028 fellowships, almost all postgraduate. The fellows came from 108 countries and territories and visited 75 countries and territories to receive their training. In keeping with the principle of "strengthening national health services," W.H.O. fellows are obliged to return for a minimum period of three years' service in their own country.

A significant feature of this international medical policy is that both "receiving" and "giving" countries and their medical professions contribute and benefit. A country like the United Kingdom, through W.H.O., is each year the source of numbers of senior medical teachers from its leading universities, who go to other countries to assist the development of their medical faculties and training institutions. Conversely, the well-known institutions of the United Kingdom, also through W.H.O., in 1955 gave advanced training in all branches of medicine to 206 doctors and scientists from other countries. Here, indeed, is a mutually beneficial process both to the countries sending fellows and receiving consultants and to the United Kingdom in having its institutions linked with developments in many countries. It extends, too, good will and even material advantage far beyond strictly medical circles.

A further expression of the various principles mentioned above is that W.H.O. does not possess its own medical institutions or operative medical services. Reference is not intended here to the long-established and accepted general international services connected with epidemiological and health statistical reporting, biological standardization, and other similar subjects, but to the fact that W.H.O. does not have its own hospitals, field medical services, or research institutions. This policy is an expression of the view that variety, freedom, and elasticity of conditions are needed by science and medicine in both investigation and application. These are more likely to be found in a number of different country institutions than in a centralized uniform official organization.

This method of working through the institutions of others is sometimes misunderstood by medical and other scientists, individualistic by training and experience. Accustomed to work in the laboratory, at the bedside, or in the field directly on their own programmes, the change to the more detached role of adviser or of medical administrator is often disturbing. It is a further facet of the position of indirect relationship, mentioned above, which W.H.O. has with its constituent governments which, once realized, enables suitable adjustment by the staff to be possible in most cases.

Co-operative Arrangements

Co-operation, co-ordination, and integration are words of common currency, if not yet debased to jargon, in international life. Yet they have more urgency and importance than in national operations. If international work is to mean anything, then co-operation and co-ordination are fundamental principles. To ignore their importance leads to inefficiency, waste, and even the disrepute of the concept of governments working harmoniously together through the existing system of international agencies. This is certainly true of international health work. The W.H.O. Constitution and numbers of policy decisions of the World Health Assembly and the Executive Board emphasize the development of all programmes by co-operation with all other interested agencies, and their integration into associated arrangements, international and national.

Achievement of the ideal is not yet here. There are the difficulties in co-ordination of work by the various international administrations themselves, with interests overlapping in many places. Interdepartmental and inter-organizational problems are not peculiar to national services. Indeed, the interests to be reconciled are more numerous.

In actual country work the problems for international agencies of co-ordination and integration are accentuated. Each agency can achieve there no more and no less than the authority and administration of the local government provides. Each faces, too, the additional complexity that there are usually other international agencies assisting the same government in related fields of work.

A disease control programme, for example, can be influenced by decisions taken by: (a) the United Nations General Assembly, the Economic and Social Council, the Technical Assistance Committee, the World Health Assembly, the Food and Agriculture Conference, and others; (b) the executive organs of the various agencies; and (c) the numerous national bodies concerned in local administration, agriculture, labour, health, etc.

This complex background to health work gives the principle of co-operation and co-ordination its importance. It calls for negotiation, adjustment, and considerable compromise before international health programmes are planned, provided for, and finally undertaken. Qualities of diplomacy, persistence, tolerance, and patience are required in the staff of the Organization to a greater extent perhaps than in any national situation.

One of the lessons, perhaps hesitantly learned by many medical men accepting the role of advisers to governments, is that more "medicine" is not necessarily the most urgently desirable step to improve general health. The dependence of community health on economic, social, and political interplay, in which more hospitals, clinics, and medical specialists do not always figure prominently, is sometimes hard for doctors to acknowledge. Then, too, it is sometimes unpalatable to accept the view that the cost of health should be measured against other claims. This need, described for instance by Ffrangcon Roberts in the *British Medical Journal* and elsewhere,⁴ is occasionally overlooked in situations where national resources are limited. It is forgotten that the application of medicine is not outside economic laws.

Nevertheless, in all governmental developments—social, economic, industrial, or agricultural—medical advice is essential to put standards of living on a sound, durable basis.

⁴ *The Cost of Health*, 1952. Turnstile Press, London.

Though sometimes he may be denied his hope of medical institutions being immediately established, the medical adviser has yet an important role in international assistance to all types of country. Often he will be helping the cause of health more by giving medical advice in relation to an agricultural scheme or an industrial enterprise than by limiting himself to a purely medical institutional programme.

Some Administrative Arrangements

There are many other policies influencing type and method of work, but only one more is selected for reference here. Article 35 of the Constitution, mentioned above, gives the importance of efficiency and integrity of the staff, but it further says: "Due regard shall be paid also to the importance of recruiting the staff on as wide a geographical basis as possible." The problem of securing geographical distribution in origin of staff has been a recurring problem for all intergovernmental agencies. The League of Nations found that "a decision to think only of building an efficient staff and to let the blows to national *amour-propre* fall where they may, would be defensible in theory. But the results would be serious. A system which depends upon the co-operation of Member States cannot ignore the factor of national prestige and interest."

A regular staff originating from a single region and culture and/or with technical experience in certain "advanced" countries only, could not sponsor successfully a world-wide health and medical programme in which adaptation to local needs and co-operation with innumerable national and social groups are fundamental. It is fortunate, therefore, that the arrangements for the advisory technical staffs on the one hand, and the regular form of appointment for the central and regional administrations on the other, provide elasticity. This helps to satisfy the call for wide geographical distribution without necessarily neglecting technical standards in recruiting staff. Results of recruitment have to bear analysis by national delegations, diplomatic services, country administrations, and, perhaps the most important, by the medical and scientific professions of the world. Whether the technical standards and achievements of W.H.O., dependent upon the ability and skill of its staff, merit respect, will be judged by the medical groups of all countries.

Constitutions and policies are ultimately revealed in administrative action. Much of this outcome has been given above, but certain other administrative methods are selected for examination.

There is the type of public service created by W.H.O. to carry out its work. Several of the facts about it have been mentioned. It is already clear that W.H.O. does *not* have a large centralized force of permanent officials, doctors, sanitarians, nurses, laboratory people, and their administrative and clerical assistants. The intention of its constitution and of its legislative authority to advise governments, and not to assume supragovernmental status, is secured through two groups. Firstly, there is the regular staff who, as already indicated, perform the essential continuing technical and administrative functions and who assist in providing certain advisory and "permanent" general technical services. Then, secondly, as also previously mentioned, there is a large specially recruited technical staff to give direct assistance to governments. While they are on W.H.O. projects these people are under its general service code, which naturally requires, *inter alia*, observance of objectivity, and loyalty to the Organization.

The use of temporary and not "permanent" staff in this work has certain advantages. The technical problems vary from year to year and some conditions are unlikely to require continuing W.H.O. assistance. Only a very large permanent technical staff could meet such continually changing demands. Further, W.H.O.'s indirect method of work would mean almost insuperable difficulty in a truly

"permanent" staff retaining a specialized technical skill. An "expert" can continue as such only by constant direct practice in his special work.

Specially recruited staff, on the other hand, enables W.H.O. to seek the best available adviser for each particular local problem, to adjust country technical staff continuously to the needs of the moment, to avoid staff redundancy when programmes end, and to guard against an international organization depriving national services permanently of their own essential technical staff. In practice, most consultants and advisers have adjusted themselves well as international officers in new spheres of work. This type of service indeed enriches all concerned—the "receiving" and "giving" countries, the "expert," and W.H.O.

There is another extensive arrangement by which W.H.O. draws on the technical resources of the world. This is the wide use of expert advisory panels and committees. The Health Assembly and Executive Board rely on such bodies for the general technical guidance needed to prepare programme policy. Serving on them are large numbers of the world's eminent medical scientists and health administrators in the W.H.O. fields of work. This expert panel and committee system has considerable advantages. Again, W.H.O. is able to draw quickly, efficiently, and economically on the best skills and knowledge required for the problems of the moment. It has its technical policies governed by a wide range of experience and knowledge, unlikely to be concentrated in a permanent official full-time staff. These advantages, generally, more than balance certain well-recognized weaknesses of the committee system in technical subjects.

On the whole the W.H.O. expert committees are forming a suitable instrument for their purpose. They have provided the scientific guidance and stimulus for the adoption of the international health statistical nomenclatures, international sanitary regulations, pharmacopoeia, and biological standards. They too have advised the Organization on public health, clinical and laboratory aspects of tuberculosis, child health, nutrition, malaria, and many other subjects.

The expert opinion, whether from the panel, committee, or individual, is integrated into W.H.O. programmes by the Executive Board and the Director-General. The fact that the full views of the expert are not automatically endorsed is occasionally questioned. Quite naturally the expert does not always accept happily a decision allotting more weight to other than technical considerations. But any organization concerned in problems with political, economic, administrative, as well as technical features, is obviously unable on occasion to adopt immediately all the desirable proposals put to it.

Numerous medical institutions in many countries are linked with W.H.O. There are long-established international centres, such as those at London and Copenhagen holding the accepted international biological standards, the influenza centres in London and Washington linked with a world-wide network, and others in health statistics, virus, blood work, and a variety of subjects.

Relatively small money grants are the material contribution that W.H.O. makes to such centres—a contribution which in no way measures the valuable two-way interchange that occurs. On the one hand, through W.H.O. countries everywhere draw on the resources of the central system, with many medical, economic, and industrial advantages. On the other hand, medical institutions and professions of an increasing number of countries become active partners with W.H.O., thereby contributing and gaining many things.

Many critics, especially such individualists as medical men, will wonder if W.H.O. can avoid the more serious evils of over-organization and over-administration. They will think with Sir J. F. Wolfenden, Vice-Chancellor of the University of Reading, that "a cure must be found for the modern scourge of 'organization.'"

* Wolfenden, J. F.—Address to Conference of Education Association, London, January 3, 1952.

Bureaucratic Risks

Some of the answers have been given in this article when the Constitution and legislative policies were quoted as a protection against W.H.O. becoming an exaggerated, ever-expanding international civil service, busying itself with too much detail. However, there are bureaucratic risks. Meetings—legislative, expert, or liaison—are multiplying in international work, and correspondingly absorb staff, time, energy, and money. Meetings there must obviously be in any representative organization, but when does their number cause too much diversion from progressive work? A round of meetings, tours, and reports in national or international life too easily becomes an end instead of a means.

The meetings involving W.H.O. are only to a limited extent under the control of the Secretariat. Through its obligations and agreements W.H.O. must send representatives to numbers of both international and national meetings. To decline invitations is also too often a cause of aggrivement. Thus the Secretariat itself is restricted in its power to control meetings and travel. This must largely come from the Member States of the various international organizations themselves.

Another administrative element exposed to bureaucratic exaggeration is the production of reports and documents. As Jules Romains puts it: "The peculiar symptom that betrays the bureaucrat is an unslakable thirst for paper." Paper now pours forth in both national and international work—reports, publications, questionnaires, documents, and working papers. Many services use much of their time and energy merely to read and initial correctly this volume of paper. Again, the best administrator, not to be confused with the bureaucrat, desiring to treat paper as but a means to an end, can himself only partly cut off the flow. Much of it is demanded by assemblies, conferences, and committees, which it is his duty to serve. This could become an insidious evil if governing bodies and their servants accepted the report as the completion of a task instead of an item to reach that end.

This is but one of the many problems the modern organized world has in dealing with the method of communication. Much of the recent examination made by the University of London of the difficulties of communication applies to an international form of organization. A relevant example from this study is where Sir Geoffrey Vickers says: "The transmission of information is limited in the first place by logistics. The sender is absolutely limited by what the receiver can absorb in the time which he can spare from action. Volumes of paper which are circulated 'for information' are pulped without ever informing those for whom they were chiefly intended, simply because these recipients did not have or make time to read them."

The Executive Board of W.H.O. has been conscious of the obstruction to purposeful work of excessive meetings, travel, and paper. These problems, too, are under continuous scrutiny by the staff. This vigilance is to some extent the assurance that such flowerings of bureaucracy will be regularly pruned.

Medical and other scientists coming to work directly or indirectly with W.H.O. will perhaps find one administrative principle particularly reassuring. It is that the Secretariat operates on a basis of delegation of responsibility. The individual units manage their own affairs with the minimum of interference from others. The technical officers and groups are free, too, in their respective technical fields. Their proposals, translated to the administrative sphere, may be subject to administrative and financial influences, but intrinsic scientific and technical data and opinions are protected.

Conclusion

This brief account has but superficially given some of the main elements determining the methods of work of W.H.O. likely to interest the medical and similar

* Vickers, Sir G., *Studies in Communication*, p. 82, 1955. Martin Secker and Warburg, London.

professions. These circumstances explain both the limitations and the opportunities of those doctors and scientists from all countries assisting the Organization on its regular or temporary staffs. They cannot always have the full satisfaction of following all their own inclinations in what they do, nor of running their own institutions, nor of ignoring elements they may dislike.

They do have the reward of playing a worthy part in giving of their technical and human knowledge and skill to assist mankind everywhere; of joining with colleagues of all countries in the extension and diffusion of medical experience; and of presenting and advocating the cause of medicine in the international and intergovernmental counsels of the world. Perhaps no other group has such opportunity, indeed responsibility, for showing the possibilities for good in international association and work. Here is an important way to the inherent universality of the science and humanitarianism of medicine.

SYMPOSIUM ON ARTERIOSCLEROSIS

[FROM A SPECIAL CORRESPONDENT]

A conference on arteriosclerosis organized by the Swiss Academy of Medical Sciences was held in Basle from August 8 to 10. The president of the Academy, Professor A. GIGON, invited to the meeting research workers from 10 countries and 4 continents who are actively engaged in problems associated with arteriosclerosis.

Professor GIGON, opening the proceedings, outlined the basic idea behind the symposium. The programme was divided into two major sections. The first day was devoted to papers on blood vessel factors and arteriosclerosis, including all generalizations on morphological changes in the vessel walls and problems on the haemodynamics of the coronary system, and so on; these subjects were considered in a series of 10 papers. The second and third days were occupied by a series of 26 papers on the problems of metabolism and arteriosclerosis. This rather wide category was further subdivided into three sections—the blood lipids and lipoproteins, dietetic factors in arteriosclerosis, and hormonal factors in arteriosclerosis. The conference was completed by a discussion on the papers and additional discussion on the problem in general.

Professor Gigon explained that Professor G. Lyman Duff (Montreal) was to have presented the opening paper under the title of "A Survey of Recent Experimental Investigations of Arteriosclerosis," but with regret he had to announce that Professor Duff was unable to be present. Consequently he called upon Professor WILLIAM DOCK (New York) to give the opening lecture.

Problems Outlined

Professor DOCK, who had originally been scheduled to speak towards the end of the congress, chose for his lecture the provocative title "Are There Effective Ways of Managing Arteriosclerosis?" In a spirited address he made it quite clear at the outset that the answer to this question at the present time appeared to be definitely in the negative. He quickly gave a skilful outline of the many morphological and metabolic problems which confront the investigator in the field of arteriosclerosis, and drew attention to the anatomical difference which exists between the intima of the newborn male infant compared with the female infant as one possible factor predisposing the male to coronary atherogenesis. The well-known sex difference in the incidence of the clinical presentation of this disease between males and females in the white population was reviewed by the speaker, and he commented on the loss of immunity by females after the menopause. Professor Dock went on to say that one of the most striking results in the field of sex hormones in

* *The International Secretariat of the Future*, p. 22, 1944. The Royal Institute of International Affairs, London.

relationship to coronary artery disease had been the observations of W. S. Bauld and associates in Montreal, who had demonstrated that the metabolism of oestradiol-17 β was different in normal healthy males compared with males of the same age suffering from coronary artery disease.

The speaker then went on to the subject of diet and disease, and commented (without reference to the source of the information) upon the very high incidence of coronary deaths among young males called up for national service with the United States Forces. It appeared that this section of the American population is required to consume vast quantities of butter, cream, eggs, and animal fat during their military service, and Professor Dock implied that this parameter required immediate investigation. The possible role of cigarette smoking and the differences which appear to exist between the incidence of certain forms of arteriosclerosis in communities who ingest animal fats and the incidence in communities who ingest largely vegetable fats were very briefly mentioned. The speaker concluded by contrasting the economics of prescribing a diet designed to lower the serum cholesterol against the cost of the so-called hypocholesterolaemic drugs, and said that the patient nowadays required education in the cholesterol content of various foods and the cholesterol content of his own tissues. Thus he hoped that a return to a diet "normal for man" might be the method of choice of the Hippocratic physician.

Morphology

Among the many interesting papers presented in the period devoted to morphological studies was a communication delivered by Dr. P. COHRS (Hanover), who focused attention on the fact that the parrot exhibits spontaneously a type of atherosclerosis which is similar in appearance and distribution to that prevailing in man. The birds studied by the speaker varied a great deal in age, and some were known to be older than 30 years. The diets were of course uncontrolled, but it did seem to your correspondent that the parrot might have a useful place in investigations of this type, since the lesions were more closely related to those found in the human than those occurring in the lipoidoses in other birds such as ostriches and turkeys.

Professor A. MÜLLER (Fribourg) gave an authoritative account of some of his studies on the haemodynamics of the coronary system. He developed the mathematical arguments in favour of a sort of backward shock wave from the periphery towards the aorta, which leads to changes in the velocity of the blood in the coronary system of the order of 50–60 cm./0.2 sec. Professor Müller showed that the consequences of these effects would be most apparent at positions further removed from laminar flow, and this would be at the bends in the coronary system.

Professor J. B. DUGUID (Newcastle) put to the meeting in a concise manner his general thesis that the process which causes narrowing of the arterial system is not fatty change but thrombosis. This speaker went on to say that there were all types of thrombi, from the large type which filled the lumen down to small wisps of fibrin attached to the intima. The fibrin masses were often to be found covered by a layer of endothelium, and Professor Duguid concluded that thrombosis does not necessarily depend on fatty changes in the arteries, as in his view the fatty changes are the result, rather than the cause, of thrombosis. He emphasized that pathologists must differentiate between lesions which are primary fatty changes and secondary fatty changes seen after thrombosis.

Metabolic Factors

In the metabolism section of the congress Dr. F. T. LINDGREN (Berkeley) discussed the relationship of the blood lipids and lipoproteins and coronary disease. The plasma lipids are almost solely in the form of lipoproteins, and the author gave the chemical analysis of some of the low density lipoproteins. From studies which Dr. Lindgren had made as a member of Dr. Gofman's group in California, he

presented data to support the argument that the rate of development of arteriosclerosis can be calculated from ultracentrifugal analysis of the low and high density serum lipoproteins, and this information was computed into an "atherogenic index." It was shown that this index was higher in individuals with angina who went on to myocardial infarction than in another group who had angina only. It was shown that the atherogenic index was lowered by the administration of heparin or desiccated thyroid and also by the consumption of a low fat diet. The speaker concluded that, when an ultracentrifuge was not available, serum cholesterol studies should be combined with concurrent serum total lipid determinations in order to obtain maximum information.

Professor A. FASOLI (Milan) delivered an interesting paper on a study which he had made of the filter paper electrophoresis method of lipoprotein assay, contrasting this with the ultracentrifugal method. Professor Fasoli showed that the electrophoretically determined alpha:beta lipoprotein ratio must always be interpreted with great caution, as he had observed considerable variation in both normal and pathological serum samples.

Professor G. SCHETTLER (Marburg) showed that in several patients who appeared to be mildly hypercholesterolaemic a diet of about 1,000 calories daily for about 10 days produced a fall in the serum cholesterol of approximately 30%. He went on to discuss the effect of the unsaturated fatty acids in lowering the serum cholesterol, and concluded that a low fat diet and/or caloric restriction may be desirable in subjects who present with hypercholesterolaemia, but persistence over a long period would be required in order to establish the usefulness of this regime. This paper was followed by a similar contribution by Professor H. MALMROS (Lund), who also showed that vegetable fats lowered the serum cholesterol and mentioned that this effect was independent of the cholesterol content of the foodstuffs. Professor Malmros presented some of the results which he obtained in association with Professor A. Keys (Minneapolis) in which the serum cholesterol values of clerks, foremen, and heavy workers in Malmö, Sweden, were compared with similar workers in Naples, Italy; the Neapolitans were all significantly lower than the Swedes. Professor Malmros urged that only well-characterized acids should be employed in all studies on the effect of the so-called "essential fatty acids" on the serum cholesterol. He showed that the incorporation of these unsaturated fatty acids into a normal diet could keep the serum cholesterol down for periods up to six months in certain selected cases.

Alpha and Beta Lipoproteins

Professor D. P. BARR (New York) gave a review of some of the studies performed by his group, utilizing the modified Cohn fractionation procedure to derive the distribution of cholesterol between the alpha and beta lipoproteins of serum. The author pointed out the statistically significant difference which exists between the serum of normal young women and normal young men, the latter having less cholesterol bound to the alpha lipoprotein than the former. This sex difference completely disappeared in older "normal" subjects, but males or females with coronary artery disease always had a lower alpha:beta ratio than had "normal" subjects of comparable age. Professor Barr went on to show that the administration of 1 mg. of ethinyl oestradiol daily to subjects with abnormal lipoprotein patterns, such as occur in xanthomatous cases, coronary artery disease cases, cretins, and in cases of myxoedema, always resulted in the serum lipoproteins shifting towards normality.

Dr. G. S. BOYD (Edinburgh) reported that the administration of small doses of triiodothyronine and triiodothyroacetic acid could result in depression of the serum cholesterol without influencing the basal metabolic rates of the subjects, but larger doses of these drugs overcame this dissociated action with a resultant rise in the B.M.R. Speaking

Correspondence

Amnion Implantation in Peripheral Vascular Disease

SIR,—The treatment of peripheral vascular disease gives no cause for complacency, and Mr. E. Troensegaard-Hansen's paper (*Journal*, August 4, p. 262) is welcome in suggesting a possible new method of treatment for patients suffering from this distressing disease. I have been carrying out this method of treatment for about the same length of time and would like to record some of my impressions.

The first twelve patients that I treated were unselected, unlike Troensegaard-Hansen's, who has limited his cases to Boyd's classifications 1 and 2. The experience with these twelve cases showed that the treatment was really only of value in Boyd's type 2; it caused no real relief to those patients who had rest as well as exercise pain, for those with incipient gangrene, and, in addition, there was no evidence of any improvement in two patients who had Raynaud's disease. The interesting fact about the patients who did improve was that the improvement was entirely subjective. I was never able to achieve any objective improvement in support of the patients' claims. On every patient the blood pressure was carefully kept, and E.C.G. was taken before and after operation, prothrombin time was similarly estimated, oscillometry and skin thermometry were also carried out, and in none of these tests were any changes noted. For the next three cases, which were all of Boyd's type 2, I carried out in addition arteriograms before and after the amniotic implants, and no alteration was seen in the arterial pattern. I realize that this is a very small number and that the test is inconstant, but I think it does denote that there is no dramatic increase in the collateral circulation.

Since Walder¹ published his paper describing a method of measuring blood flow utilizing radioactive sodium, Dr. W. Kulke, consultant radiotherapist at the Liverpool Radium Institute, has used this technique in measuring blood flow before and after amniotic implants on six cases up to the present time, and the results conform quite closely with those published by Troensegaard-Hansen. In the published graphs, however, there are some points which are subject to criticism. In the first place the patients are exercised for two minutes prior to the amniotic implant; in many of our cases the patients cannot exercise for one minute owing to the onset of pain. Secondly, the inter-exercise hump as described in Fig. 2 has not been obtained by us in any case. Thirdly, in Figs. 9 and 11, the uptake of sodium after exercise appears to be greater than before or during, which is certainly not normal, and it is difficult to assess.

Clinically, the more recent cases that I have done have been successful, and I feel that this method of treatment may well have a selected place in the treatment of intermittent claudication. I think, however, that this article should be treated as a preliminary publication. There is no direct evidence for many of the hypotheses put forward in the discussion. There is also no evidence that nucleated cells in the epithelial zone are the active part, nor is there any proof that this action is specific to amnion. Much work requires to be done in the use of living tissues in producing a similar effect—possibly another serous membrane such as pleura or peritoneum—and only time can tell whether the effect of amnion will be permanent or whether relapses will increase as the period after implantation lengthens. Like other new methods of treatment, early results may be misleading and should be treated with considerable reserve and caution.

I should like to express my gratitude to Messrs. Smith and Nephew Research Ltd. for supplies of amnion and for their constant help and encouragement.—I am, etc.,

J. G. GOW.

Liverpool, 1.

REFERENCE

- 1 Walder, D. N., *Clin. Sci.*, 1953, 12, 153.

Nova et Vetera

ONLY EIGHTY YEARS AGO

Go back only 80 years, and in what an incredible world of medicine you find yourself! What masterly pharmacological orchestration! Come and look over the shoulder of Dr. Tschudi Madsen¹ as he peers at a tattered Prussian medical diary found hidden in the loft of a house in Bergen, the second largest town in Norway. In addition to the standard information characteristic of medical diaries, this volume had several spare pages into which a general medical practitioner, Dr. Harald Lehmann, had in 1873 crammed his medical records. He can have had no thought of ulterior publication as he jotted down his notes in a handwriting so fine that a magnifying glass is needed to decipher them. Many of his 543 patients, whose names are given, had patrician family names and were the social cream of this Hanseatic town. Their complaints? Much the same as those of 1956. But how varied the remedies for them! And how Hippocratic the differentiation of symptoms and diagnosis! For whooping-cough an infusion of tonka (from the African tonka bean). For phthisis, lichen Islandicus. For haemoptysis, salt, secale, and extractum hyoscyami. For catarrh with blood-stained sputum, cod-liver oil, rum, and milk. For asthenia, tinctura absinthii composita. For epilepsy, subcutaneous injections of ergotin in the nape of the neck. For goitre, a bag of salt on the spot every night. The versatile Lehmann took his remedies from the animal as well as from the vegetable kingdom, and he drew on the musk-ox (tinctura moschi for heart failure), the beaver, the Spanish fly (cantharides on the chest for asthma), and above all the leech. For pain in the praecordium and anywhere else, for exudative pleurisy, and for a bruised knee, always the leech. It was applied to the temples for tinnitus and for pneumonia running a fatal course. Eight leeches at a time *ad anum*. At about this time, when Lehmann was 56 years old, the sands had begun to run out for himself. He evidently referred to himself when he jotted down: "Icterus with stinking intestinal catarrh . . . lassitude . . . tar pills, tincturae aurantii and nucis vomicae, aqua regiae, and aqua ferripyrofosforici." Surely he had earned a holiday; and he took it in Italy with a small library consisting of the Bible, Baedeker, Björnson's poems, and three of Ibsen's plays. There was also a whole medicine chest. Its alphabetical list began with elixir paragoricum (good old tinct. camp. co.), and ended with vinegar. Tidy to the last, he had slipped into his medical diary a note of what he had paid for cab fares in Genoa, Naples, and Florence.

CLAUDE LILLINGSTON.

¹ T. Norske Laegeforen., 1956, 76, 120.

Effect of Fatty Meals on Blood Coagulability

SIR,—May I be permitted to reply to Professor H. W. Fullerton's comments (*Journal*, August 11, p. 356) on my paper (*Journal*, July 28, p. 207) on the effect of ingested fat on blood coagulation? My choice of the coronary arteries as an example of vessels commonly affected by atheroma was fortuitous: I might equally well have selected the aorta, where in fact atheroma is even more frequently found.¹ If atheroma was confined to, or even most frequently found in, the coronary vessels the unique character of the coronary blood flow might perhaps be incriminated as a necessary, if not effective, cause: but this is not the case. What Professor Fullerton does not mention is the correlation between the frequency of atheroma and the pulse pressure in various parts of the aorta. The pulse wave is greatest in the abdominal aorta, and it is here that atheroma is commonest. Yet there is no likelihood of systolic "reduction or cessation of flow" at this point which would "readily allow deposition of pre-formed fibrin" in the way he suggests as occurring in the coronary arteries as the earliest lesion of atheroma.

My main intention in repeating Professor Fullerton's experiments, using modified techniques, was to illustrate once more the importance of method in this field of research, and not to advance or repudiate a theory. However, there is one aspect of Professor Fullerton's hypothesis on which I would like to comment: it is the validity of using estimates of clotting time as a measure of blood coagulability. Under certain experimental conditions the clotting time of a specimen of blood is inversely proportional to its lipid content. This only means that the process of coagulation has been accelerated: it does not necessarily mean that coagulation is therefore more likely to take place, as the factors which govern the speed of coagulation are quite different from those controlling its inception.

I would close by reiterating my original point: that proportionality of clotting time to lipid content is found only in the absence of platelet activity. This does not occur in the body, and the phenomenon described is probably only a reflection of the ability of chylomicrons to imitate the action of platelets² and is not an indication of changes in blood "coagulability."—I am, etc.,

G. H. HALL.

London, W.6.

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- Cramer, W., and Pringle, H., *Quart. J. exp. Physiol.*, 1913, 6, 1.

Benzhexol in Parkinsonism

SIR,—I was frankly amazed to read the report on a series of cases of this distressing condition by Drs. H. B. Porteous and D. N. Ross (*Journal*, July 21, p. 138), and to learn that patients were, apparently, immediately put on 7.5 mg. of benzhexol hydrochloride daily, except in the case of one aged 80. This person was only given an initial dose of 5 mg. daily.

By experience as a mere general practitioner, I am obliged to be more cautious in my dosage. I find that for sometimes a week or even more I can only prescribe one-third of a 2-mg. tablet a day, but by dint of persevering the dose can be increased to the normal 6 mg. per day, and increased after that. One fails to see why a condition so chronic, albeit progressive, should receive the full impact of high doses. In all drugs where time is more of a secondary nature, an initial low approach is surely a "must."—I am, etc.,

Tonypany, Glam.

E. B. PHILLIPS.

Maladjusted Children

SIR,—I must thank your correspondents for their support in this matter. Dr. J. G. Howells's enterprise and initiative in Ipswich (*Journal*, July 21, p. 179) are admirable, and will, I hope, encourage others to do likewise.

I appreciate that many younger graduates have had more training in child psychiatry than was customary in my youth, but my experience with young graduates is that they have little practical knowledge of how to manage a case. They

usually know all about the Oedipus complex and forgot to ask whether the parents are still living together, and without a proper history remedial psychiatry is impossible. The course I had in mind for assistant medical officers of health (*Journal*, June 23, p. 1487) was of a more formal kind. Clinical lectures with actual cases are difficult to manage in the presence of more than a few students without disturbing the patient, and actual cases could be discussed in formal lectures, as well as more systematic tuition. In this way larger groups of medical officers could be instructed.

Dr. J. S. Owen's suggestion (*Journal*, July 7, p. 47) that some psychiatrists are not in favour of dilution is interesting. When I tried to persuade the late Sir James Spence that Newcastle was very backward in having no child guidance clinics, he took the opposite view. He was not at all sure that psychiatrists were the best people to treat maladjustment, or indeed mental diseases in general, and his view is shared by many physicians. We all think we understand human nature, but we must stop making jokes about psychiatrists, since this undermines patients' confidence. I suppose the reason behind the psychiatrists' objection to dilution is that a difficult case in unskilled hands may be worse after treatment. This is, of course, unanswerable, except that an important part of my training course would be the early recognition of such cases and their immediate referral to the psychiatrist. Another safe guide would be the lack of progress under treatment.

Sir David Henderson points out (*Journal*, August 27, 1955, p. 519) that of every hundred births eight will have a nervous breakdown and three of these will be of such severity as to require admission to a mental hospital, and the amount of minor illness, both purely functional and psychosomatic, which any practitioner sees is colossal. Indeed, any psychiatrist will be the first to admit that the only well-adjusted person he knows is himself.

Psychiatry has its limitations, but they are not considerable. The experience of totalitarian countries has shown how easily humanity can be conditioned, but we in the democracies have been very slow in following up Pavlov's work. Child guidance will not revolutionize our communities in a generation, but in time it can work wonders. Both Goethe and Plato, and no doubt many other philosophers, recognized the importance of the proper rearing of children for attaining an ideal state, and both considered that mothers were the last people to be entrusted with the care of their own children. While we consider to-day that difficult it can be with the unintelligent, or the mother who cannot bear the idea that she is the cause of her child's difficulty, but even the mothers of problem families can be trained—for example, as in London, where they are housed in blocks of flats with a permanent warden, which, with other recognized aids, should be fruitful. In time the method of rearing children would become common knowledge, and then 'twill be bliss to be alive.

As I said in my last letter, I look for your support, Sir, in filling the gaps in this most important branch of medicine.—I am, etc.,

MAX PARK.

Virilism with Mental Symptoms

SIR,—The case history given below seems worthy of record because of the unusual nature of the symptoms and the fact that to-day, ten years after medical and surgical treatment ceased, the patient is fit and well.

A married woman of 25 was referred for an opinion because a profound change had taken place in her habits and attitude towards others: from being a happy and active, though shy person, she had become silent, morose, and careless in her personal habits and appearance. The deterioration came gradually following the birth of her only child three years previously. Her husband reported that she had refused all medical attention. The patient remained almost silent during the first interview and kept muttering: "Let me die, let me die." She was unkempt and there was a luxuriant growth of hair on the chin with acne and scurfy

hair. Social conventions were disregarded, and she lounged in a chair smoking cigarettes. Beyond taking her pulse no examination was allowed. After several interviews the patient permitted a superficial examination. Her general condition was sound, but there was an excessive growth of hair on the abdomen and legs. Conversation was monosyllabic and it was impossible to establish any rapport. A diagnosis was made of a schizoid-depressive illness with marked endocrine disturbance.

Mr. L. R. Broster saw the patient in consultation, and he considered that her mental condition was related to an endocrine dysfunction. He advised operation, but this was declined by the patient and by her relatives. Eventually she was persuaded to enter a nursing-home, where she remained with special nurses for three months. Treatment began with was by E.C.T. and insulin shock, and followed by psychotherapy. An improvement took place after two months' treatment: conversation became connected, and it was possible to gain her co-operation in the simple psychotherapy which was used. While still careless in her dress, she was tidier, and her social adaptation improved, although her mental condition was unstable and erratic. Ultimately she accepted the need for further treatment and her relatives withdrew their objection to an operation. Special examinations followed: uroselectan and x-ray examinations of both kidneys showed a normal function; but the shadows of both adrenals were larger than normal. She was secreting 11.9 mg. of ketosteroids daily.

Mr. Broster again saw the patient and agreed to operate. On operation it was found that both adrenal glands were enlarged; the right ovary was cystic, and the left solid and without corpora lutea. The hypertrophied left adrenal—2 in. by 1 in. (5 cm. by 2.5 cm.)—was removed. Shortly after the operation the ketosteroid secretion showed a 50% reduction. The patient made an uninterrupted recovery from the operation, and after it she was able to depilate herself with satisfactory cosmetic effects. Her complexion improved, the acne disappeared, and her hair lost its scurfy appearance. There was a rapid improvement in her mental condition. For the first time in almost four years the patient undertook responsibility of a mild nature such as shopping. A notable feature was the development of initiative and the return of her sense of humour. After a few weeks' holiday she went home and resumed domestic life.

During the next two years progress was intermittent and there were relapses with a reappearance of the schizoid-depressive features and negativistic behaviour; but these symptoms cleared up without treatment. Progress since then has been steady, although the home circumstances required considerable patience and common sense. Three years ago—that is, seven years after medical treatment had terminated—the patient became pregnant, and after a normal pregnancy and confinement bore a healthy child. She is now leading a normal life, interested in her family and taking part in social activities.

The psychiatric treatment was successful up to a point, but the original gloomy prognosis remained until after the operation. The adrenalectomy was the decisive factor in treatment; without it she would almost certainly have ended her days in a mental hospital.—I am, etc.,

E. A. BENNET.

London, W.1.

Trendelenburg Tilt

SIR,—Few anaesthetists will disagree with the contention of Dr. J. M. Inglis and Mr. B. N. Brooke (*Journal*, August 11, p. 343) that modern anaesthetic technique can prevent that encroachment of the intestines upon the pelvic operating field which Trendelenburg's position was designed to diminish. Although their paper refers primarily to the steep tilt it nevertheless unfortunately implies that even a moderate (say 15°) tilt has no place in modern operating technique. During the synchronous combined excision of the rectum this degree of tilt is necessary if only to bring the perineum up to the level of the seated surgeon while

leaving the table as a whole low enough for the standing operator to work comfortably in the abdomen. I feel sure my surgical colleagues at St. Mark's Hospital would be reluctant to abandon the "lithotomy-Trendelenburg" position for that operation.

From the anaesthetic viewpoint the authors' remarks upon the disadvantages of the position raise issues calling for further comment. The impression is given that it is regarded as a disadvantage to have to use controlled respiration and a cuffed tube. It is disturbing that, 10 years after the introduction of curare into anaesthetic practice, reference to a "partially curarized diaphragm" working against gravity should be additional evidence of a widely held, semi-mystical belief in the virtue of inadequate spontaneous respiration, as compared with efficient controlled respiration. One had hoped that the routine use of an apnoeic technique in major abdominal surgery (with its corollary of a cuffed tube) would no longer be discouraged by writers associated with a teaching hospital centre.

As far as the vasomotor system is concerned, if the patient is moved into a moderate degree of tilt by stages during the interval between induction and the approach to the pelvis and returned to the horizontal even more gradually during the corresponding period between peritoneal closure and the return to bed, the hydrodynamic disturbances of the circulation are minimal and cause little apprehension even in known "cardiac" cases. The speed at which the table is tilted appears to be more important than its final angle. Although it would be easier if the tubing of National Blood Transfusion Service giving sets were 18 in. (45 cm.) longer, it is still possible to have the transfused arm retained alongside the patient whether he is horizontal or tilted. The nerve palsy objection (which anyway only applies to a steep tilt) is then met by careful placing of the shoulder-rests.

In short, Sir, I feel it would be a pity if surgeons who asked for a moderate degree of Trendelenburg tilt were left with the impression that they were presenting their anaesthetist colleagues with a major problem involving an increased hazard for the patient.—I am, etc.,

Loughton, Essex.

DONALD V. BATEMAN.

Antibodies Against Cancer

SIR,—Apropos your leading article (*Journal*, August 4, p. 290) on antibodies against cancer, would it be of interest to you to hear of the following experiment performed about 1940?

From an adenocarcinoma of the colon, removed at operation, about the size of a large cricket ball, non-tumour tissues were dissected away immediately as far as possible, and from the tumour masses an antigen was produced by the same method exactly as that used in the preparation in my laboratory of a Wassermann antigen, but using the malignant tissue in place of the human heart tissue. With this tumour-extracted antigen a Wassermann test was performed on about 25 of the sera which had been received that day for the ordinary Wassermann test, using the standard technique.

Two strong positives and one positive were found, and, on checking with the Wassermann bench, the results were identical with the Wassermann results: the remaining sera were negative by both tests.—I am, etc.,

Maidstone, Kent.

E. R. JONES.

Shoe-fitting by X Rays

SIR,—While Dr. E. D. Dyson (*Journal*, August 4, p. 269) has clearly indicated the hazards from the x-ray fluoroscopes so commonly used in the shoe shops of to-day and has indicated the need for control measures to prevent harm from this source, may I suggest that the opportunity be taken by the Ministry of Health committee to consider the total prohibition of the use of these machines in the fitting of children's footwear?

There is no doubt that these machines have been found to be an excellent medium for salesmanship, and are used

mainly to impress parents with the need for the purchase of new footwear on the grounds of short-fitting shoes. The machine, of course, cannot give a proper estimate of the fit of a shoe, since it is only able to relate the length of the foot skeleton to the length of the sole of the shoe. It is quite impossible for a machine of this kind to estimate the width or girth required to give a true fitting of a child's foot, although cumbersome devices, which are rarely used, exist which claim to do this. This, of course, is the really important part of shoe-fitting, and can only be done by trained and experienced fitters. The introduction of an x-ray machine to a shop gives a sense of false security to the shop assistants and to the prospective purchasers regarding the fitting of the shoe and encourages the use of untrained and uninstructed girls straight from school to practise their salesmanship. This is done on the basis of a shoe's pleasing appearance to the eye and the extremely doubtful advantage of having looked at the foot skeleton under a "pedoscope."

The high incidence of foot deformity among school-leaving girls (almost certainly in the region of 75% showing hallux valgus caused by bad fitting of footwear) does call for some control in the shoe-fitting practice of the country. If no one were allowed to fit shoes to children and no shoes were allowed to be sold without the fitting being done by a trained and qualified fitter, then the need for the pedoscope would be obviated, hallux valgus would become a thing of the past, and the potential hazards from shop x-rays would be eliminated.

I hope the Ministry's committee will be able to use its influence to prohibit the use of these machines and to obtain the trade's co-operation to a system of shoe-fitting which would rest upon the trained eye and hand rather than the pseudo-scientific fitting that is accepted so glibly by the general public under pressure of the boot and shoe trade. The harm that is being done to children's feet and health is not nearly so much from the radiation of this toy as from the ignorance of the poorly paid shop assistants, who are so often dependent upon commission on sales to enable them to secure a reasonably adequate livelihood.

Dr. Dyson's article has given us an opportunity to review the whole position in relation to children's shoe-fitting, and, as one who has been interested in this subject for a number of years, I feel this opportunity should not be allowed to pass without making a real step toward the prevention of hallux valgus among the population as a whole.—I am, etc.,

London, W.5.

W. G. BOOTH.

Medical Evidence at Inquests

SIR,—The letter (*Journal*, August 11, p. 356) of Dr. F. M. Rose, of Preston, as to coroners is of significant interest: I have no doubt that the present system is capable of improvement both locally, for some local authorities do not find it possible to see to all the needs of the coroner, and generally by alteration of the law. But the work has to be done by someone. Coroners as a whole are not averse to comment, even adverse comment, upon their methods, but it should be accurate. Dr. Rose clearly knows something about the subject-matter of his letter, but his allegation about a block grant is entirely untrue: his conclusion that the coroner personally benefits ("a direct saving to the coroner personally") appears to be almost libellous, though no person with any knowledge would take it seriously. How does he justify it, or does he retract?—I am, etc.,

London S.E.1.

W. B. PURCHASE.

Chiropody Associations

SIR,—In your issue of August 4 (p. 308) you report an exchange of views between Mr. Somerville Hastings, M.P., and Mr. Robert Carr, M.P., the Parliamentary Secretary to the Minister of Labour, regarding the recognition of the Society of Chiropodists, during which Mr. Carr stated that "The British register was maintained by the B.M.A., which recognized only the Society."

I think, for reasons of clarity, it should be pointed out that the "British register" (by which is meant the *National Register of Medical Auxiliary Services*, maintained and published by the Board of Registration of Medical Auxiliaries) is not maintained by the B.M.A., as such. The Board is an independent body set up in 1936 jointly by the B.M.A., the Society of Apothecaries of London, and a number of medical auxiliary organizations, to establish a register of properly qualified medical auxiliaries. The Society of Chiropodists is the only chiropody body recognized by the Board, because it is the only body whose standards of training, curriculum, and ethical rules are considered adequate.—I am, etc.,

London, W.C.1.

A. M. A. MOORE,
President,
Board of Registration of Medical Auxiliaries.

Invalid Aid

SIR,—As a sufferer from Parkinson's disease, I find that one of its many disabilities is the difficulty of getting in and out of a bath. In hospitals it is hard work for one male nurse or two female nurses, and a frightening performance. At home I can do this practically unaided owing to a simple arrangement my wife devised some years ago to enable her to manage unassisted.

This device is a strong right-angled steel rod, fixed across and above the bath: one arm enters the wall through a socket 14 in. (35.5 cm.) above the rim of the bath, and 17 in. (43 cm.) from the taps; the other arm is firmly fixed into a 6-in. (15-cm.) socket screwed to the floor, leaving a clearance of 8½ in. (21.5 cm.) between it and the side of the bath to facilitate cleaning. Where the bath stands clear of the wall two vertical and one horizontal rods would be necessary and probably a central stay rod at right angles to the horizontal rod, fixed to the wall beyond the taps or right-angled to the floor.

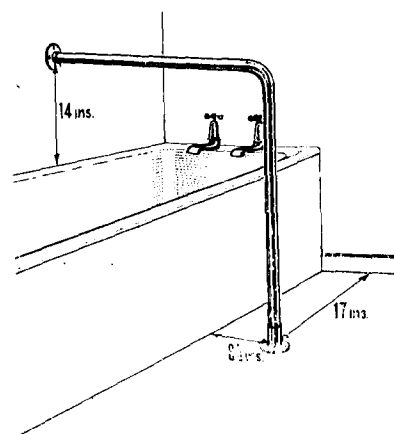
Provided a person is able to use his arms it is very much easier to lower or pull himself up in the forward plane and especially in conditions where balance is affected. Most elderly, weak, or disabled people would find this arrangement a much greater help than side rails, and the use of it entails much less strain on the nursing staff with consequent time-saving, one nurse being able to manage with ease where two would normally be required.—I am, etc.,

Newcastle, Co. Down.

F. S. MAYNE.

Effect of Glycyrrhetic Acid on Eczema

SIR,—Recently glycyrrhetic acid has been introduced in dermatology as having a similar action to hydrocortisone. We have tried to assess its value on a series of in-patients with various patterns of eczema, using the paired limb comparison technique, employing independent observers, and deciding the effect without knowing on which side the control ointment was applied. The preparations of glycyrrhetic acid used were a 2% ointment supplied by Genatosan, and in the last six patients a 2% ointment marketed by Biorex Ltd. We first compared the effect with 1% hydrocortisone, and in eight patients the response to the hydrocortisone was greater. We next compared glycyrrhetic acid ointment with ung. emulsificans aquosum (B.P.) and later with the



exact inert base. In 12 out of 19 patients the side treated with the active ointment showed no difference from the control side. In three the active ointment was slightly better, and in four the inert base was slightly better. There did not appear to be any difference in the effect of the two makes of the glycyrrhetic acid.

From this small series of cases it would seem probable that glycyrrhetic acid in the two preparations used has no effect.—We are, etc.,

Bristol.

ROBERT P. WARIN,
CLIFFORD D. EVANS.

Sickling in African Community

SIR,—Drs. H. Lehmann and A. B. Raper are to be congratulated on the important contribution they have made to the problem of sickling in African communities (*Journal*, August 11, p. 333), but their article contains one misleading suggestion. It is not true that the loss of life from malaria acting differentially upon the normal homozygote can be reduced by the simple expedient of deferring malarial mortality until other diseases have reduced the child population. Their own figures show this to be an illusion. Thus in Table III they postulate 157 deaths of AA homozygotes from a mean population of ½ (648+491), or a mortality of 27%. Table IV shows 69 deaths from a mean population of ½ (282+213), again a mortality of over 27%. The reference to 6.9% of all children born alive is a red herring.

It is possible to carry the authors' conclusions a step further. Having considered the elimination of normal homozygotes both before and then after other mortality, they continue: "If malaria is imagined as causing deaths concurrently with other diseases . . . the figures observed would lie somewhere between the limits assigned." The "limits" referred to are in effect one and the same mortality of 27%, and it is easy to show that it remains the same even with concurrent mortality. Let us assume that the population is reduced by death so as to follow an exponential curve expressed by the equation $N.e^{-at}$, where N is the initial population and " a " the exponential rate of decline. Let " μ " be the uniform mortality affecting all children, and " m " the mortality due to malaria operating upon normal homozygotes only. The two population curves are then $P.e^{-\mu t}$ and $P.e^{-(\mu+m)t}$ respectively. The ratio of these populations at the onset is P/P or unity and after the lapse of time " t " becomes $\frac{P.e^{-\mu t}}{P.e^{-(\mu+m)t}}$ or e^{-mt} . In other words, the proportional reduction due to malaria is independent of other mortality operating and will be the same whether acting alone or concurrently.

The authors quote mortality rates from the Belgian Congo of 22 deaths from malaria per 1,000 per annum below the age of 3, and from Accra of 17 per 1,000 under 1 year and 10 per 1,000 from ages 1 to 5 years. These account for approximately 66 and 57 deaths per 1,000 exposed to infection and are still far from the required 27%. Support for the views that these rates are not far from the maximum likely to be found in susceptible populations can be given from data referring to Uganda itself. An analysis was made of all registered deaths of non-Africans in Uganda in the five-year periods straddling the years in which a census was taken. The death rates per 1,000 per annum from malaria in its widest meaning were:

	Death Rates per 1,000 per Annum			Cumulative Mortality to Age 15 per 1,000
	Under 1 Year	1-4 Years	5-14 Years	
1909-13	4	6	4	68
1919-23	5	1	2	29
1929-33	7	8	14	29
1946-50	2.9	3.6	6	12.5

These figures include deaths from "fever" and "cerebral malaria" as well as microscopically confirmed malaria, but

on the other hand it is likely that deaths in the first months of life may be underestimated. The influence of modern methods of control is well illustrated, and it is interesting that the earliest rate approximates so well to that found among African children elsewhere.

From the available data there is still seen to be a big gap to be closed between the 24% reduction in population needed by this hypothesis and the 7% or so which malaria can effect. If sickling heterozygotes are not completely immune to malaria the gap would of course become larger.—I am, etc.,

Dundee.

WILLIAM A. WILSON.

Prevention of Tetanus

SIR,—Your leading article (*Journal*, August 11, p. 348) emphasizes some of the difficulties inherent in the application of passive immunization against tetanus and renews the doubts which have recently arisen as to its overall prophylactic value. Few will now question the preference for active immunization; it is the practical difficulties which are the barrier retarding progress towards a complete civilian active immunization comparable with that pertaining in the Services.

The early fears that the use of the triple toxoid would necessarily result in the lowering of the antitoxin titres of any one of the three has now largely been dispelled by the recent work of Barr *et al.*¹ and Ungar.² But the more potent deterrent seems to be the question of the cost of mass triple toxoid immunization, and this boggy is frequently used as an argument against its introduction. It is a difficult one to refute, since it is not easy to ascertain what the present practice of passive immunization costs the nation. It can only be pointed out that in the three hospitals reviewed³ the yearly cost of passive immunization alone must have been nearly £400, and that at least one large supplier of the diphtheria-tetanus-pertussis prophylactic makes no additional charge for the tetanus constituent of D.T.P.P. as against that for the diphtheria-pertussis prophylactic. One presumes that the Ministry of Health could, without difficulty, ascertain the saving of cost to the nation which active immunization might well afford apart from its intrinsic value, and could dispel the possible illusion that such an innovation would be as costly as is often suggested.

Finally, many recent authorities in America, Australia, and in this country have urged the necessity for a record card for inoculations and have deprecated haphazard and unrecorded immunizations. It has already been suggested that there seems to be no valid reason why the National Health Medical Card (form E.C.4) should not be redesigned to cover this need. Once again this suggestion has to overcome the inertia of the Ministry of Health before it can be implemented. The sooner a start is made in that quarter the sooner will civilian prophylaxis become as efficient as the excellent Barr-Sachs report⁴ indicates that it has become in the armed Services.—I am, etc.,

London, N.W.1.

N. H. MOYNIHAN.

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Food-poisoning

SIR,—The main efforts to control food-poisoning in this country have been concentrated upon improving hygiene in kitchens and other places where food is prepared or sold. Despite the fact that this campaign has been waged for several years, the incidence of food-poisoning is still increasing. Sir William Savage (*Journal*, August 11, p. 317) is of the opinion that increased methods of exhortation will be necessary before this campaign has any great effect. Although this may be so, I believe, at least as far as salmonella infection is concerned, that it could be very

Obituary

E. M. LOURIE, M.B., M.R.C.P., D.P.H.

Dr. E. M. Lourie, chief of the Section of Biological Standardization of the World Health Organization, died suddenly in Geneva on August 11 at the age of 52.

Born at Johannesburg, South Africa, on February 18, 1904, Emanuel Mannie Lourie obtained the London Conjoint diploma in 1927 and the London degrees of M.B., B.S. in 1928, after receiving his medical education at the University College Hospital Medical School. He took the D.T.M.&H. of the London School of Hygiene and Tropical Medicine in 1930, the D.P.H. in 1934, and was elected M.R.C.P. in 1948. Two years after qualification Lourie went to Palestine to work on leishmaniasis with his friend, Professor Saul Adler. In 1930 he joined the staff of the Liverpool School of Tropical Medicine, and in the following year became Rockefeller Research Fellow of the Medical Research Council and worked in Chicago with Professor W. H. Taliaferro. There he devised a method for testing drugs on avian malaria which subsequently was adopted in laboratories throughout the world. In 1934 he returned to Liverpool as a Beit Memorial Fellow under the direction of Professor Warrington Yorke, with whom he was intimately associated in continuous work on the chemotherapy of protozoal infections until the death of Professor Yorke in 1943. Lourie was then appointed the first director of the department of chemotherapy of the Liverpool School of Tropical Medicine and so served until 1948. After a short period in the department of pharmacology in Oxford he finally assumed the office of chief of the Section of Biological Standardization of the World Health Organization, a post which he held until his untimely death. In 1945 he was awarded the Chalmers Memorial Gold Medal by the Royal Society of Tropical Medicine and Hygiene for his outstanding contributions to tropical medicine.

A man of ability, indefatigable industry, and complete intellectual honesty, Lourie's publications were numerous and of high quality. The pharmacology of the synthetic drugs and the problem of drug-fastness were his special interest, and he did much to advance knowledge in each of these fields and published many papers on these and allied subjects. Together with Warrington Yorke he discovered the diamidine series of drugs and developed them in the treatment of protozoal infections of animals. When penicillin first became available it was Lourie who showed its efficacy against spirochaetal infections in laboratory animals and forecast its role in the treatment of human syphilis. This shortly afterwards was substantiated by himself and others. During the early years of the second world war he was in West Africa investigating an epidemic of sleeping sickness, and there he initiated extensive field trials on the treatment of the disease with the diamidine group of drugs, which fulfilled the promise of his initial experiments. On his return home the ship in which he and his wife were travelling was torpedoed.

As a man, Lourie was charming and accomplished, and a delectable companion; no mean athlete, he equally was interested in the arts and muses. Of great personal integrity, he was singularly free from a desire for personal advancement and from those jealousies which may cloud scientific endeavour. His generosity to his junior colleagues is evident in the lists of authorship

profitably aided by directing a little more attention at points earlier in the process of food production.

As an example of this, may I refer to the position with regard to emergency-slaughtered animals? For the benefit of your readers who are not acquainted with meat production I would mention that these are sick animals taken to abattoirs for slaughter in the hope that their carcasses will be suitable for human consumption. In large abattoirs a room is set aside for the slaughter of such animals, but in many small ones all animals, sick and healthy, have to be slaughtered out of necessity in the same room and by the same personnel. Meat inspection in these small abattoirs is usually not a continuous process, and consequently some considerable delay may occur before an emergency-slaughtered animal is officially inspected, during which time the slaughter of healthy animals continues.

Emergency-slaughtered animals have been responsible for some of the most severe outbreaks of food-poisoning ever recorded. It is not unusual, too, for some of them to be found to be suffering clinically from other diseases, such as tuberculosis, that are communicable to human beings. I firmly believe that emergency-slaughtering, particularly in the small abattoirs, merits much more serious attention from those concerned with the maintenance of public health.—I am, etc.,

Stock, Essex.

H. WILLIAMS SMITH.

Broken Probe

SIR,—May I suggest that Dr. G. H. Gibbens (*Journal*, July 28, p. 240) buy one or two Jobson Horne's probes? These are standard equipment in E.N.T. work and will do all that his pieces of wire will do and will last longer than the owner. They are made of stainless steel and are about 18 cm. long and 2-3 mm. thick in the middle of the shaft, which is usually octagonal in cross-section and tapers towards the ends, one of which is flattened with fine lateral serrations on the terminal 1.5 cm. or so and the other of which carries a fine loop about 3 mm. in diameter.

The use of cut wire, as described by Dr. Gibbens, to do anything with an eye (or an ear) seems unwise. It is impossible to cut wire without leaving the ends rough. If the art of digital eversion of eyelids has not been acquired, a wooden "applicator" is the best instrument. The applicator undoubtedly is unsatisfactory, because of its excessive diameter, for mopping out ears. However, if any reader can suggest something more suitable for use at home by patients' relatives in those cases needing more frequent aural toilet than can be given by the practitioner, I shall be glad to hear of it.—I am, etc.,

Gaillimh, Ireland.

SEAGHAN UA CONCHUBHAIR.

POINTS FROM LETTERS

"Pop-gun" Containers

Dr. JOHN M. HARDY (Burnley, Lancs) writes: May I draw attention to a danger to children from the plastic containers of tablets with a well-fitting cork? When empty and with the stopper in position, a sudden squeeze projects the stopper with remarkable force—certainly equivalent to the old cork "pop-gun."

Innovation in Technique for Dental Gas

Dr. C. J. COOPER (Blanes, Spain) writes: "... A suitable mouth prop is inserted ... and the child is instructed to blow out and in through the nose" (*Journal*, May 12, p. 1085—my italics). Dr. Arthur Tom appears to have thought of everything in his paper "An Innovation in Technique for Dental Gas," so I shall not cavil at the slight misuse of language in saying "blow ... in" for "breathe in" when referring to the nose, if in practice he gets the more forcible respirations that he wants. But I should like to know why he does not simply say to his young patients, "Put your tongue on the roof of your mouth (or put your tongue up) and breathe hard in and out." Is it not possible that those whose "nasal respiration is not satisfactory" have simply omitted to put their tongues up in the moment of stress? The child has his mouth propped open and cannot ask questions, so is it not important to give very clear instructions?

of papers on which his name appears. They and his very numerous friends in various parts of the world share a great sense of loss with his wife, Olga, and their young son, Michael.—A. R. D. A.

LILIAN HUTTON, M.B., D.P.M.

The death of Dr. Lilian Hutton at the age of 52 on August 8 after a long illness has brought a sense of grief to her colleagues and patients, whom she so loved, at the Burden Neurological Institute, Bristol, at which she was clinical director.

Lilian Hutton was born on March 25, 1904, and was trained at the Royal Free Hospital, London, graduating M.B., B.S., London, in 1928. Her early experience in psychiatry was obtained at Harton Hospital, South Shields, and at Rainhill Hospital, Liverpool. In 1932 she took the D.P.M. of the English Royal Colleges, and in the following year obtained an appointment at Horton Hospital, Epsom. She left Epsom in 1939 to join the staff of the Burden Neurological Institute.

Dr. W. D. NICOL writes: In 1933 Lilian Hutton came south and I had the good fortune to have her as a colleague at Horton Hospital. She was the first medical officer to receive a clinical research appointment under the London County Council, and for some seven years she worked with me at the special malaria therapy centre, now the Mott Clinic, for the treatment of neurosyphilis. Her flair for research and her keen industry made for a happy team with Mr. Shute and myself, and several papers on the problems of neurosyphilis and malaria were published. It was a matter for regret at Horton when Dr. Hutton left to join Professor F. L. Golla as the clinical director of the Burden Neurological Institute. I always felt that there she was given a wider scope for her researches and I am sure the hopes which she entertained were abundantly fulfilled. At the Burden Institute her activities were switched to psychotherapeutic problems of the neuroses. Lilian Hutton was a remarkable person, and her death at the height of her powers is a severe loss to psychological medicine. To her mother, with whom she lived, we extend our sympathy.

Professor F. L. GOLLA writes: Dr. Hutton always desired to engage in psychotherapeutic research unhampered by the many difficulties and restrictions incidental to the organization of a large public hospital, and hence was willing to accept the joining the Burden Neurological Institute to accept the material sacrifices involved in exchanging a Government position for the freedom of an autonomous research centre. Her earlier work at Horton in the establishment of the celebrated clinic for the malarial treatment of neurosyphilis, and her researches on the aetiology of schizophrenia at the Central Pathological Laboratory at Denmark Hill, made it possible for her to appreciate the nexus between the bodily and mental disorder with full recognition of the validity of both psychological and physiological research methods.

At the Burden Neurological Institute in 1939, when she assisted at the introduction of electric convulsion therapy and leucotomy into this country, she published some pioneer papers on the psychological results of these methods and later participated in research work on imagery and neuroendocrinology. When war conditions made access to research patients easier she was able to devote herself to research on the psychotherapy of neurotic conditions. Both as a clinician and as a laboratory worker she was very alive to the value of the contributions of physiological psychology, but she had the wisdom to realize that in the present state of our knowledge there is little to be gained, and much to lose, by any attempt to elucidate disorders of conduct by an exclusive use of either physiological or psychological methods. She considered a pragmatic approach as the one

likely to be most fruitful. But, though she refused to be limited by methodological considerations, she came to see more and more clearly that phenomenism is not enough when we apply our methods of description to psychiatry.

Of a deeply religious nature, she felt that no system of psychotherapy is likely to succeed if it does not attempt to deal with the patient's spiritual difficulties. Though she subscribed to the teaching of Jung, that a neurotic is essentially a person in search of his soul, she felt that Jung's concept could be more fully expressed by a more activist attribution. To love, not to be loved, is, she maintained, the ultimate goal, in the quest for which psychological medicine requires the aid of religion. Love thus understood is not merely intrapersonal but must so be directed as to embrace the eternal values.

In her small clinic of in-patients and her larger collection of out-patients she obtained remarkable success with cases of neurotics of many years' standing. In some such cases that had hitherto proved to be refractory to every form of treatment her results were both dramatic and permanent. Though she wrote little her fame spread to other countries, and much of her time was given to answering inquiries from abroad and in interviewing colleagues from all parts of Britain. At the time of her death she was actively engaged in collating her great mass of clinical observations with a view to publication. She was loved by her patients and loved and admired by her colleagues. Those who knew her only as a physician mourn the loss in the fullness of her powers of a very great teacher and healer, and it is little short of a calamity that her early death has finally prevented her views from becoming made widely known.

H. P. PICKERILL, C.B.E., M.D., Ch.M., M.D.S.
F.R.A.C.S.

Mr. H. P. Pickerill, consulting plastic surgeon to the Wellington Hospital, New Zealand, died on August 10 at the age of 77.

Henry Percy Pickerill was born in England, at Hereford, in 1879, and was educated at Hereford College. In 1896 he was articled to a dental surgeon in Hereford, where he worked until 1900, when he entered Birmingham University as a dental student. He had a brilliant career there, winning the Charles Greene Memorial Medal and the senior prize among other awards. He obtained the diploma of L.D.S. of the Royal College of Surgeons of England in 1903 and the Birmingham B.D.S. in the following year. Having decided to take a medical qualification, he graduated M.B., Ch.B. in 1905 while holding the appointment of demonstrator at the Birmingham Dental Hospital. In 1906 he became assistant surgeon at the hospital and lecturer on dental histology and pathology in the university. In 1911 he was awarded the Cartwright Prize and Medal by the Royal College of Surgeons of England for his essay on the prevention of dental caries, and in the same year he proceeded to the M.D. and the M.D.S.

Soon afterwards Pickerill went to New Zealand, where he held a teaching post at the University of Otago. But the first world war brought him back to England as a member of the 1st New Zealand Expeditionary Force. Eventually he attained the rank of lieutenant-colonel in the New Zealand Medical Corps and became officer in command of the New Zealand section at Queen Mary's Hospital for facial injuries at Sidcup, in Kent. By this time he was widely known for his skill as a plastic surgeon, and for his services he was appointed O.B.E. in the 1919 Birthday Honours. He was promoted C.B.E. in the New Year Honours of 1923 for valuable services rendered since the war in connexion

with facial and jaw operations on wounded soldiers in New Zealand. In the same year he proceeded to the Ch.M. After the war Pickerill returned to his work in New Zealand, being appointed surgeon in charge of the facial and jaw department at the Dunedin General Hospital and director of the dental school of the University of Otago. In 1927 he moved to Australia and settled in practice in Sydney, becoming honorary plastic surgeon to the Royal North Shore Hospital there. He did not stay long in Australia, however, but went back to New Zealand in 1935, this time to Wellington, where he was plastic surgeon to the Wellington Hospital and, later, to the Middlemore Hospital, Auckland. He was elected a Fellow of the Royal Australasian College of Surgeons in 1930. In later years he and his wife, who is also a plastic surgeon, did much valuable work at the Bassam Hospital, Lower Hutt, correcting congenital deformities in children.

A member of the British Medical Association for nearly fifty years, Pickerill was chairman of the Otago Division in 1922. He was also a foundation member of the British Association of Plastic Surgeons; a former vice-president of the Section of Odontology of the Royal Society of Medicine; and an honorary member of the Société Belge de Stomatologie. An expert on facial surgery, he contributed numerous papers on his special subject to the literature. He was twice married: first, in 1906, to Miss Mabel Knott, and secondly, in 1934, to Miss Cecily M. Clarkson, a medical graduate of the University of New Zealand. He had three sons and two daughters.

Dr. L. D. B. COGAN died at his home at Northampton on August 6 at the age of 81. Lee Danby Buxton Cogan was born on January 23, 1875, the son of Dr. L. F. Cogan, who was medical officer of health for the county borough of Northampton for twenty-six years and a justice of the peace there. From Epsom College he went on to Guy's Hospital, qualifying L.S.A. in 1898. He saw service as a medical officer with the Ashanti Field Force and in the Northern Territories of the Gold Coast before qualifying for the diploma of L.R.C.S.Ed. in 1903. A little later he settled in general practice at Northampton in partnership with his father. Always keen on the Volunteer movement, Dr. Cogan joined the Territorial Army as a lieutenant in the R.A.M.C. some years before the outbreak of the first world war in 1914, during which he was present at the Gallipoli landings. Later he held the post of assistant director of medical services of the 29th and Southern Divisions, and was in command of the 88th Field Ambulance with the acting rank of lieutenant-colonel when he was awarded the D.S.O. in the 1919 New Year Honours. He was also mentioned in dispatches. After the war he returned to his practice at Northampton, and for a time acted as senior clinical assistant at the Metropolitan Ear, Nose, and Throat Hospital when the hospital was in Fitzroy Square, London. In 1925 he obtained the diploma of L.M.S.S.A. For many years he was medical officer to the Northampton Post Office and factory surgeon for the Northampton district. He was also medical officer to the prison. In 1935 he was president of the Medical Practitioners' Union and had served on the council of the Union. From 1938 until he resigned in 1953 Dr. Cogan was a member of the Northampton County Borough Council, being appointed an alderman in 1952. He leaves a widow, one son, and three daughters.

With the death of Dr. H. C. BARTLETT on June 16 Saffron Walden has lost one of her oldest and most distinguished citizens. He was 92 years of age. Born in London on July 7, 1863, Hedley Coward Bartlett began his medical career at the age of 16 as an apprentice to Dr. Henry

Stear, a general practitioner in the market town of Saffron Walden, in Essex. After qualifying M.R.C.S., L.R.C.P. from the Middlesex Hospital in 1886, he held a number of house appointments at the Middlesex Hospital and also became clinical assistant at the Royal London Ophthalmic Hospital. Later he returned to Saffron Walden as a general practitioner, having bought Dr. Stear's practice on the latter's retirement. He practised there for over fifty years and was on the staff at the Saffron Walden General Hospital for over forty-three years as surgeon (1890-1933) and later as senior surgeon. During the first world war he was locally responsible for two Red Cross hospitals for convalescent soldiers and also for the wounded at the Saffron Walden General Hospital. He practised midwifery in remote cottages and farmhouses, often assisted only by a "handy woman" and a coachman holding a lamp. Dr. Bartlett practised in an age when the tradition of the family doctor played a vital part in the lives of the community. He was friend and confidant, and many to-day still pay tribute to his kindness and brilliance as a surgeon and his devotion to medicine and healing. In the early days Dr. Bartlett covered many miles on his rounds in carriage and pair or in a dog-cart. He was an early pioneer of motoring and one of the first doctors in East Anglia to possess a motor-car. Interested in the legal aspect of medicine, he was called to the Bar at Gray's Inn. He was a member of the Medico-Legal Society and medical referee for many insurance companies. He was a Fellow of the Society of Antiquaries, being particularly interested in old furniture, of which he made a large collection. In 1912 he bought and restored a small mediaeval castle, known as Pembridge Castle, on the Welsh border, where he lived after he retired in 1939. In 1891 he married Miss Flora Sibley, daughter of Dr. Septimus Sibley, a London general practitioner. She died in 1948. He is survived by one son and four daughters. His eldest daughter on qualifying went into partnership with her father, the son joining the partnership ten years later.

The obituary of Dr. D. F. WHITAKER was printed in the *Journal* of August 11 (p. 365). C. M. S. writes: May a further tribute to Donald Whitaker be paid by one privileged to claim friendship with him, particularly on central committees during the past five years? No one could fail to be impressed by his deep sincerity, which added great weight to his invariably sound opinion. Ever jealous of the honour and traditions of his beloved profession, he had, like so many of his generation, become increasingly perturbed at many of the effects and implications of the N.H.S. that have become increasingly apparent since 1948: but nevertheless he firmly continued to give of his best, with far too great a strain on his constitution. Few committees could ever have had a more conscientious and valuable member, and yet, with it all, he managed to enjoy the good things of life to the full, as evidenced at the Brighton Meeting. He was impatient with the second-rate, and his acuity of vision enabled him to detect the sham when covered by a mask of plausibility.

W. E. S. writes: May I, as a fellow student of Donald Whitaker at University College Hospital, add a few words to the obituary notice published in the *Journal*? As a student he was a keen member of the hospital rugby team and an active supporter of numerous student functions. He was a tall man of distinguished appearance, but spoke always in a quiet voice, giving an outward impression of imperturbability. His dealings with patients were marked by conscientiousness, kindness, and common sense. Although in later years he became a member of many committees, his sense of humour prevented him from becoming pontifical. He was brought up in Hendon, where he retained many contacts and will be much missed, as also at the annual gatherings of old U.C.H. students. He married a daughter of the well-known surgeon, the late Mr. Mower White, and had three children, one of whom is entering the medical profession. To them and his widow deep sympathy is extended in their bereavement.

Medico-Legal

EYES OFFERED TO SAVE SIGHT NOT TO BE USED FROM LIVING PERSONS

Miss Pat Hornsby-Smith, Parliamentary Secretary, Ministry of Health, has stated why the Ministry could not take advantage of the offer a number of people had made to give in their lifetime one of their eyes to help save the sight of other people who would otherwise be completely blind. Replying to Lieutenant-Colonel Marcus Lipton, Labour M.P. for Brixton, who asked for an official ruling from the Ministry, Miss Hornsby-Smith says in a letter dated August 13 that similar offers have been made from time to time direct to the department. "The law on the matter is not certain, but I am advised that it is at least possible that for a surgeon deliberately to remove a sound eye from a living person, even with that person's consent, might be held to be a criminal offence. In any case it seems most unlikely that surgeons would be willing to perform the operation. At the same time I am glad to be able to let you know that we have recently been able to improve the arrangements for supplying the hospitals which carry out corneal grafting with eyes derived from patients who have died in these hospitals, and we hope that the shortage from which these hospitals have been suffering is being brought to an end. None of this, of course, detracts in any way from the splendid spirit of the people who have offered to give their eyes while they are still alive."

Universities and Colleges

UNIVERSITY OF CAMBRIDGE

In Congregation on August 4 the following degrees were conferred:

M.D.—J. M. S. Knott, I. H. Mills, K. Brown-Grant, R. H. B. Protheroe, J. P. D. Thomas, M. F. Bethell, M. T. Parker.
M.B., B.Chir.—A. H. H. Johnson, *R. W. Lister, B. M. King, V. Whitehead, *J. A. D. Todd, F. Mansfield, *P. S. Bentlif, *P. D. Jackson, J. Shaw, *W. R. B. Jones, *G. Maisel.
M.B.—*L. G. Whitby, N. F. Jones, R. E. Scott, *G. M. Petrie, *G. Yates, *C. P. K. Watson, *R. T. Barrie-Adshad, *A. L. Gunn, T. W. Young, *R. W. M. Smith, *O. W. Hill, *R. K. L. Percival Smith, J. K. L. Jones, G. E. G. Williams, *C. A. Fox, G. W. M. Faris, N. D. Kilpatrick, M. G. Smedley, P. C. Bewes, T. W. Hoskins, *P. F. Gray, A. C. Keegan, *Jennifer M. D. Gibson, *Elizabeth D. Hocking, *Frances J. Keegan, *Brenda J. Sheail, *Jean E. Vallis, *Margaret F. Beard, Eleanor M. Bray, *F. G. Cooper, *V. Cope, *K. A. McL. C.-O. Swinburne.
*By proxy.

UNIVERSITY OF GLASGOW

The following degrees were conferred on July 7:

M.D.—*R. J. Calvert, *R. C. Curran, *J. T. G. Ewan, *K. C. Wybar.
Ch.M.—*W. T. Irvine, *W. B. Stirling.
M.B., Ch.B.—*R. T. Abbott, A. Abdurahman, G. Abrami, D. C. Azbo, Eleanor McL. Aitken, J. M. Allan, W. K. G. Allan, Catherine F. Anderson, R. L. Andrew, Sarah L. Armour (Mrs. Hemming), A. A. Atkinson, S. Azimuddin, Moira C. Baird, W. L. M. Baird, W. H. Beattie, J. M. Bell, Margaret J. A. Blackwood, T. Blair, B. B. Borthwick, M. F. Brewster, *K. A. C. Brown, *N. MacL. Brown, J. S. Bryden, G. D. Burnett, A. T. Calder, J. A. Caldwell, Veronica R. Carson, Georgina M. Chadwin, I. A. Chisholm, G. A. Clark, C. Comyns (name changed from Comens), Ruth S. R. Conacher, P. Connolly, F. M. Cranna, J. M. Crombie, Martha K. Cuthbertson, J. Dalling, T. W. B. Davidson, W. C. Davidson, Jean S. Dick, G. Drummond, A. A. Efunkoya, W. M. Elder, I. L. Felstein, A. K. Foli, W. Frank, A. S. Fraser, J. B. W. Galloway, I. D. G. Garvie, I. Ian J. Geddes, S. W. George, J. B. Gibson, Jane M. B. Gilchrist, Mary L. Girkins, J. F. Glencross, J. G. Graham, A. J. Hardie, Greig, R. C. Grievie, W. D. Guy, Elizabeth H. Hamilton, A. J. Kelly, J. R. G. Hayes, Robina M. Herd, Helen E. Holms, R. W. Irvine, Elizabeth J. A. Ives, *L. Johnson, D. Johnston, Julia A. Keane, J. H. Kleinglass, J. A. Kernohan, I. F. Kerr, J. F. Kirk, I. B. Kirkland, A. H. Klein, C. J. Laithwaite, T. W. Lindsay, Elizabeth R. Lohar, I. T. Loudon, C. J. Macaulay, Sheila H. McCulloch, A. R. McCutcheon, C. McDonald, W. W. McDougall, Grace N. Macfarlane, W. G. McKenna, Harriet B. MacKinnon, McHugh, J. MacKay, J. D. McKean, B. R. Maclean, B. G. P. Macnamara, (formerly Shaw), Sheila A. H. McLaren, J. MacShane, A. J. N. McNeill, A. D. McNeill, R. L. McRitchie, W. Miller, G. McN. Milne, Marshall W. Marsnall, A. MacG. Michael, J. Morrison, J. J. Morrow, N. R. G. McK. Mitchell, D. L. Morrison, J. Neilson, Barbara J. L. Morton, A. Munro, D. S. Munro, R. K. Murray, M. L. Peacock, J. L. Newman, T. L. O'Donnell, B. Patel, E. H. Paterson, M. L. Peacock, J. L. Price, A. J. Rintoul, K. K. T. Robertson, Ann F. M. Savage, I. W. H. Scott, Joanne E. M. Scott, Mary B. Simpson, M. W. Smellie, I. Soutar,

D. Stephen, R. McK. Still, J. Stothers, F. W. C. Surgenor, W. Susskind, R. M. R. Taylor, A. B. M. Telfer, *J. A. Thomson, R. G. B. Turner, D. A. L. Watt, Doris S. Whiteford, S. Witherspoon, D. G. Young, J. J. Young.

*With commendation. *With honours.

UNIVERSITY OF EDINBURGH

At a graduation ceremony on July 18 the following degrees and diplomas were conferred:

M.D.—B. A. Bembridge, *W. P. Cockshott, *J. R. Fountain, *I. C. Lewis.
Ch.M.—R. B. Duthie (awarded gold medal for thesis).
Ph.D.—*In the Faculty of Medicine*: K. B. Singh, M.S. (in absentia), H. P. Sinha, M.B., B.S. (in absentia), Maung Mya Tu, M.B., B.S.
M.B., Ch.B.—E. I. Adam, Margaret Aitken, W. B. Aitken, Mary M. Anderson, O. A. Audain, P. M. Barnes, J. S. Barr, J. C. J. Li. Bath, R. W. Bell, F. E. P. Bernard, G. W. Beveridge, R. D. R. Birtwhistle, L. McM. Black, Joan M. Bradley, D. P. Braid, C. Brough, Rose M. Brown, Bridget M. Buchanan, D. A. Buchanan, G. O. D. Busby, A. Cameron, A. E. Cameron, J. A. Cameron, R. V.-V. Cavaroli, W. G. Charlesworth, G. J. A. Clunie, A. D. Colledge, S. J. Cooper, I. C. Crawford, C. Croll, G. G. K. Davidson, C. A. R. Dennis, Ruth Douglas, *T. W. Fenton, A. J. W. Fordyce, D. F. Foster, G. L. Frank, Christina A. Fulton, P. W. Gason, W. K. Gibb, A. A. M. Gibson, A. B. J. Gilbert, W. L. A. Gilchrist, J. Gordon, J. G. Govan, D. E. Graham, G. S. Graham, G. C. Greig, A. R. Grievie, J. Gunn, T. Hall, T. Hamilton, Agnes M. Hay, C. P. Heflon, M. A. Henderson, W. E. Howieson, J. J. Huston, D. C. Ingham, J. T. Ireland, P. Jacques, Ann R. Karnitschnig (formerly Gaddum), G. M. Kay, K. M. G. Keddie, I. W. Kemp, R. Lampard, *A. O. Langlands, Annabel M. Lauchlin, *D. Leak, P. Lee, J. R. B. Livingstone, E. B. Longon, J. N. McCormick, H. R. Macdonald, Isabella S. Macdonald, F. M. McGurk, Catherine J. McHardy, J. C. MacInnes, I. MacG. MacIntyre, J. C. McIntyre, B. Mackay, I. M. Mackay, D. S. Mackenzie, J. Markie, Shirley A. Markintosh, Gillian E. MacKrell, A. R. MacLeod, J. MacLeod, J. P. A. McManus, F. J. McMinn, J. MacSweeney, D. O. Marsh, J. McK. Mason, M. D. Middleton, D. R. Millar, E. N. C. Milne, Norah Milne (formerly Symington), W. M. U. Moffat, D. Morton, N. J. Moule, Aileen C. Munro, J. C. M. Murphy, W. D. Murray, E. K. Newman, Marjorie S. Newton, R. T. Nicoll, D. L. Norrie, N. D. Ogilvie, F. R. Orr, Elspeth M. Paterson, R. S. Phillips, K. Protheroe, A. G. C. Renwick, G. R. Rogers, R. M. Savage, J. M. Scott, D. S. Sibbald, B. Simpson, Catherine M. Simpson, Barbara Somerville, N. A. McC. Somerville, D. A. Spence, S. C. E. Spink, B. R. Stead, J. D. Sutherland, Norma E. I. Temple, W. J. Thomson, M. A. Turner, B. J. Tyson, J. A. Waddell, Brenda Wainwright, A. A. Walker, Aline M. Watson, S. I. Williams, A. R. Wilson, P. Wilson, W. L. Yule.
DIPLOMA IN PUBLIC HEALTH.—A. H. Duncan, W. M. Fee, R. Y. Forbes, Ruth E. Graham-Yooll, J. M. H. Hopper, R. A. Ingles, Elinor K. Johnston, Ko Ko, H. R. W. Miller, A. R. Mills, S. R. Nair, Kee Saik Ooi, R. S. H. Pasqual, D. Shearer, R. Steele, W. Williams.

DIPLOMA IN TROPICAL MEDICINE AND HYGIENE.—G. C. Anbunathan, A. Annamalai, G. I. Forbes, Tun Tun Hlaing, A. D. McIntyre, M. P. Misra, P. Rabindran, A. McQ. Robertson, J. R. K. Robson, A. W. H. Thomson, Dorothy N. Ullah, S. K. Vaish, J. Wilkinson, V. Zaman, O. K. Hazari.

The following scholarships, etc., were awarded in the Faculty of Medicine: Cameron Prize in Practical Therapeutics, jointly to Professor W. D. M. Paton and Dr. Eleanor Zaimis in recognition of their work on methonium compounds. Ettles Scholarship and Leslie Gold Medal in Medicine, James Scott Scholarship in Obstetrics and Gynaecology, Beane Prize in Anatomy and Surgery, A. O. Langlands. Scottish Association for Medical Education of Women Prize and Dorothy Gilfillan Memorial Prize, Margaret Aitken. Buchanan Scholarship in Obstetrics and Gynaecology, Mouat Scholarship in the Practice of Physic, Keith Memorial Prize in Systematic Surgery, and Murdoch Brown Medal in Clinical Medicine, David Leak. Annandale Gold Medal in Clinical Surgery, D. P. Braid. Royal Victoria Hospital Tuberculosis Trust Gold Medal, G. O. D. Busby. Graduate Research Fellowships, G. D. Campbell, A. Peters, J. H. Tait, Elizabeth M. Humphreys. Sir David Wilkie Research Fellowship in Medicine, R. B. Cross. James Traquair Scholarship, J. Hindley. Graduate Research Scholarships, E. W. Horton, Margaret A. J. Moffat, J. A. Hodgson. Graduate Travelling Scholarships, J. A. L. Clark and T. T. S. Ingram. Ellis Prize in Physiology, E. A. Harris. Gunning Victoria Jubilee Prize in Public Health and Social Medicine, J. A. H. Lee. William Leslie Prize in Medicine, L. J. P. Duncan and B. C. Paton (equal). Lawrence Poole Prize in Rehabilitation after Poliomyelitis, W. J. W. Sharrard. Greig Medal for Tropical Medicine, J. Wilkinson. Wellcome Prize and Medal in the History of Medicine, E. W. Horton.

*Highly commended for thesis. *Commended for thesis. *With honours.

The Services

Major-General D. Bluett, O.B.E., late R.A.M.C., Deputy Director of Medical Services, Eastern Command, has been appointed Honorary Physician to the Queen, in succession to Major-General A. Sachs, C.B., C.B.E., retired.

Colonel W. D. Hughes, C.B.E., late R.A.M.C., has been appointed Honorary Physician to the Queen, in succession to Colonel (Honorary Brigadier) J. T. Robinson, O.B.E., retired.

INFECTIOUS DISEASES AND VITAL STATISTICS

Summary for British Isles for week ending August 4 (No. 31) and corresponding week 1955.

Figures of cases are for the countries shown and London administrative county. Figures of deaths and births are for the 160 great towns in England and Wales (London included), London administrative county, the 17 principal towns in Scotland, the 10 principal towns in Northern Ireland, and the 14 principal towns in Eire.

A blank space denotes disease not notifiable or no return available. The table is based on information supplied by the Registrars-General of England and Wales, Scotland, N. Ireland, and Eire, the Ministry of Health and Local Government of N. Ireland, and the Department of Health of Eire.

CASES In Countries and London	1956					1955				
	Eng. & Wales	London	Scot.	N. Ire.	Eire	Eng. & Wales	London	Scot.	N. Ire.	Eire
Diphtheria ..	0	0	3	0	7	5	0	5	0	1
Dysentery ..	603	94	120	3	3	392	63	141	19	5
Encephalitis, acute	3	1		0		3	0		0	
Enteric fever: Typhoid ..	1	0	0	0	1	24	2	5	1	
Paratyphoid ..	8	0	1(B)	0		5	1	0	0	1
Food-poisoning ..	334	23		3		361	44		9	
Infective enteritis or diarrhoea under 2 years ..				5	36				15	40
Measles* ..	3,220	258	39	48	168	9,971	130	33	59	78
Meningococcal infection ..	26	4	4	0	1	11	0	9	0	
Ophthalmia neonatorum ..	30	0	8	0		26	0	2	0	
Pneumonia† ..	196	11	81	1		188	13	66	6	
Poliomyelitis, acute: Paralytic ..	73	4		0	23	146	22		0	1
Non-paralytic ..	58	2				161	36			
Puerperal fever‡ ..	220	27	5	2		253	34	8	3	
Scarlet fever ..	426	25	41	8	9	196	11	24	21	8
Tuberculosis: Respiratory ..	620	61	99	17		512	61	112	14	
Non-respiratory ..	87	6	15	5		71	3	29	2	
Whooping-cough ..	2,146	191	215	22	56	1,553	83	79	91	81

DEATHS In Great Towns	1956					1955				
	Eng. & Wales	London	Scot.	N. Ire.	Eire	Eng. & Wales	London	Scot.	N. Ire.	Eire
Diphtheria ..	0	0	0	0	1	0	0	0	0	0
Dysentery ..	0	0		0		0	0		0	
Encephalitis, acute	0			0		0			0	
Enteric fever ..	0	0	0	0		0	0	0	0	
Infective enteritis or diarrhoea under 2 years ..	1	0	1	0	1	6	0	1	0	3
Influenza ..	6	0	1	0	0	1	0	0	0	0
Measles ..		0	0	0	0		0	0	0	1
Meningococcal infection ..		0	0				0	0		
Pneumonia ..	148	26	9	6	4	114	12	8	3	2
Poliomyelitis, acute	1	0			0	4	0		0	0
Scarlet fever ..		0	0	0	0		0	0	0	0
Tuberculosis: Respiratory ..	50	2	6	0	1	55	3	0	3	1
Non-respiratory ..		0	2	0	0		3	0	0	
Whooping-cough ..	1		0	0	0	0	0	0	1	1
Deaths 0-1 year ..	194	29	21	7	7	175	19	13	4	14
Deaths (excluding stillbirths) ..	4,321	627	477	98	118	4,057	549	453	77	154
LIVE BIRTHS ..	8,196	1,117	896	222	409	7,052	1,075	883	237	366
STILLBIRTHS ..	191	26	16			180	17	18		

* Measles not notifiable in Scotland, whence returns are approximate.

† Includes primary and influenzal pneumonia.

‡ Includes puerperal pyrexia.

Vital Statistics

Poliomyelitis

Poliomyelitis notifications in the week ending August 11 (32nd week of the year) were as follows: paralytic 54 (73), non-paralytic 75 (58), total 133 (131). This is an increase of 2 compared with the previous week, the figures for which are in parentheses.

Cases notified from the beginning of the year (with rate per 100,000 in parentheses) are as follows for districts of relatively high incidence: Macclesfield M.B. 25 (69), Whitehaven M.B. 22 (87), Ennerdale R.D. 18 (63), Yeovil M.B. 19 (79), Guildford M.B. 33 (70), Manchester C.B. 241 (35), Woking U.D. 21 (38), Reigate M.B. 17 (35), Middleton M.B. 14 (33), Guildford R.D. 15 (32).

Week Ending August 11

The notifications of infectious diseases in England and Wales during the week included: scarlet fever 275, whooping-cough 2,134, diphtheria 4, measles 2,685, acute pneumonia 136, acute poliomyelitis 133, dysentery 443, paratyphoid fever 12, and typhoid fever 5.

Infectious Diseases

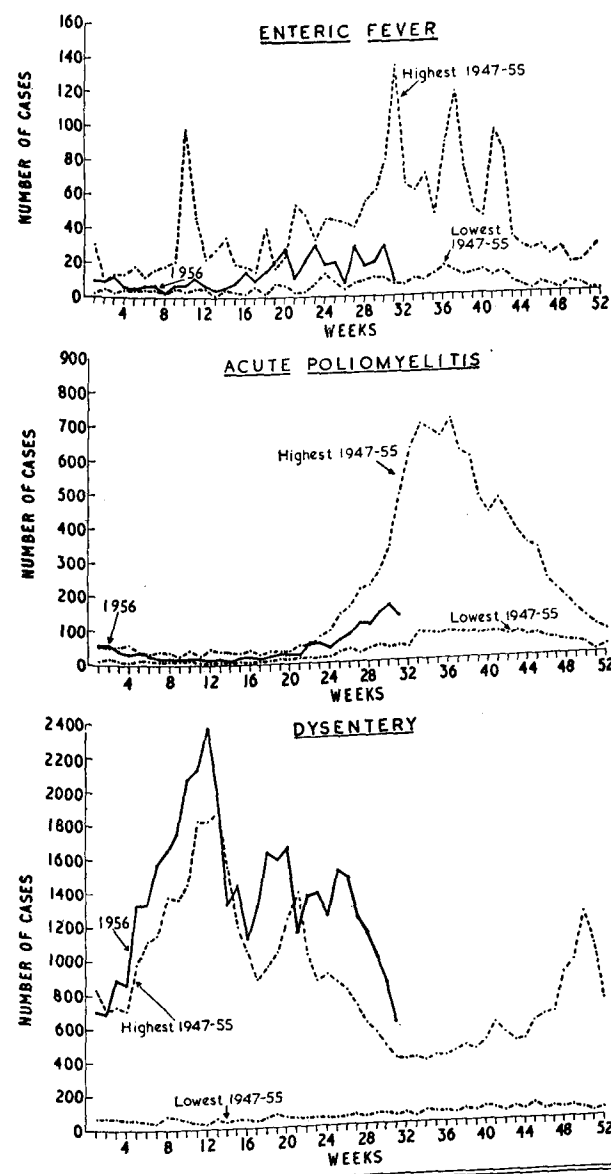
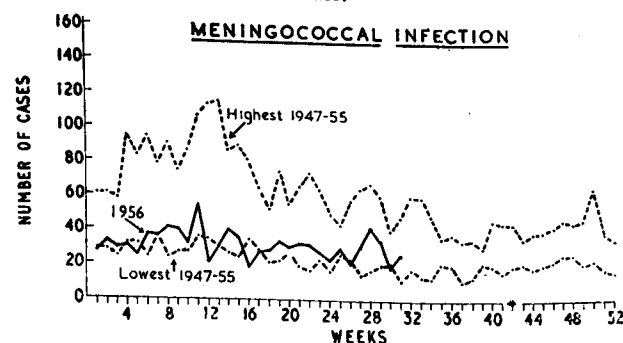
The incidence of infectious diseases fell in England and Wales during the week ending August 4. The decreases in the number of notifications were 242 for whooping-cough, from 2,388 to 2,146; 240 for dysentery, from 843 to 603; 147 for scarlet fever, from 573 to 426; 85 for food-poisoning, from 419 to 334; 50 for measles, from 3,270 to 3,220; and 29 for acute poliomyelitis, from 160 to 131.

The largest declines in the notifications of whooping-cough were 86 in Yorkshire West Riding, from 236 to 150, and 40 in Warwickshire, from 201 to 161. A fall in the incidence of scarlet fever occurred throughout the country, but no large local fluctuations were recorded. The largest variations in the local trends of measles were decreases of 105 notifications in London, from 363 to 258; 75 in Cornwall, from 284 to 209, and a rise of 99 in Oxfordshire, from 96 to 195. The outbreak in Oxfordshire was mainly confined to two areas, Witney U.D. (102) and Witney R.D. (54). No case of diphtheria was notified. This is the first week since records have been kept that a case of diphtheria has not been reported.

The chief centres of dysentery were Yorkshire West Riding 106 (Rotherham C.B. 39, Leeds C.B. 22); London 94 (Hackney 10, Greenwich 9, Stepney 9); Lancashire 69 (Liverpool C.B. 17); Warwickshire 59 (Coventry C.B. 38, Birmingham C.B. 15); Leicestershire 26 (Leicester C.B. 24).

Graphs of Infectious Diseases

The graphs below show the uncorrected numbers of cases of certain diseases notified weekly in England and Wales. Highest and lowest figures reported in each week during the nine years 1947-55 are shown thus -----, the figures for 1956 thus ———. Except for the curves showing notifications of Medical Statistics and Epidemiology, London School of Hygiene and Tropical Medicine.



Medical News

New Medical School in Africa.—The University College of Rhodesia and Nyasaland has appointed a committee to advise it on the desirability and practicability of establishing a medical school. The committee is to prepare proposals for the training curriculum, research facilities, buildings, the equipment, and staffing, and estimates of the costs. The following are the members: Mr. L. FARRER-BROWN (Director, the Nuffield Foundation), chairman; Professor W. MELVILLE ARNOTT (William Withering Professor of Medicine, University of Birmingham); Professor T. H. DAVEY (Middlemass Hunt Professor of Tropical Hygiene, University of Liverpool); Professor A. D. M. GREENFIELD (Dunville of Belfast); Professor of Physiology, Queen's University of Belfast); Professor P. B. MEDAWAR, F.R.S. (Jodrell Professor of Zoology, University College, London); Professor R. MILNES WALKER (Professor of Surgery, University of Bristol); Dr. HONOR M. V. SMITH (May Reader in Medicine, University of Oxford). The committee will make a preliminary visit to the Federation of Rhodesia and Nyasaland in January, 1957.

"Tranquillizers."—In a statement published in the *Pharmaceutical Journal* of August 11 (p. 97) the council of the Pharmaceutical Society calls attention to "the recent intro-

duction of a number of new products which owe their use to their depressant action on the central nervous system." The statement goes on: "While these drugs are not advertised to the public a widespread public knowledge of them has been created by newspaper articles, and there is a substantial demand for them otherwise than on prescription. The indiscriminate use of such drugs is, in the council's opinion, against the public interest, and the council are approaching the Ministry of Health requesting an early consideration of this class of drugs. Pharmacists are advised not to display them or to supply them unless satisfied they will be taken on medical advice."

High Energy Radiation Unit.—A new high energy radiation treatment unit at Cookridge Hospital, Leeds, was opened recently by the Princess Royal. This unit marks the completion of the first stage in the development of Cookridge Hospital as a regional radiotherapy centre, a development made possible by the co-operation of the Board of Governors of the United Leeds Hospitals, the Rockefeller Foundation, the British Empire Cancer Campaign (Yorkshire Council), the University of Leeds, and the Leeds Regional Hospital Board. The new unit is claimed to be unique in Great Britain in that it has been specially designed for the dual purpose of radiotherapy and radiation research. There is only one other therapeutic source of radio-cobalt of equivalent size in the country, a Canadian gift to the British Empire Cancer Campaign. Smaller cobalt units exist, however, in various British centres, the two in the Leeds region being at the General Infirmary at Leeds and the Radium Institute at Bradford. The Cookridge Unit has been established to provide new facilities for the treatment of cancer and for the study of the physical, chemical, and therapeutic action of high energy radiation. This sharing of a powerful radiation source by radiotherapists, chemists, and physicists was planned because of its economic use of expensive apparatus and also to bring together a group of medical and non-medical men working on problems which have much in common and are fundamental to radiobiology. The source of high energy radiation at this new unit will emit radiation equivalent to a machine working at about 3,000,000 volts.

Hunter House Memorial Fund.—A committee representing the University of Glasgow, the Royal Faculty of Physicians and Surgeons of Glasgow, and the East Kilbride Development Corporation has been set up to raise a fund for the renovation and preservation of the birthplace of William and John Hunter at Long Calderwood, East Kilbride (illustrated below). A nucleus of nearly £3,000 has been raised in Scotland. A total sum of £20,000 is aimed at, and, of this, £3,500 will be needed urgently to restore the fabric of the house, leaving the balance as an endowment fund. It is planned to organize a board of trustees with appropriate representative interests to maintain the restored house as a memorial, a museum, a place of pilgrimage, and, possibly, as a research centre. In its appeal, which is now



(Harry Blake, Strathaven)

extended to all medical men, the committee states that "urgent action is necessary to save this national historic monument as a fitting memorial to the two brothers whose names will ever be gratefully remembered for their unique achievements in the advancement of medical knowledge." Cheques should be made payable to the "Hunter House Memorial Fund" and sent to the Hon. Treasurer, Royal Faculty of Physicians and Surgeons, 242, St. Vincent Street, Glasgow, C.2.

Mental Health Research Fund Awards.—A grant of £200 has been made to Dr. JAMES A. HISLOP, of the department of human ecology and university health service, Cambridge, for investigation of the length of stay of patients admitted to Fulbourn Hospital from the Isle of Ely during the past hundred years. This area has been chosen because of its "immobile" population, which for generations has been served by the same hospitals. A Leverhulme grant has been made to the University of Leeds towards the cost of a senior research fellowship awarded to Dr. MAX HAMILTON, senior lecturer in the department of psychiatry, who is investigating constitutional and other aspects of the patient suffering from paranoid disorders with a view to finding some tests or assessments which will give information about the probable response to treatment by electric convulsion therapy or insulin shock. A travelling fellowship has been awarded to Dr. R. P. HULLIN, lecturer in the department of biochemistry, University of Leeds, to enable him to spend a year chiefly in the department of physiological chemistry, University of Pennsylvania, investigating new biochemical methods which may be applied to the study of the blood in manic-depressive psychoses and endogenous depression.

Forensic Clinic in Toronto.—A Forensic Clinic has been opened recently in Toronto by the Department of Health of Ontario. While under the jurisdiction of the Department of Health, the Clinic also forms a division of the Toronto Psychiatric Hospital, and as such is affiliated with the University of Toronto. It carries out psychiatric appraisals on cases referred by the courts of Metropolitan Toronto, and in suitable cases psychotherapy is given. On such cases, and on those referred by probation officers, a specialized function of the clinic will be research on the problem of the sex offender. Cases of sex deviation are being received from a wider field than the courts—for instance, from private doctors and community services, etc. At present there is one full-time psychiatrist and one full-time psychologist on the staff. A social worker will be appointed in the immediate future, and a full-time research worker will be added within a matter of months. Further additions to the staff are expected in due course.

Retirement of Medical Librarian.—Mrs. EILEEN R. CUNNINGHAM, librarian of the school of medicine of Vanderbilt University, Nashville, Tennessee, has retired after 31 years of service. Since 1939 she had been professor of medical library science at Vanderbilt. In 1948 she was president of the Medical Library Association and received the first Marcia C. Noyes award for outstanding achievement in medical librarianship. Mrs. Cunningham has served on numerous international and national committees concerned with library services and with the documentation and interchange of scientific literature, and she has been active in promoting the recently organized International Association of Medical Libraries. The best-known of her written works is *Classification for Medical Literature*, the fourth edition of which we reviewed earlier this year (March 3, p. 499). Miss ELEANOR G. STEINKE, assistant librarian at Vanderbilt since 1946, will succeed Mrs. Cunningham.

COMING EVENTS

Doctor and Law.—The seventh International Congress of Catholic Doctors takes place in Scheveningen, Holland, during September 9–15. The subject is "The Doctor and the Law." Particulars from the Secretariate, 35, Herenstraat, Utrecht, up to September 1, and thereafter from the Palace Hotel, Scheveningen.

Lectures for Parents of Deaf Children.—The Deaf Children's Society has arranged a course of six lectures to help parents of deaf children. These will take place at the National Institute for the Deaf, 105, Gower Street, London, W.C.1, and will be as follows: September 13, 7 p.m., "The Deaf Child in the Family"; September 27, 7 p.m., "Lip-reading"; October 4, 7 p.m., "Auditory Training"; October 16, 7 p.m., "Language for Juniors"; November 1, 7 p.m., "Language for Seniors"; November 15, 7 p.m., "Reading Readiness." The lectures will be given by experts and the charge will be 1s. 6d. per lecture or 5s. for the complete course. Further particulars from WILLA A. MOOJEN, 92, New Cavendish Street, London, W.1.

Anthropology and Psychiatry.—Dr. MARGARET MEAD, of the American Museum of Natural History, New York, will talk on "The Contribution of Social Anthropology to Psychiatry" in the lecture theatre at Maudsley Hospital, Denmark Hill, London, S.E.5, on Friday, September 14, at 12 noon. Postgraduates are invited to attend.

Mackenzie Industrial Health Lecture.—The B.M.A., in conjunction with the Association of Industrial Medical Officers, announces that the sixth Mackenzie Industrial Health lecture will be given by Dr. R. S. F. SCHILLING on September 25 at 3 p.m. in the Great Hall, B.M.A. House, Tavistock Square, London, W.C.1. His subject will be "Assessing the Health of the Industrial Worker." All lay and medical, interested in industrial medicine are invited. There will be no charge for admission.

Nutrition in Pregnancy.—The Scottish Group of the Nutrition Society is holding a symposium in Dundee on Saturday, September 29, on human and animal nutrition in pregnancy. Further particulars from Dr. J. DAVIDSON, The Rowett Institute, Bucksburn, Aberdeenshire.

London County Medical Society.—A meeting of the Society will be held at 5.30 p.m. on October 4 at the County Hall, Westminster Bridge, London, S.E.1. The society will be addressed by Sir CLEMENT PRICE THOMAS, and his subject will be "Carcinoma of the Lung." Members of the Association of Industrial Medical Officers, the Middlesex County Medical Society, and members of the London Divisions of the B.M.A. are invited.

BIRTHS, MARRIAGES, AND DEATHS

BIRTHS

Clift.—On August 8, 1956, to Dorothy (formerly Newell), M.B., Ch.B., wife of Arthur Clift, F.R.C.S., a daughter—Cecilia Margaret—a fifth child.

Eton.—On August 10, 1956, to Ilse (formerly Ursell), wife of Bruce Eton, M.B., M.R.C.O.G., of 1, High Street, Trumpington, Cambridge, a daughter—Rachel Caroline.

Heyworth.—On August 11, 1956, at Bank Hall Maternity Hospital, Burnley, to Freda and Frederick Heyworth, a daughter.

Levy.—On August 16, 1956, to Dr. and Mrs. Basil Levy, of 63, Anfield Road, Liverpool, a son.

MARRIAGES

Bhattacharyya—Bagchi.—On February 3, 1956, at Calcutta, Bhahani Bhattacharyya, F.R.C.S., to Puraby Bagchi, M.A.

DEATHS

Armstrong.—On August 5, 1956, at 514, Anniesland Road, Glasgow, William Hunter Stirling Armstrong, M.B., Ch.B., aged 79.

Baird.—On August 7, 1956, at 44, Station Road, Blackpool, James Campbell Baird, M.B., Ch.B.

Bradley.—On August 7, 1956, at Fremantle, Overwallop, Hants, Neville Bradley, M.B., Ch.B.

Brough.—On August 8, 1956, at 30, Craigleith Hill Gardens, Edinburgh, David Sands Brough, M.C., M.B., Ch.B., D.P.H.

Christie.—On August 3, 1956, Arthur William Stark Christie, M.B., Ch.B., F.R.C.S.Ed., of 4, Glencairn Crescent, Edinburgh.

Cogan.—On August 6, 1956, at Highfield House, Northampton, Lee Danby Buxton Cogan, D.S.O., L.R.C.S.Ed., aged 81.

Garnett.—On August 9, 1956, Graham Hogg Garnett, M.D., of 14, Croom's Hill, Greenwich, S.E.

Goldie.—On August 3, 1956, Ellis Gordon Goldie, M.D., of 11, Park Avenue, Mansfield, Notts, aged 79.

Gow.—On August 8, 1956, at Nestlea, Newbury, Berks, Henderson Gow, M.B., Ch.B.

O'Driscoll.—On August 3, 1956, at Lydney and District Hospital, Lydney, Gloucestershire, John Patrick O'Driscoll, M.B., B.Ch., of Bream, Gloucestershire.

Slocombe.—On August 2, 1956, Bernard Atkinson Slocombe, M.B., Ch.B., of Springfield, Keighley, Yorks.

Any Questions?

We publish below a selection of those questions and answers which seem of general interest. It is regretted that it is not possible to supply answers to all questions submitted.

Life Expectancy of Doctors

Q.—What is the life expectancy of medical practitioners as compared with the general population? Please give figures for various countries, if such are available.

A.—In the middle of the last century Neison¹ examined the mortality experience of members of the Royal Medical and Chirurgical Society, and found 96 deaths at ages 26–70 compared with 97.1 in the corresponding general population. Hill² studied the early records of the Royal College of Physicians, and for various periods has compared the expectation of life of physicians, at age 35, with that of peers, with the following result:

	R.C.P.	Peers
1570–1689	30.3 years	28.6 years
1690–1749	32.1 "	31.0 "
1750–99	35.3 "	33.7 "

On the basis of the Registrar-General's occupational mortality data for 1910–12 for England and Wales, Hill calculated the expectation of life of medical practitioners aged 35 to be 32.7 years, compared with 31.7 years for all males. In 1921–3 and 1930–2 the Registrar-General³ found the standardized mortality of male medical practitioners aged 20–65 to be respectively 1% and 6% higher than that of the general population. No later official figures for England and Wales have been published.

In Scotland, in a 25-year follow-up study of 899 Glasgow medical graduates of 1923–6, Meiklejohn⁴ found their mortality "a good deal lighter than the mortality of the Scottish population as a whole." In France in 1907–8,⁵ death rates per 10,000 population in the total population and among physicians and pharmacists were as follows:

	Age in Years	25–35	35–45	45–55	55–64
Total population		80	112	178	320
Physicians and pharmacists		70	111	194	442

In the United States of America, Dublin and Lotka⁶ reported the expectation of life of physicians aged 30 in 1925 to be 38.01 years, compared with 37.60 for the general population. In 1938–42 Dublin and Spiegelman⁷ found that "physicians experienced practically the same longevity and mortality as white males of the same ages in the general population." Expectations of life at age 25 were:

	Male	Female
Physicians	43.54	47.10
U.S. white population	43.31	46.86

Diseases with high mortality rate amongst physicians were leukaemia, gall-bladder disease, cerebral haemorrhage, heart disease, arteriosclerosis, and cirrhosis of liver. Their mortality was low from syphilis, tuberculosis, prostatic disease, non-automobile accidents, and ulcer of the stomach and duodenum. The mortality of specialists⁸ was only 71% of that of non-specialists.

In an occupational mortality survey⁹ covering ten States of the United States in 1930, the mortality of physicians and surgeons was 87% of that of all occupied males in selected occupations.

REFERENCES

- Neison, F. G. P., *J. statist. Soc.*, 1852, 15, 193.
- Hill, A. B., *British Medical Journal*, 1925, 1, 754.
- Registrar-General, *Decennial Supplement. England and Wales, 1931.* Part IIa, Occupational Mortality, 1938, p. 137. H.M.S.O.
- Meiklejohn, A., *British Medical Journal*, 1953, 1, 930.
- Huber, M., *Bull. Statist. gen. France*, fasc. IV, 402, 1912. (Quoted by Daric, J. (1951), *Vital Statistics Special Reports*, Vol. 33, No. 10, U.S. Publ. Hlth Serv.)
- Dublin, L. I., and Lotka, A. J., *Length of Life*, 1936, p. 226. Ronald Press Co., New York.
- and Spiegelman, M., *J. Amer. med. Ass.*, 1947, 134, 1211.
- *Ibid.*, 1948, 137, 1519.
- Whitney, J. S., *Death Rates by Occupation Based on Data of the U.S. Census Bureau, 1930*. New York, National Tuberculosis Association, 1934. Quoted by Daric (see ref. 5).

Radiography as a Career after Unilateral Oophorectomy

Q.—Should a girl who has had a cystic ovary removed be discouraged, on genetic grounds, from her intention of becoming a radiographer? The remaining ovary was normal at operation.

A.—There is no reason, from a genetic point of view, why this girl should be discouraged from taking up radiography as a career. The fact that one ovary has been removed is not relevant in assessing any genetic hazard from the effects of irradiation. The genetic effects of ionizing radiation depend on the fact that an increased rate of mutation of genes, in the chromosomes of the germinal cells, occurs as the result of accumulation of dose. The possibility of some genetic effects is not influenced by the fact of whether both ovaries are present or whether one has been removed—that is, whether the normal complement or half that complement of germinal cells are present—and there is no greater danger in the case of this girl.

The conditions of employment of radiographers are governed by the recommendations of the International Commission on Radiological Protection, recommendations which have recently been reinforced by the report of the Medical Research Council Committee on radiation hazards.¹ The relevant recommendation is that an individual occupationally exposed—for example, a radiographer—"should not be allowed to accumulate more than 50 r of radiation to the gonads, in addition to that received from the natural background, from conception to the age of 30 years." An accumulated dose of 50 r is an estimate of the dose which would produce a doubling of gene mutation rate. Paragraph 188 of the Medical Research Council report states: "One may conclude that, if a relatively small group of prospective parents receives a doubling dose of radiation, no noticeable effects will be produced either on their immediate offspring or upon their descendants. For levels of radiation up to the doubling dose, and even some way beyond, the genetic effects of radiation are only appreciable when reckoned over the population as a whole and need cause no alarm to the individual on his own account."

REFERENCE

- Medical Research Council, *The Hazards to Man of Nuclear and Allied Radiations*, 1956, Cmd. 9780. H.M.S.O., London.

Inhalation of Mucolytic Agents

Q.—What is the value of inhalation therapy with the modern mucolytic agents?

A.—These mucolytic agents are claimed to reduce the viscosity of sputum, thereby making it easier to expectorate. To understand how they might act, it is necessary to describe how viscid secretions form in the bronchi. Respiratory mucus is a gel of fibrous protein and polysaccharide molecules, held together by linkages which normally include water molecules. The more water the gel contains the longer these linkages become, making the network looser and weaker. Therefore the viscosity of the mucus varies inversely with its water content.

Sometimes, as in fibrocystic disease and after the use of atropine-like drugs, mucus is secreted in a viscid dehydrated state. Under normal circumstances it is the drying of the mucus after secretion which renders it viscid and difficult to expectorate. During quiet breathing air reaches the main bronchi saturated with water at body temperature, having been humidified in the upper respiratory passages. If this is prevented, as it is by tracheotomy or endotracheal anaesthesia or during hyperventilation, then air will take up moisture from the bronchial mucus, leaving it increasingly viscid. Air saturated at body temperature contains three times as much water as air saturated at room temperature, but an aerosol at room temperature contains less than twice as much. Partially dried viscid mucus in the bronchi will imbibe water from a saturated atmosphere and become less viscid, and it will imbibe a little water from air partially saturated by forming an aerosol at room temperature. Thus

a simple aerosol of water may reduce the viscosity of mucus. Mucus dried to the point of crusting will not imbibe moisture unless first broken down by chemical action.

Two kinds of "mucolytic" solutions for administration as aerosols have been used. The first contains a detergent, glycerin, and sodium bicarbonate. There is no evidence that such a solution affects the viscosity of mucus *in vitro*, and no controlled trials of its effect in man have ever been published. The only theoretical advantage of the solution over water is that it forms a more stable aerosol which may carry more water into the bronchi. The second type of solution contains trypsin, which is claimed to be specifically mucolytic. Trypsin is, in fact, a proteolytic enzyme which will damage the mucosa if used in sufficient concentration to affect dried mucus. Even premalignant changes in bronchial mucosa have been reported after the use of purified trypsin.¹ Lastly, trypsin is a foreign protein and its repeated use leads to sensitization.

No safe specific mucolytic agent has yet been discovered. In its absence prevention of viscid secretions is better than treatment. This is best done by ensuring an adequate fluid intake, eschewing atropine-like drugs, and by increasing the water saturation of inspired air.

REFERENCE

- ¹ Farber, S. M., Pharr, S. L., Traut, H. F., Wood, D. A., and Gorman, R. D., *Lab. Invest.*, 1954, 3, 33.

Athlete's Foot in a School

Q.—What is the best method of dealing with an outbreak of athlete's foot in a secondary boys' school? Should the use of shower baths be prohibited in school?

A.—Shower-bath floors favour the epidemic spread of fungous infection of feet. The regular scrubbing of such floors with fungicidal detergents and the wearing of slippers reduces the risk. Regular washing of feet, the wearing of cotton socks which are regularly boiled, and the use of dusting powder for the toes and feet are also important prophylactic measures.

It is important first to find the causative fungus by culture, for some are curable and others incurable. Infection by *Trichophyton rubrum*, which is becoming more common in this country, is very difficult to eradicate.

Benzoic and salicylic acid ointment or lotion (3% of each) at night and a fungicidal powder (undecylenic acid types) by day are a good method of treatment. There are, however, many other effective fungicides, including the mercurials and dyes. Brilliant green ($\frac{1}{2}\%$) and perchloride of mercury ($\frac{1}{2}\%$) in spirit is also effective, but stains clothes. The presence or absence of infection in the nails is important, and, if present, it may be necessary temporarily to remove the nails. Disinfection of socks and shoes by formalinization is also wise.

Involution of the Uterus and Oestrogens

Q.—Does the exhibition of oestrogens during the puerperium, to suppress lactation, delay involution of the uterus?

A.—No.

Inheritance of Friedreich's Ataxia

Q.—How is Friedreich's ataxia inherited? A woman, whose twin brother died from the condition at the age of 23, wishes to marry. What is the prognosis regarding her life and the chance of her children being affected?

A.—The clinical conditions labelled Friedreich's ataxia are not homogeneous. The great majority of those with early onset behave as if due to one or more recessive genes, and the illness is usually uniform within families and independent of sex. Much more rarely, dominant genes may give a somewhat similar clinical picture, these types showing much more variation of expression within families. While, therefore, it is probable that the gene concerned in the present patient's family is recessive and that there is little chance that she will develop the condition or will have affected

children (assuming she does not marry a near relation), a careful family history should be taken and an expert neurological examination made of the patient herself and of her parents for minimal signs of the disease.

NOTES AND COMMENTS

Functional Ciliary Spasm.—Dr. THOMSON HENDERSON (Hursley, Hants) writes: May I comment on your expert's explanation on functional ciliary spasm ("Any Questions?" July 28, p. 254), which, while orthodox in conception, is, when analysed, incapable of realization? According to established convention the vascular choroid functions as a counterweight to the lens and the unstriated ciliary muscle is actuated by a single nerve. If these two tissues were able to function in such a manner they would be absolutely unique in the whole range of the animal kingdom. Nowhere can a vascular structure be found subjected to constant stress or unstriated muscle actuated except by two nerves and functioning accordingly. The physiological function of unstriated muscle is to contract into a phase of rest, such as is appreciated by every human being on emptying the bladder. Thus it is that the contracted unstriated fibres support the zonular curvature and maintain the lens flattened. As discussed in my book *Principles of Ophthalmology* (p. 132), asthenia from whatever cause results in diminution of the general tonus of the body. The neuromuscular mechanism, that maintains the body erect, sags, the individual stoops, and the atonic stomach dilates. Similarly, the atonic ciliary muscle is unable to support the lens traction and likewise sags. The zonular curvature is lowered and lenticular myopic refraction induced. This sequence of events is the very opposite of the so-called spasm, and its treatment is essentially constitutional.

OUR EXPERT replies: Although the precise action of the ciliary muscle has been debated for many years it is now widely accepted that the action of both portions of the ciliary muscle is to slacken the suspensory ligament of the lens, causing the lens to become more convex. Furthermore, the circular fibres act directly as a sphincter which diminishes the circumference of the ring formed by the ciliary body and hence also aids in relaxing the suspensory ligament of the lens. It is interesting to compare the unstriated muscle of the urinary bladder with that of the ciliary body, but surely the neuromuscular mechanism of a hollow viscus such as the bladder is a very different matter. Whatever objection may be raised to the orthodox explanation of the action of the ciliary muscle, it still remains a fact, which can be proved by mere observation, that in functional ciliary spasm of any appreciable degree there is an accompanying spasm of the medial recti. If the process causing the "over accommodation" were atonic in nature then one would hardly expect an accompanying contraction of the synergic medial recti muscles.

Prolonged Constipation in Children.—Mr. E. W. GODDING (Westminster Laboratories, Ltd., London, N.W.1) writes: As manufacturers of the "senokot" standardized senna preparations discussed by Mr. H. Reid and your expert ("Any Questions?" August 11, p. 374), may we comment on the question of costs? Your expert is correct in saying that two drams (7 ml.) of liquid paraffin daily and a tablet of senokot daily is about one penny a week, in either case, but for prolonged constipation the comparison may be very different. While liquid paraffin has to be given indefinitely, senokot dosage is required at less frequent intervals, and usually dosage can be gradually reduced and eventually discontinued.

Correction.—In the Epidemiological Table in the *Journal* of August 18 (p. 426) the number of deaths in the first year of life in the 17 principal towns of Scotland should have been shown as 21, and the deaths at all ages (excluding stillbirths) as 482; these numbers were inadvertently transposed.

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BRITISH MEDICAL JOURNAL

LONDON SATURDAY SEPTEMBER 22 1956

ZONOOSES AS A STUDY IN ECOLOGY

WITH SPECIAL REFERENCE TO PLAGUE, RELAPSING FEVER, AND LEISHMANIASIS

BY

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According to Karl Meyer (1942) the term "zoonosis" was first introduced by Virchow. In a recent publication of the World Health Organization the zoonoses have been defined as "those diseases which are naturally transmitted between vertebrate animals and man." Other definitions have been given from time to time, most of which are not very satisfactory. That given by the World Health Organization is probably the best, but it includes the word disease, which perhaps ought to be avoided, as in certain zoonoses one or more of the vertebrate hosts may show no symptoms of disease. In a recent textbook of protozoology it is even suggested that infections common to man and animals cannot be regarded as zoonoses when the animal host shows no symptoms. Chagas's disease, in which symptomless armadillos act as reservoir hosts, is given as an example. I shall try to refute this idea, and to emphasize that usually resistant or relatively insusceptible animals are the most efficient reservoirs of the zoonoses. It is of course not always easy to know when an animal is feeling ill, and a friend pertinently remarked, "How do you know the armadillo doesn't get a headache"; this was difficult to answer.

A simple definition which avoids some of the more obvious pitfalls is *infections of man naturally acquired from other vertebrates*. According to Metchnikoff, "Infection must be considered as a struggle between two organisms, the parasite and its host. . . . This struggle brings about adaptations on both sides."

A zoonosis can be considered in reverse, the infecting organism passing from man to animals and not vice versa. Monkeys are sometimes infected with quartan malaria and certain filariae in this way. Such infections might be called "anthroponoses," but the term is really superfluous, as most of the zoonoses show this quality of reversal. The zoonoses can be divided into two main groups: those transmitted by arthropods, and those which are not. Only the first group is considered in this paper.

Evolution and the Zoonoses

Garnham (1952) has commented on the evolution of the zoonoses, and according to him the story is something like this. First, the parasite lives happily, passing between its animal host and arthropod vector; next, man breaks into the circle and accidentally becomes infected; the parasite flourishes in this abnormal host—and may be transmitted by a more domestic vector—for example, flea or louse. The disease then often

assumes an epidemic form, and may pass from man to man. Relapsing fever illustrates some of these points. The causative spirochaete seems originally to have been a parasite of merions, gerbils, shrews, and other small mammals, the vectors being ticks of the genus *Ornithodoros*. Man became involved in this cycle, and, after being bitten, developed relapsing fever; this still happens in North Africa and around Dakar.

It is worth trying to trace the evolution of *Spirochaeta duttoni*, which causes tick-borne relapsing fever in Kenya and other parts of tropical Africa, the vector being *Ornithodoros moubata*. Some years ago a spirochaete, named *S. dipodilli* and closely related to *S. duttoni*, was isolated from pygmy gerbils (*Dipodillus* sp.) and *O. erraticus* from small burrows on Crescent Island in Lake Naivasha (Heisch, 1950). Near the small gerbil burrows are large burrows, which are excavated by ant-bears, occupied by warthogs or porcupines, and often contain large numbers of *O. moubata* (Heisch *et al.*, 1953). The presence of *O. moubata* came as a surprise, for the ticks usually have domestic habits, frequenting native huts, rest-houses, and the camp sites of travellers; ant-bear burrows may be their original or natural habitat. It was thought possible that in the remote past the gerbil spirochaete might have become established in the "burrow-haunting" *O. moubata*, and then have evolved into *S. duttoni*. Unfortunately there is no evidence to support this possibility: specimens of *O. moubata* from burrows have always been negative for spirochaetes, and so have the few porcupines and warthogs examined. In Kenya and other parts of tropical Africa, even if there was once a reservoir host of *S. duttoni*, it appears to have faded into the background, tick-borne relapsing fever no longer being a true zoonosis; it thus differs from the disease in America, where man is infected in caves, various small mammals acting as reservoir hosts.

In recent years it has been found that certain tick-borne spirochaetes can infect lice (Baltazard *et al.*, 1947; Heisch and Garnham, 1948; Boiron *et al.*, 1948). Thus in Kenya strains of *S. duttoni* develop readily in lice, and infected lice have even been found in nature (Heisch, 1949). These results support the hypothesis, first suggested by Nicolle and Anderson (1927), that louse-borne spirochaetes evolved from tick-borne ones.

Other zoonoses, in which man breaks into a cycle in animals, are plague and leishmaniasis. Plague is primarily an infection of wild rodents, and man gets infected only by accident. In parts of Siberia gerbils are the

reservoir host of cutaneous leishmaniasis, which is transmitted by "burrow haunting" sandflies. Man sometimes gets bitten and epidemics have occurred among Soviet troops camped near infected burrows.

In Kenya kala-azar was almost unknown before the second world war. Early cases were sporadic, but in recent years there has been a severe epidemic in the Kitui District, and a smaller outbreak near Marigat in the Rift Valley. No animal reservoir has yet been discovered, and, though one may exist, it is believed that man is the usual host, and that interhuman transmission can occur on a large scale. In Kenya the epidemiology of kala-azar is highly complex, and at least three species of sandflies are suspected as vectors; these emerge from termite hills. Apparently evolution is still taking place, and it is difficult to know what the final epidemiological pattern will be.

Holistic Tendency in Nature

It is evident from Professor Garnham's observations that in nature organisms may be parasites of man, of animals, or of both, and it is the last or zoonotic phase which concerns us here. The conception of a zoonosis is complex and includes an environment, as well as man, animals, sometimes arthropods, and a causative organism, the various parts forming a biological whole.

The importance of "wholes" has been stressed by General Smuts (1936). According to him there is a holistic (from *ὅλος* = whole) tendency in nature, parts combining into wholes, which in turn again combine, forming even more complex and significant wholes. A whole is not just the sum of its parts, but something more, something new; it is not just a mechanical system but "dynamic, organic, evolutionary, creative." The concept has little in common with the static absolutism of Hegel and other philosophers, and should not be confused with it. In nature, every organism, whether plant or animal, is a whole, and the modern science of ecology attempts to show how these various wholes react on each other, becoming linked, or rather combined, into new wholes, which are continually modified by changes in the environment.

A zoonotic whole is best considered in relation to the infecting organism or parasite, which makes use of some of the existing ecological links between man and animals in an environment, forming cycles or wholes of varying complexity. In fact, a zoonosis is really a small natural whole or holoid built, as it were, round an infecting organism. As already shown such systems, cycles, wholes, or whatever one prefers to call them, are seldom static, and at any time a zoonosis may cease to exist, the parasite becoming adapted to man and the animal reservoir fading into the background. Or the parasite, after passing through a zoonotic phase, may again become confined to animals, man fading into the background. Treating zoonoses as wholes in this way is useful, but perhaps rather artificial, as it depends on distinguishing between man and animals.

The Zoonoses and Ecology

The foregoing remarks make it clear that a study of the zoonoses is essentially a problem in ecology. Ecology has been defined as the "study of interrelation between organisms and the environment." There are two approaches—the *synecological* and the *autecological*. Synecology, as the name implies, is synthetic or holistic in character, the various plants and animals in a community being treated as a whole, the parts of which are in dynamic relationship, and influenced continually by the environment. Autecology deals with single organisms or species in relation to the environment; it has more in common with physiology and is not really ecology at all. Clumsy words like *synecology* and *autecology* should be replaced by ecology properly defined in the true holistic sense.

Audy (1954) names the whole assemblage or array of parasites associated with a host population the "parasite-pattern," and includes under parasites "all those viruses, bacteria, protozoa, fungi, worms, and arthropods which live on or in or at the expense of higher organisms such as the vertebrates, whether harmlessly or harmfully." The vectors and causative organism of a zoonosis form part of a general parasite pattern, though, actually, while unravelling a zoonosis much of the general parasite pattern gets worked out as well. Many of the ideas tentatively outlined in this paper have been influenced by the opinions of Audy, who for a number of years has been working on the ecology of scrub typhus in Malaya. Audy has long appreciated the importance and holistic nature of synecology, and has discussed various aspects in an interesting note on medical geography (Audy, 1954).

The early work on plague in Kenya illustrates the limitations of an autecological approach. Everyone was so convinced that the domestic rat (*Rattus* sp.) was the reservoir host that it was considered in isolation and not sufficiently in relation to the wild rodents which are the real source of *Pasteurella pestis* (Heisch *et al.*, 1953). The working out of the life-histories of arthropods in the artificial atmosphere of laboratories also verges on autecology, and, though such studies have a certain value, they can never replace work in the field. Elton (1927) has pointed out that the discoveries of Darwin "had the remarkable effect of sending the whole zoological world flocking indoors, where they remained hard at work for 50 years or more, and whence they are now beginning to put forth cautious heads again into the open air. But the open air feels very cold."

Host-Parasite Relationship

A most important aspect of the zoonoses and indeed of parasitic infections in general is what is known as the host-parasite relationship, by which is meant the nature of the interaction between the host and the parasite. It is suggested that the most important reservoirs of zoonoses and other parasitic infections are relatively insusceptible animals rather than highly susceptible ones. There is nothing new in this idea, and as long ago as 1926 that great protozoologist, the late Dr. Wenyon, wrote: "Whenever a parasite is discovered which brings about the death of its host in a short time, it may be safely assumed that the host is not a natural one, or that it is a natural one that is in some unnatural condition. After a time adaptation may occur and a host that was at first an unnatural one may gradually become a natural host."

Resistant animals are very important in plague. Thus in Kenya domestic rats (*Rattus* sp.) are highly susceptible and rapidly almost exterminated, while certain wild rodents (*Arvicanthis*, *Mastomys*, and *Otomys* sp.) are resistant and perpetuate the infection during enzootic periods. In South Africa two species of gerbil are involved (*Desmodillus* and *Tatera* sp.), one of which is resistant and the other susceptible. In California susceptible ground squirrels (*Citellus* sp.) die in large numbers, but the primary hosts are now believed to be various resistant field-mice (*Peromyscus* sp.) and wood rats (*Neotoma* sp.) which harbour *P. pestis* almost indefinitely. In Kurdistan the sole reservoirs of plague are highly resistant merions (*Meriones* sp.). For many years regions occupied by resistant namaqua gerbils (*Desmodillus* sp.) and merions were believed to act as barriers to the spread of plague, instead of being regarded as the real source of the infection.

Recently kala-azar has been extensively studied in Kenya, but, as already noted, no reservoir host has yet been discovered. If an animal host does exist, it may be so resistant that the infection can be detected only by special methods. When isolating *P. pestis* from wild rodents in Kenya (Heisch *et al.*, 1953), the pooled-tissue technique was employed, batches of spleens being emulsified and inoculated into guinea-pigs, for it was only by this indirect

method that the infection could be demonstrated at all. The same principle is being applied in kala-azar, the spleens of animals being inoculated into hamsters. Two hamsters actually became infected, one after being inoculated from gerbils (*Taterillus* and *Dipodillus* sp.) and the other from mongooses (*Helogale* sp.), but this may have been due to cross-infection in the laboratory. All known reservoir hosts of leishmaniasis, which include dogs, jackals, gerbils, and foxes as well as man, show a marked resistance to the infection.

Armadillos and antelopes, which harbour pathogenic trypanosomes, are excellent examples of resistant animals acting as reservoir hosts, the parasites causing no obvious symptoms. In the zoonoses mentioned in this paper the reservoir complex, or whole, includes arthropods as well as vertebrates, both helping to maintain the infection in nature. Sometimes, as in mite and tick-borne typhus, tick-borne relapsing fever, and perhaps certain virus diseases, the arthropod vector may be the principal host.

It is rather difficult to know what to call the various kinds of host. Perhaps resistant or relatively insusceptible animals might be termed "permanent hosts," and highly animals might be termed "temporary hosts"; this would correspond to the natural and unnatural hosts of Wenyon (1926). Hosts can also be classified as "domestic" or "wild," and this may be important, as in many zoonoses the principal reservoirs are domestic animals, which bring the infection in close contact with man. The reservoir of a zoonosis is seldom just one animal, but usually includes several species, which are in close ecological association and act as a "zoological complex" or "biological whole." A good example is sylvatic plague in Kenya. At least three species of resistant rodents are involved, and these, acting in combination, probably perpetuate the infection far more efficiently than if one species acted alone. Highly susceptible hosts like *Rattus* are not included in the reservoir complex.

Hosts have also been classified as final or definitive and intermediate, depending on whether the development of the parasite in them is sexual or asexual. This results in certain ambiguities, and here the arthropod vector is regarded as the intermediate host, the final host being man or some other vertebrate.

Niches

Resistant and unduly susceptible animals fill different "niches" in nature. According to Elton (1927), the "niche of an animal means its place in the biotic environment, its relation to food and enemies." The word "enemies" is taken to include parasites.

Elton has also remarked that "when an ecologist says, 'There goes a badger,' he should include in his thoughts some definite idea of the animal's place in the community to which it belongs, just as if he had said, 'There goes the vicar.'" On seeing an arvicanthid round Rongai one might say, "There goes an animal that can have plague without noticing it."

Important niches are filled by vectors of zoonoses. Thus in plague the niche is filled by fleas, in leishmaniasis by sandflies, and in relapsing fever by ticks and lice. A particular niche is usually filled by different species in different parts of the world.

A study of niches enables us to see that in their organization different animal communities have much in common. It also helps in forming analogies. Thus it was hearing that Dr. Baltazard had discovered resistant hosts of plague in Kurdistan that made me look for similar animals in Kenya. The term "habitat niche" has a different meaning in ecology, which is explained below.

Focal Distribution of Zoonoses in Nature

A feature of certain zoonoses is their "focal distribution" in nature. This is well shown by plague, and, according to Karl Meyer (1942), "focal occurrence and discontinuous distribution is apparently one of the characteristics of

sylvatic plague." While studying plague near Rongai in the Rift Valley of Kenya, a "focus" was found in a field, where *P. pestis* could be isolated from wild rodents long after the widespread epizootic had died down and the animals in adjacent fields had become negative. After the field was ploughed up no more infected rodents were found, conditions apparently being too unstable for the formation of a permanent focus. At Rongai "permanent foci" of sylvatic plague are believed to exist on the foothills of the escarpments where rodent burrows are relatively undisturbed, and not in the Rongai plain. The unstable plains in the valley are ideal for the dissemination of *P. pestis* when conditions are suitable, but the infection probably retreats to the foothills between epizootics. Dr. Baltazard (1955, personal communication) has found permanent foci of sylvatic plague on the foothills of the Himalayas; these never seem to form in the cultivated plains below.

Focal distribution is a marked feature of scrub typhus in Burma and Malaya. The vector mites are found in forest clearings, where they congregate, sometimes in enormous numbers, on patches of secondary vegetation known as "mite islands," often only a few yards across, in which the rodent hosts abound. When the mite islands are infected they are known as "typhus islands"; these are "erratically but not fortuitously distributed" (Audy and Harrison, 1951).

Relapsing-fever spirochaetes may also have a patchy or focal distribution in nature. Thus in Africa, where tick-borne relapsing fever is endemic, only some huts contain infected ticks. Other examples are *Spirochaeta latichevi* and *S. dipodilli*, which are parasites of rodents, and *Ornithodoros* ticks in burrows; the spirochaetes have a very patchy distribution, infected burrows being few and far between. Both the rodent spirochaetes are pathogenic for man, but only mildly so.

In parts of Kenya and the Karamoja District of Uganda, bush-babies (*Galago*) are believed to be reservoirs of yellow fever virus. Dr. Haddow, of the Virus Institute, Entebbe, informs me that infection in these animals is very localized, neutralizing antibodies being confined to groups or families of bush-babies living in widely scattered parts of the forest.

Focal distribution seems characteristic of most parasites in nature, but the ecological factors concerned are still largely unknown.

Sites of Infection

Zoonoses are transferred to man and other vertebrates in a variety of places. Thus round Rongai man gets infected with plague in native huts, domestic rats (*Rattus* sp.) chiefly in village maize cribs, and wild rodents in burrows. In Kurdistan plague is almost entirely sylvatic, man being bitten by infected fleas near the burrows of merions. In East Africa tick-borne relapsing fever is contracted in huts; in America and the Middle East in caves. In Kenya kala-azar is probably caught away from houses near termite hills, while in India the disease is a domestic infection. In parts of Russia cutaneous leishmaniasis is transmitted to man near gerbil burrows by "burrow-haunting" sandflies. Yellow fever is often a house infection, but in Uganda man is infected in banana plantations on forest edges, and monkeys in forest canopies. In Malaya and Burma man contracts scrub typhus in forest clearings and forest edges.

These sites of infection show certain differences, some being unstable, others relatively stable. The plague-infected plain at Rongai and the forest clearings containing typhus islands are unstable areas, for man is continually ploughing up the one and cutting down the other. In fact, the balance of nature is always being upset. It is also doubtful whether the forest edges where man contracts yellow fever and scrub typhus are ecologically stable. In comparison huts, rodent burrows, caves, termite hills, and forest canopies are all relatively stable. Sometimes relatively stable habitats are present in an unstable area; they then partake of the general instability.

Ecologically unstable areas have certain characteristics. Plants and animals living in such zones are usually undergoing active succession, and are prevented from reaching that condition of relative stability known as climax. Species tend to appear that are absent from adjacent communities, and one or more species, whether present in adjacent communities or not, may appear in unusually large numbers. The occurrence of myriads of mites in the mite islands of Malaya, and the sudden appearance (when conditions are suitable) of innumerable wild rodents in the Rongai plain are examples of this. When such prolific species harbour parasites pathogenic for man his chances of becoming infected are much increased. Round Rongai it is only when the wild rodents are numerous that *P. pestis* reaches *Rattus* and finally man.

It is suggested here that it might be possible to call unstable areas "ecotones." The word is generally used, in a botanical sense, for transition or intermediate zones between adjacent plant communities. Might not this definition be too narrow? A striking feature of transition areas, marginal zones like edges, forest clearings, and cultivated plains is often their instability. The ecotone concept implies a state of tension in nature, a temporary or permanent loss of ecological balance. Ecotones may be man-made or occur naturally, as when places are periodically flooded, like certain river banks, mud-flats, and the sea-shore. A study of ecotones might throw light on the evolution of certain species. Audy and Harrison (1951) have pointed out that, in Malaya, rodents of the genus *Rattus* "have been greatly encouraged, and a number of commensal and subspecies have evolved in the artificial environments made by man."

A medical example of an ecotone might be the bowel of a patient suffering from dysentery. In a normal person the intestinal flora is in a state of equilibrium, but in dysentery and other infections of the bowel a single species may predominate and disturb the ecological balance. A similar effect may follow the administration of antibiotics. The elimination of susceptible organisms produces a bacteriological vacuum in which may develop a pathogenic staphylococcus, the life of the patient being endangered. Species of plant or animal which outstrip others and appear in abnormal numbers are comparable to cancerous cells, which defy the authority of the human organism as a whole and threaten to disrupt the co-ordinated complex of interlocking cell communities.

Forest edges are of particular interest, for they can be relatively stable or unstable and act as transition zones or end abruptly. Audy (personal communication) calls forest edges "fringe habitats" and the distinctive communities they contain "fringe communities"; such communities often contain species which are absent or very rare in adjacent regions. Important fringe species are *Aedes simpsoni*, the vector of yellow fever in forest edges in Uganda, and a species of *Chrysops* which transmits loa loa on the west coast of Africa. Transition zones, whether stable or not, are important meeting-places for animals and arthropods, and an interchange of parasites is very likely to occur. Perhaps in East Africa the two cycles of yellow fever are or were linked in such a zone.

Relatively stable habitats like huts, caves, animal burrows, and termite hills, near or in which zoonoses can be transferred to man, are known to ecologists as "habitat niches"; they are sanctuaries protecting certain species from a potentially hostile environment. Forest edges, other transition zones, and forest canopies, though sometimes unstable, may be relatively stable; they then have more in common with habitat niches than ecotones. It is, of course, sometimes difficult to decide whether a particular area is unstable or not, and the foregoing remarks are tentative only.

The suggestion has been made that in Kenya and India the permanent foci of sylvatic plague are more likely to be found on relatively stable foothills than in plains rendered unstable by cultivation. The idea may have a wider applica-

tion, and perhaps organisms causing zoonoses and other parasites can become firmly established in nature only if part of their life history is spent in an animal or animals living in a relatively stable environment. This view at present is somewhat speculative.

Food-chains and Cycles

A study of what ecologists call "food-chains" and "food-cycles" is an important aspect of the synecology of the zoonoses. Animals linked by food form food-chains, and all the food-chains in a community form the food-cycle. In an animal community herbivores are preyed on by carnivores, which in turn are preyed on by larger carnivores, until an animal is reached which virtually has no enemies. The animals at the base of the chain are smaller and more numerous than those at the top. Elton (1927) has called this the pyramid of numbers.

Elton has suggested that parasites are really small carnivores, though they often do not kill their prey. The large components of parasite food-chains get smaller instead of larger, and more numerous instead of fewer; in fact, the pyramid of numbers is inverted. A study of the food-cycle and plague at Rongai shows that various ectoparasitic fleas pick up *P. pestis* from several rodent hosts. Plague bacilli develop rapidly in these fleas and are transmitted to man. Eventually the plague bacilli in the fleas may be attacked and destroyed by even smaller and more numerous organisms known as bacteriophages.

The importance of food-cycle studies has been stressed by Elton, who wrote: "Since the food cycle is so important in determining many of the possible modes of transference of parasites from one host to another, it is plain that biological surveys carried out along food-cycle lines would be of great value in narrowing the field of inquiry when the life history of any particular parasite is being studied." The value of food-cycle studies, particularly in relation to the food preferences of various disease-transmitting arthropods, is now fully appreciated. Dr. Weitz, at the Lister Institute, under the inspiration of the late Professor Buxton, has formed a most valuable unit, which devotes much time to the identification of arthropod blood meals from all over the world.

Animal Communities

Most animals fluctuate greatly in numbers, and this must be taken into account when studying the zoonoses. At Rongai outbreaks of plague usually coincide with a remarkable increase in the wild rodents; when their numbers drop, which often happens quite suddenly, the link with the domestic rats (*Rattus* sp.) is temporarily broken and human infections cease for the time being. Plague and the regulation of numbers in wild animals has been discussed by Elton (1925), but the effect on resistant animals is not mentioned. In Kenya epizootic plague decimates the highly susceptible domestic rat, but several species of wild rodent are scarcely affected; they are, however, susceptible to other infections, and at times parts of the Rift Valley have been littered with wild rodent corpses. The periodic reduction of numbers in vertebrates is often caused by disease.

Other rodents as well as *Rattus* are highly susceptible to plague in other parts of the world, examples already given being ground squirrels in California and lobengula gerbils in South Africa. Periodically, these species are almost wiped out by plague in certain areas, and it may take as long as five years for their numbers to build up again; this affects the incidence of human infections. In South Africa the periodic fluctuation of rodent populations has been extensively studied by Davies.

Another important matter, which can only just be mentioned here, is the range or distribution of various species in nature. Animal hosts and arthropod vectors are dependent on their environment, and the occurrence of zoonoses in definite areas is essentially a zoogeographical problem.

Conclusion

Although the importance of a synecological or holistic approach is stressed, it would be a mistake to take this too literally. Ecological processes are so complicated that there is a danger of getting involved in a mass of irrelevant ecological detail, and of forgetting that when studying a zoonosis the natural history of the causative organism is our chief concern. The infecting organism is in fact the pivot round which the ecological investigation revolves.

If the views expressed here have any validity, they probably apply not only to the zoonoses but to parasitic infections in general.

Summary

The zoonoses, which are defined as infections of man naturally acquired from other vertebrates, are treated as a problem in ecology. This entails studying the interrelation between man, animals, a causative organism, the environment, and sometimes arthropods. Such an approach is holistic or synecological—wholes being regarded as more important than parts. Holism is a dynamic not a static conception.

The evolution of the zoonoses is discussed, particularly in relation to plague, relapsing fever, and leishmaniasis. The most important reservoirs of zoonoses and other parasitic infections are usually resistant or relatively insusceptible animals rather than highly susceptible ones. Plague and Chagas's disease illustrate this. Resistant and unduly susceptible animals occupy the different "niches" in nature. By "niche" is meant the place of an animal in its biotic environment. Zoonoses often have a "focal distribution" in nature. Thus wild rodents infected with plague may occur in "pockets," and the vector mites of scrub typhus congregate in "typhus islands."

An unstable environment often favours the transference of zoonoses to man and animals. Examples are the plague-infected plain of Rongai, in Kenya, the typhus-infected forest clearings in Malaya, and the yellow-fever infected forest edges in Uganda. Ecologically unstable areas are termed "ecotones." Zoonoses can also be transmitted in or near relatively stable sites such as huts, rodent burrows, caves, and termite hills. These are known as "habitat niches." Animals and arthropods in a community are linked by food, and the importance of what are known as "food chains" and "food cycles" is discussed in relation to the transference of zoonotic infections from one host to another.

Reference is also made to the fluctuations in numbers of various animals in nature, and how this affects the incidence of zoonotic disease. Certain highly susceptible rodents are periodically decimated by plague; this breaks the link with man, and human infections cease for the time being.

I wish to thank the Director of Medical Services, Kenya, for permission to publish this paper.

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CHEMICAL AND CLINICAL PROBLEMS OF THE ADRENAL CORTEX*

BY

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Some Factors Governing the Response to Corticotrophin

Growth Hormone

In 1951 Stack-Dunne and Young stated that they were able to obtain preparations from the anterior pituitary having two distinct kinds of activity. These separate preparations produced either a fall in the adrenal ascorbic-acid content or an increase in adrenal weight. They used growth hormone as a source of the adrenal weight factor, but did not consider that this factor was necessarily growth hormone itself. There seemed to be clinical data supporting the view at the same time, for at the same meeting to which Stack-Dunne and Young gave their paper we presented our early data on discrepancies between human response and the assay potency as determined by the Sayers method. However, as we have seen, this seems to have been explained on grounds of destruction or inactivation of the corticotrophin in the patients receiving it. The substance promoting adrenal weight and associated with, but not necessarily identical with, growth hormone also causes increased mitotic activity in the adrenal cortex and differs from the ascorbic-acid-depleting substance which is probably responsible for release and synthesis of corticosteroids (Cater and Stack-Dunne, 1955).

Forsham *et al.* (1955) summarized some experiments using a substance prepared by Rinfret from pig pituitary which was not itself steroidogenic but which, when given to a patient subsequently given corticotrophin, augmented the urine steroid response measured by the Porter-Silber method. A commercial growth-hormone preparation did not have a similar effect. We were fortunate enough to have at our disposal a small quantity of one of Young's growth-hormone preparations which he thought would be active with respect to the adrenal weight factor, although it had not been specifically tested for this activity. This substance was administered to a patient with Simmonds's disease whose adrenal had already been and continued to be stimulated with corticotrophin. We judged that in these circumstances the patient would also be deficient in growth hormone or the adrenal weight factor, and would be quite sensitive to it. There was a rapid increase in blood-sugar level, presumably due to the growth hormone itself, given intramuscularly 25 mg. twice daily for five days, but no increase in the ketogenic steroid or ketosteroid excretion. This negative result cannot be construed to be entirely contradictory to the hypothesis presented. It may well be that too little material was given for too short a time, or, as we shall see, that the absence of some other factor was limiting the response.

There is a clinical example before us worthy of attention with regard to this matter—namely, acromegaly. It is a commonplace that the adrenal cortices of patients with acromegaly are large and often contain subcapsular nodules. There is no unanimity of opinion about their

*Conclusion of the Humphry Davy Rolleston Lectures delivered at the Royal College of Physicians of London on May 15 and 17. The first part was published last week.

steroid production, but this might be expected to be low if the acidophil tumour caused sufficient reduction of anterior pituitary tissue. Adrenocortical insufficiency appears to be rare in acromegaly (Rummell, Baer, Hollister, and Kolb, 1951). In six patients with acromegaly the ketosteroid excretion was normal in three and low in three (Fraser *et al.*, 1941). In another group, three women and three men had high normal values, whilst one male with very prolonged disease had low values (Prunty, 1944).

Three cases have recently been studied. The first was a Polish grave-digger aged 36 with gross acromegaly. He excreted up to 22.5 mg. of ketosteroid daily and 18.4 mg. of ketogenic steroid. The second case was that of a man aged 43 who for five years had acromegaly with diabetes. He excreted up to 17.9 mg. of ketosteroid daily and 17.8 mg. of ketogenic steroids. The third patient was a woman aged 39 who 15 years previously had had an acidophil adenoma removed for eye signs. She had lately become very hirsute, with severe acne and pubic hair of male type. She excreted up to 34 mg. of ketosteroid and 12 mg. of ketogenic steroids daily. The last two patients were given corticotrophin according to the standard test. This was unfortunately of poor potency and had given apparently subnormal responses in several patients (see Table II). It had been used, however, in a patient with Cushing's syndrome due to hyperplasia of the adrenal cortex, with strongly positive results (S. E., Fig. 17). Such patients have a high sensitivity to corticotrophin. The two acromegalics gave a ketogenic steroid response which was low normal. The first acromegalic received a known potent batch of corticotrophin (89754) and did not show a brisk response. Clinically all these patients could be regarded as being in the active stage of the disease; although they presumably secreted excessive amounts of growth hormone, it does not follow that they did likewise with some other adrenal-cortical-activating agent. The results merely suggest that growth hormone itself did not appear to be a potent potentiating substance under these conditions of study.

Gonadotrophins

A second substance which has been implicated in having a subordinate effect on the adrenal cortex is the luteinizing hormone. Albright, Smith, and Fraser (1942) advanced complex arguments, based on the clinical relation between ovarian function and adrenal cortical function, that luteinizing hormone exerted an effect on ketosteroid secretion by the adrenal. Experiments based upon the suppression of ketosteroid excretion, which were thought to cause a simultaneous depression of luteinizing hormone and adrenal secretion of ketosteroid, seemed to support this hypothesis (Reifenstein, Forbes, Albright, Donaldson, and Carroll, 1945). We have conducted several experiments using preparations of luteinizing hormone ("pregnyl"; chorionic gonadotrophin) and follicle-stimulating hormone ("gestyl," prepared from pregnant mare's serum; serum gonadotrophin). The first of these was tried in the patient with Simmonds's disease who failed to show an effect with the growth-hormone preparation. No significant changes occurred when, in addition to corticotrophin, 1,000 units of gestyl was given daily for 10 days and on the fifth day 1,000 units of pregnyl daily was started for 10 days. This was in spite of the fact that a small menstrual period occurred, the first for many years.

In a second experiment a seemingly positive result was obtained. A patient with Hodgkin's disease was

under successful treatment with corticotrophin; on 20 "clinical units" daily he excreted 34 mg. of ketogenic steroid and 24 mg. of ketosteroid. The addition of 3,000 units of pregnyl daily (chorionic gonadotrophin) caused, on the fifth and sixth days, a rise in ketogenic steroids to 60 mg. and ketosteroids to 33 mg. There was a prompt fall in the steroid levels after withdrawing gestyl.

A third experiment with pregnyl in a patient with rheumatoid arthritis treated with corticotrophin was negative. Two other experiments have also been made with gestyl (from pregnant mare's serum) with negative results; if anything there was a fall in the ketogenic steroid excretion.

These results are difficult to interpret, and, even if the positive finding can be repeated, it should be noted that both ketogenic steroids and ketosteroids responded to chorionic gonadotrophin, which does not correspond with the theory of Albright. There remains little doubt that there is a complex reciprocal relation between the adrenal cortex and the gonads (Parkes, 1945), and studies in animals suggest that the ovaries may sometimes even replace the adrenal cortex (Hill, 1948). In guinea-pigs gonadotrophin has been found to suppress the response of the adrenal to corticotrophin, using the excretion of ketogenic steroids as a criterion (Clayton and Hammant, 1955b).

Effect of Tri-iodothyronine on Response to Corticotrophin

It has been thought for many years that there is an interdependence of the thyroid and adrenal cortex (Marine, 1930). Claims have been made that cortisone and corticotrophin reduce thyroid function (Hill, Reiss, Forsham, and Thorn, 1950; Wolfson, Beierwaltes, Robinson, Duff, Jones, Knorpp, Sieminski, and Eya, 1951; Lerman, 1955a). In the rabbit, radioactive iodine release by the thyroid is retarded by cortisone (Harris, 1955a). The low ketosteroid excretion in myxoedema has been found to rise when replacement therapy is given (Beierwaltes and Bishop, 1954; Lerman, 1955b). In our experience thyroid therapy has been required to produce significant clinical change in patients with myxoedema secondary to anterior hypopituitarism.

We have been able to conduct a single observation on the effect of tri-iodothyronine on the activity of the adrenal cortex. The same patient with Simmonds's disease was again under treatment with corticotrophin (Fig. 6), and tri-iodothyronine was given intravenously in a single dose of 0.5 mg. and two days later 0.25 mg. was injected. The typical effects of tri-iodothyronine are shown on the B.M.R. and the serum creatine and blood cholesterol levels. After an interval of two days the urine steroids and plasma hydrocortisone levels rose significantly. There were also effects on the level of blood sugar and on sodium retention. It can be concluded from this experiment that conditions exist in which increased thyroid activity can increase adrenal cortical secretion. The likely interpretation seems to be that when a near maximal stimulus by corticotrophin was applied the response was limited by a degree of hypothyroidism, the correction of which produced a good normal response. This effect might not so easily occur in patients treated for myxoedema, since in this situation, although thyroid hormone is raised to adequate levels for response of the adrenal cortex, the rate of endogenous secretion of corticotrophin could be the limiting factor.

Development of Resistance to Corticotrophin

Earlier, when inactivation in muscle or subcutaneous tissue was a common problem, the development of resistance to continued injection also occurred (Forsham, Renold, and Frawley, 1951). It has already been indicated how variable

the response of patients can be to different doses and batches of corticotrophin, and for this reason some direct measurement of corticotrophin activity seems essential before in clinical practice the conclusion is drawn that a patient does not show a symptomatic response to treatment.

This point has been stressed by West (1954) and is illustrated by J. J., a woman under treatment with corticotrophin for rheumatoid arthritis (Fig. 7). After a prolonged period of therapy she no longer responded well clinically. It was known that the batch of corticotrophin in use on day 88 was not very effective in other individuals, so it was changed to a known very potent one (89754) at the same dosage (10 "clinical units" twice daily). As the response at day 109 was poor we repeated the identical batch and dose given at the beginning—that is, corticotrophin (89754) in doses of 20 "clinical units" twice daily. The patient responded again, but to a smaller degree. Nevertheless the intravenous administration of 40 "clinical units" of the same material on day 118 produced a large response, the excretion rate reaching 6.1 mg. per hour. It must be concluded that this patient developed a partial degree of unresponsiveness which could easily be overcome with sufficient stimulus. This experience demonstrates another reason for avoiding assumptions about the dose-response relationship to corticotrophin. West (1956) has also observed under certain conditions a failure of adrenal response to long-acting corticotrophin which is capable of being overcome.

Responses to Operation

The first observations on the effect of trauma in man on adrenal cortical secretion were made by Venning (1945), who found by bioassay an elevation of cortin levels of urine extracts under these conditions. For this and other reasons it may be supposed that operative intervention is a good method of investigating a patient's response to endogenous corticotrophin and possibly of studying quantitative differences in the response from those obtained with exogenous corticotrophin. Post-operatively, the general pattern of events seems to be that there is often a short initial increase of ketosteroids, sometimes followed by a fall for several days (Forbes, Donaldson, Reifstein, and Albright, 1947; Prunty, 1953). When the Porter-Silber method was used the corticoid metabolites were found to

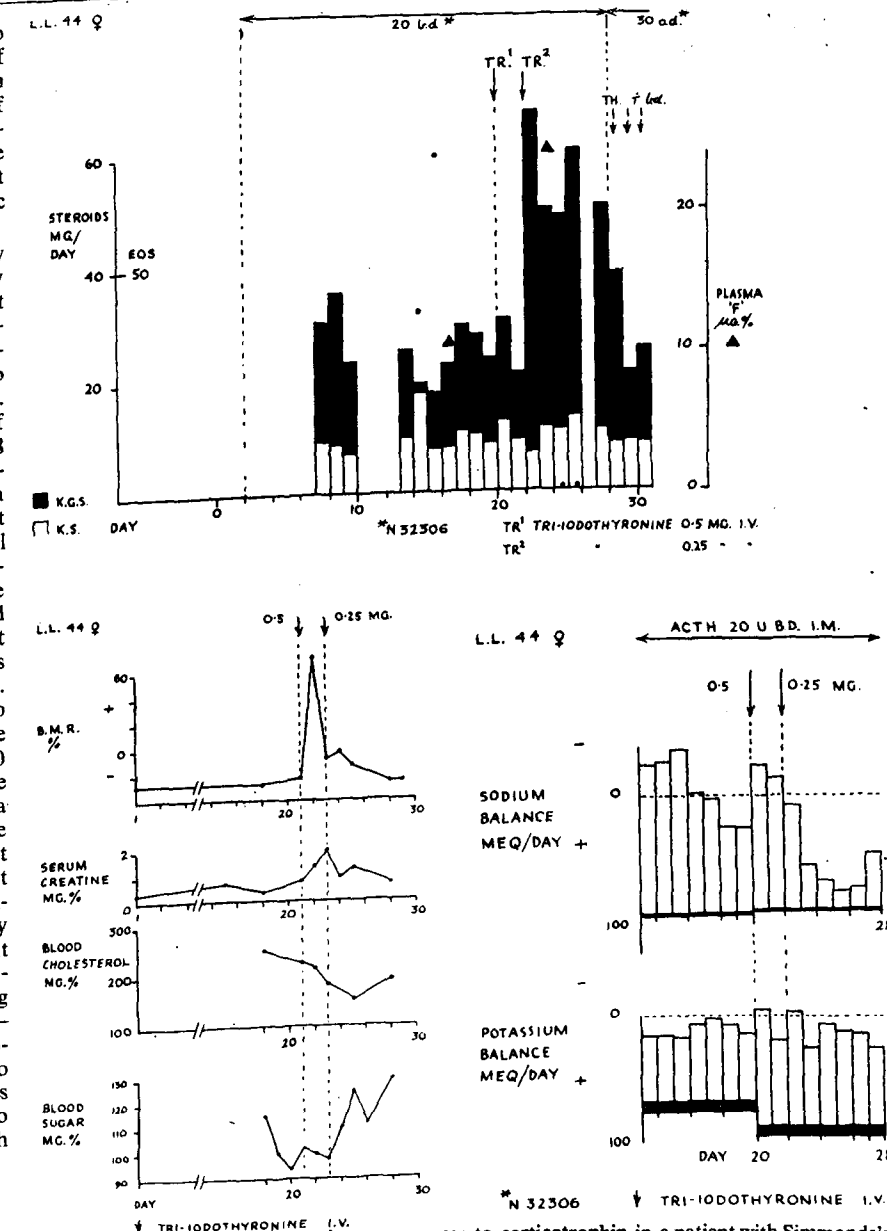


Fig. 6.—Effect of tri-iodothyronine on response to corticotrophin in a patient with Simmonds's disease. Tri-iodothyronine, two doses, was given intravenously. Eosinophils marked ●; plasma hydrocortisone ▲.

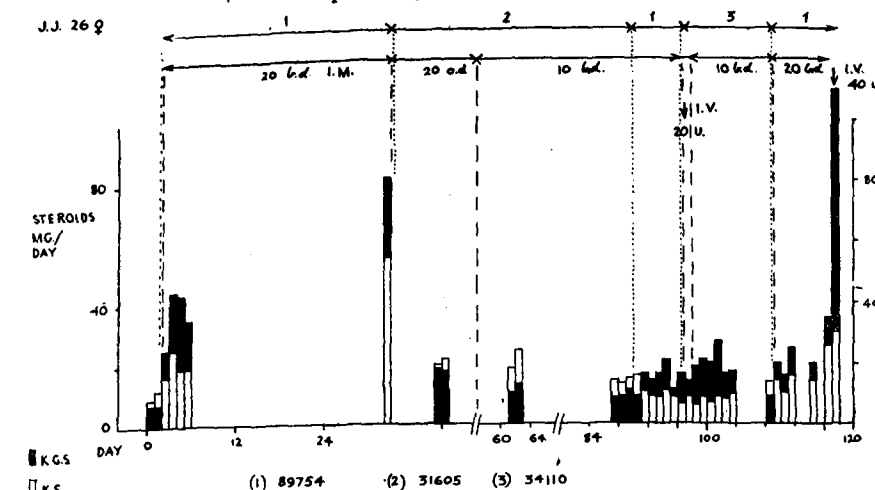


Fig. 7.—Long-term response of patient with rheumatoid arthritis to three batches and varying doses of intramuscular corticotrophin (except where marked, i.v.). The numbers on the top line, above the dosages, refer to different batches of corticotrophin.

increase early after operation and to persist for several days, depending on the amount of trauma (Moore, Steenburg, Ball, Wilson, and Myrden, 1955); this also occurs after burns (Wilson, Lovelace, and Hardy, 1955). With the method for ketogenic steroids the response is similar (Fig. 8). This has also been found by Jepson, Jordan, and Levell (1956). The magnitude of the response varies in different patients, but there is a tendency for the corticoid metabolites to increase to a greater extent than the ketosteroids. When methods of blood analysis for corticoids were used a sharp rise was also found immediately after operation, which may to a small extent be enhanced by temporary inability of the liver to metabolize the hormones as rapidly as normally (Sandberg, Eik-Nes, Samuels, and Tyler, 1954).

Adrenal Cortical Virilism and Hirsutism

In 1933 Broster and Vines classified patients with the adrenogenital syndrome into those occurring before puberty and those after puberty. The rise in urine ketosteroids is a much more pronounced feature in the former group, and the ketosteroid levels in these patients are often very high after the adrenarche at puberty (Mason and Engstrom, 1950). In the latter group ketosteroids may apparently be normal, high normal, or just above normal, which is seen to be the case in the group of patients described below. Recently Patterson has found that the pre-pubertal group is divisible into two subgroups according to a high or low level of dehydroepiandrosterone excretion (Broster, Patterson, and Camber, 1953). There seems to be no obvious clinical significance of this finding at the present time. It has been observed that even patients with virilizing adrenocortical tumours, who sometimes have high excretion rates of dehydroepiandrosterone, need not necessarily excrete large amounts of this substance (Mason and Engstrom, 1950; Prunty, 1950). Its excretion will depend on its further conversion by the adrenal and rate of metabolism after secretion.

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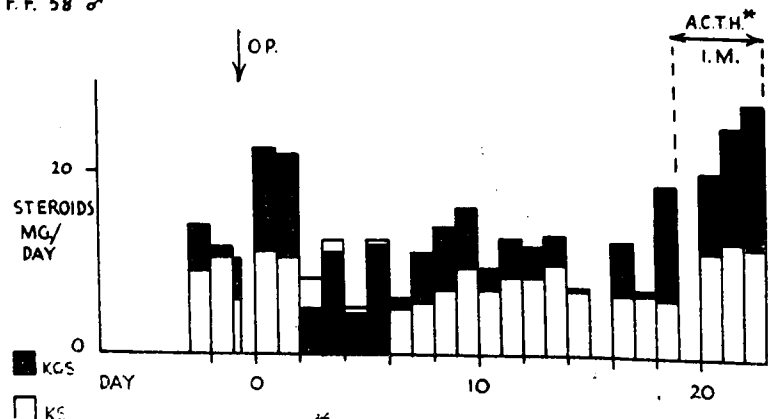


FIG. 8.—Response of "normal male" to lobectomy for bronchial carcinoma. Subsequently he responded normally to a poorly potent batch of corticotrophin.

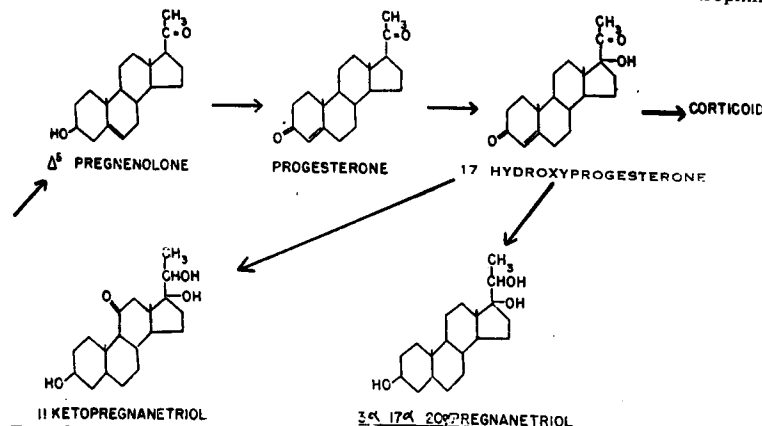


FIG. 9.—Failure of corticoid synthesis in pre-pubertal virilism with excessive excretion of pregnanetriol and 11-ketopregnenetriol.

The greatest biochemical advances in the field of the pre-pubertal syndrome have been made by Wilkins and his associates, particularly Bongiovanni (Wilkins, Bongiovanni, Clayton, Grumbach, and van Wyk, 1955). Bartter, Albright,

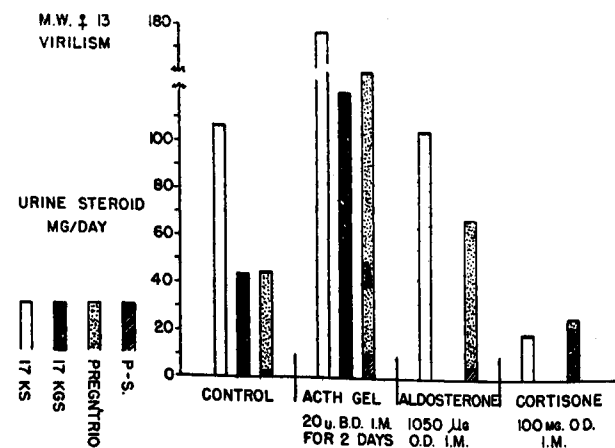


FIG. 10.—Pre-pubertal virilism. Effect of corticotrophin, aldosterone, and cortisone. Note the determination of ketogenic steroids includes pregnanetriol, therefore corticoid metabolites measured by Reddy method (P.S.). The latter rises on cortisone therapy due to metabolites derived from it.

Forbes, Leaf, Dempsey, and Carroll (1951) were the first to suggest that there is basically a deficiency in adrenal corticoid synthesis in this condition, and this would theoretically lead to an increased circulation of corticotrophin. The latter has been demonstrated by Morris (1952) and by Sydnor, Kelley, Raile, Ely, and Sayers (1953). The deficiency in synthesis of hydrocortisone and other corticoids is partially due to failure of introduction of the hydroxyl group at position 21 (Dorfman, 1955). A high proportion of ketosteroid is often found with hydroxylation at position 11. Bongiovanni has also found that pregnanetriol is excreted in the urine in large amounts which, it seems likely, originate from 17-hydroxyprogesterone, as also probably does the increased excretion of 11-ketopregnenetriol reported by Finkelstein, von Euw, and Reichstein (1953) (Fig. 9). It is thought that the high secretion rate of corticotrophin stimulates the secretion of excessive adrenal androgen, a raised blood level of which, unlike that of hydrocortisone, does not inhibit further corticotrophin release.

These patients vary in their response to exogenous corticotrophin, but the response shown in Fig. 10 is typical. The corticoid metabolites have here been estimated by a modification of the method of Reddy *et al.* (1952) and show very little response to corticotrophin, whereas there is a distinct rise in ketosteroids from already excessively high levels. The urine of this patient also contained greatly increased amounts of pregnanetriol, the excretion of which was further raised by corticotrophin. The estimation of pregnanetriol is relatively simple and has appeared to be quite specific in this syndrome. It is, however, also included in the steroids estimated by the method of Norymberski *et al.* (1953), giving falsely high values for the level of corticoid metabolites. Wilkins and his group have observed a large series of these cases, and have found that cortisone, as suggested by Bartter *et al.* (1951) and especially if used early enough, has dramatic effects in alleviating the abnormalities. It also has a very powerful effect, as would be expected, on reducing

TABLE III.—Steroid Excretion and Response to Corticotrophin—Adult Hirsutism

Patient	Age	Summary	Resting (mg./day)		Response to Corticotrophin	
			Ketosteroid	Ketogenic Steroid	Max. Ketogenic Steroids (mg./day)	K.G.S./K.S. Ratio
1 F.S.	37	10 years' severe hirsutism accompanied by post-encephalitic changes from illness at age 7	20-27	10-4-13-1	27	0-3
2 L.C.	22	Hirsutism at puberty. Menorrhagia. Pseudomucinous cystadenoma removed at age 17, with one ovary. Histology of other ovary normal at 22. Other ovary had to be removed with uterus for menorrhagia. Urine oestrogen 13 µg./day after this	11-7-14-3 20-25	3-7-4-1 2-8-11-8	36 44	0-8 0-9
3 S.J.	28	Hirsute at 21	10-12	6-7-10-3	30	1-1
4 Z.C.	30	Hirsute at puberty. Virilized. Homosexual. Normal ovarian histology. Improved after subtotal adrenalectomy	(1-4-5-5 post-op.) 18-19 15-22	12-2-14-9 15-4-20-1	60 74	1-1 1-5
5 S.B.	21	Hirsute at 16. Severe. Normal E.U.A.	17-20	12-4-15-4	50	1-2
6 O.F.	25	Overweight and hirsute from after puberty. Severe acne	9-12	13-2-17-7	67	1-9
7 K.P.	26	Overweight 10 years, severely hirsute 4 years. Few purple striae. E.U.A. normal	17-25	9-3-9-7	75	1-4
8 M.L.	29	Severe hirsutism from puberty. E.U.A. normal				
9 J.B.	30	2 years' severe facial hirsutism. A mild case				

E.U.A. refers to examination of genital tract under anaesthesia.

the level of the ketosteroid output, and control of the dosage in this way is essential. It similarly depresses the excretion of pregnanetriol.

Post-pubertal Hirsutism

Patients suffering from post-pubertal hirsutism have been the subject of less fruitful research, and indeed are often grouped together under the term "idiopathic hirsutism." There is a striking incidence of the beginning of the disturbance at or soon after puberty, which is at a time when the adrenal cortex has assumed its adult pattern of secretion, especially with regard to ketosteroids (Mason and Engstrom, 1950). It is perhaps odd that they develop the degree of hirsutism that they often do, with little or no increase in their resting ketosteroid excretion. It has been shown that under conditions of increased stimulation with corticotrophin they are then capable of excreting amounts of ketosteroids relatively in excess of the normal. A group of nine patients have been studied.

The basal steroid levels in the urine and the data of response to corticotrophin for these patients are summarized in Table III. There is a general tendency for the ratio of the ketosteroid patterns to correlate with their clinical state, Case 1 being the most severe and Case 9 the mildest. There seems to be little relation between this ratio and the basal ketosteroid levels. Dr. Brooks, in our laboratory, has kindly carried out more detailed investigations of the ketosteroid patterns in three of the worst of these patients, using methods he has been developing for this purpose (Brooks, 1956). The β -ketosteroids represent largely purpose (Brooks, 1956). One of the most viril-dehydroepiandrosterone (Table IV). One of the most virilized individuals (Case 4) showed the highest basal level and, like Case 2, responded well to corticotrophin. The excretion of this substance in Case 1 was poor. The fraction of polar ketosteroids is particularly important, as it represents the ketosteroids with 11-ketone or hydroxyl groups. That they do not form a large proportion of the ketosteroid excretion

TABLE IV.—Ketosteroid Fractionation in Adult Hirsutism

Case	Total Ketosteroid (mg./day)	β -Fraction (mg./day)	Polar Ketosteroids (mg./day)
1 { Resting	20-4	0-9	2-7
1 { Corticotrophin	49-2	2-4	8-1
2 { Resting	14-3	2-6	6-5
2 { Corticotrophin	41-3	13-7	1-2
4 { Resting	12-1	5-6	4-0
4 { Corticotrophin	27-6	11-4	<0-1
Rheumatoid arthritis { Resting	11-4	2-9	3-7
Rheumatoid arthritis { Corticotrophin	18-5	4-0	
Prepubertal adrenogenital syndrome { Resting	107	12-1	33-6
Prepubertal adrenogenital syndrome { Corticotrophin	182	19-1	56-6

after stimulation with corticotrophin would therefore indicate that the larger part of the ketosteroids is not primarily derived indirectly as corticoid metabolites, but almost certainly by increased ketosteroid synthesis by the gland. The highest proportion of the total ketosteroid as polar ketosteroid after corticotrophin (19%) was found in Case 1. This was appreciably less than in the patient studied with prepubertal adrenogenital syndrome, whose corresponding figure was 31%. The comparison is similar in the case of the resting levels of the polar fraction.

TABLE V.—Pregnanetriol in Urine

	Before Corticotrophin (mg./day)	After Corticotrophin (mg./day)
Case 1. Hirsutism	1-5	8-2 (4)*
" 2. "	1-1	6-0 (4)
" 3. "	1-2	1-6 (4)
" 4. "	1-3	4-5 (3)
" 5. "	1-1	7-6 (4)
" 8. "	45-0	124-0 (3)
Adrenogenital syndrome (F)	1-9	2-3 (3)
Rheumatoid arthritis (F)	0-2	4-6 (3)
Sub. nephritis (F)	0-2	3-0 (4)
Hodgkin's disease (M)	—	2-0 (—)
Cushing's syndrome (M)	2-8	2-7/8 hours*

Figure in parentheses is day of corticotrophin administration.
* Equivalent to approximately 8 mg./24 hours.

TABLE VI.—Comparison of Steroid Responses in Patients with Normal Adrenals and Those with Adult Hirsutism or Pre-pubertal Adrenogenital Syndrome

	Normal	Hirsutism	Adrenogenital Syndrome
Resting corticoid metabolites	Normal	Normal	Normal or low
" ketosteroids	"	Normal to high	High to very high
" 11-oxyketosteroids	"	Normal	Often high
" β -ketosteroids	"	Normal or high	Sometimes high
" pregnanetriol	"	Normal	High
Corticoid metabolites response to corticotrophin	Good	Good	Poor
Corticoid metabolites/ketosteroid response to corticotrophin	High	Low	Very low

The excretion of pregnanetriol in these patients is not very different from that found in other individuals (Table V), even after stimulation with corticotrophin. The highest level reached is that in Case 1, which is similar in magnitude to that in the patient with Cushing's syndrome. It cannot therefore be inferred that there is an abnormality in pregnanetriol excretion comparable to that in the pre-pubertal adrenogenital syndrome. Comparison of the hirsute group with normal individuals and the findings in the adrenogenital syndrome are summarized in Table VI.

enuresis, having a daily urine output of 12 litres, containing up to 400 g. of glucose. At the age of 9 he had had "poliomyelitis" and for some time had noticed blurring of vision. He was somnolent by day, but not sufficient to prevent his working. He had gynecomastia, sparse head and facial hair, but almost normal axillary and pubic hair. His external genitalia were small. Reduction of visual acuity accompanied bilateral papilloedema with numerous small circumscribed retinal haemorrhages. He had left-sided ptosis and signs suggesting old poliomyelitis in the left arm. His voluntary food consumption was equivalent to 7,000 calories daily.

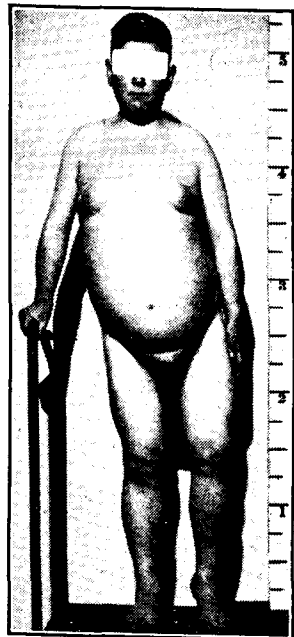


FIG. 14.—Case J.G. Obesity and gynecomastia associated with chronic encephalitic lesion especially involving hypothalamic region.

The E.E.G. showed bilateral slow high-voltage activity, especially in the frontal regions, paroxysmal in nature. It was increased by overbreathing and stabilized by photic stimulation. Apart from what turned out to be a falsely positive ethyl iodophenyl-undecylate ventriculogram, suggesting a filling defect in the third ventricle, other neurological investigations were normal. The blood sugar was 300 mg. per 100 ml. and liver glycogen only 0.74%. There was never excess ketone in blood or urine. The blood sugar was unresponsive to adrenaline. F.S.H. was absent from urine. All epiphyses were united. After later control of the glycosuria with insulin he concentrated his urine to only S.G. 1014 by dehydration or with "pitressin." The B.M.R. was plus 15%, but thyroid uptake of ^{131}I was only 10%.

His response to corticotrophin (89754), both intramuscularly and intravenously, was poor and suggestive of hypopituitarism. At first he required 240 units of soluble insulin daily to control his glycosuria, with a reduction of urine volume to 2 litres. He was then put on a 2,000-calorie diet and given x-ray therapy to the infundibular area, whereupon his insulin requirement fell to 30 units daily. He was discharged on insulin and thyroid, but several months later returned with cerebellar symptoms and signs and died with hyperpyrexia.

At necropsy there were old encephalitic lesions of generalized nature, but specially involving the neighbourhood of the tuber cinereum and mammillary bodies (Fig. 15). There were extensive and more recent haemorrhagic lesions in the pons. The pituitary appeared normal; the thyroid showed vesicles filled with colloid and flattened epithelium (Fig. 16); the adrenals were small, and the fascicula was particularly narrow, with pronounced pigment granules in the inner zone and shrunken reticula; the testicles showed a considerable impairment of spermatogenesis with prominent Sertoli cells, and Leydig cells were reduced in number. Breast tissue showed considerable duct hyperplasia.

Harris (1955b) has carefully reviewed the evidence from experimental work on the hypothalamus and concludes that external stimuli to the anterior pituitary can pass by two pathways. The ordinary day-to-day stimuli are transmitted through nervous pathways, whereas stimuli can also pass by a direct metabolic mechanism. The animal experiments on which this conclusion is based are of two types: section of the pituitary stalk with care to avoid regeneration of the portal vessels, or stimulation of the various parts of the hypothalamic region and production of experimental lesions in this region. Thus stimulation of the posterior part of the hypothalamus in monkeys causes corticotrophin release (Porter, 1954). Pituitary stalk section need only lead to slight atrophy of the anterior pituitary and some atrophy of the adrenal cortex. It is reasonable to suppose that in our patient sufficient stimulation of the anterior pituitary remained by extrahypothalamic pathways to maintain the adrenal in its subnormal state of activity and to give the

somewhat reduced positive response to injected corticotrophin. The decreased uptake of ^{131}I in our patient closely follows Harris's (1955b) finding of reduced thyroid activity in the rabbit with pituitary stalk section.

With regard to gonadotrophin secretion, most experimental work has been done in female animals, but Benoit and Assenmacher (1953) found that isolation of the anterior pituitary of the duck caused decreased testicular function and atrophic changes. The changes in our patient were of partial degree and less severe than those often seen in anterior hypopituitarism (Howard, Sniffen, Simmons, and Albright, 1950). Similarly, the adrenal atrophy had not progressed to the degree often occurring in anterior



FIG. 15.—Case J.G. Typical encephalitic lesion adjacent to mammillary body. ($\times 280$.)

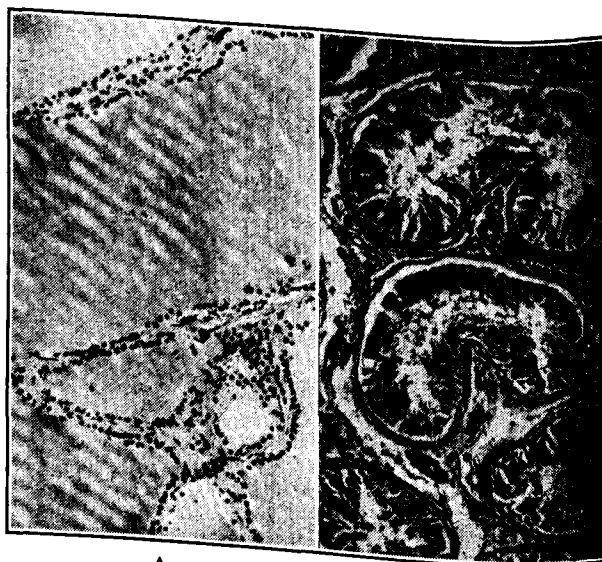


FIG. 16.—Case J.G. A. Quiescent thyroid. B. Testicle. Note the basement membrane, diminished spermatogenesis, prominent Sertoli cells, and reduction of interstitial cells. ($\times 110$.)

hypopituitarism (Sheehan and Summers, 1949). In a series of 60 cases showing endocrinological disturbances as a result of damage in the hypothalamic area meningo-encephalitic lesions were uncommon (Bauer, 1954). The most prominent change was alteration of sexual pattern, precocious puberty, or hypogonadism. In the latter group when tubero-infundibular lesions predominated, and patients with examined the pituitary was usually normal. Patients with encephalitis most resembling ours, but less completely investigated, are those of Moore and Cushing (1935) and of Ayala (1934). They both, however, had diabetes insipidus; in the former, irradiation of the region of the sella reduced the urine volume. In monkeys the hypothalamic nuclei are known to be sensitive to irradiation (Arnold, 1954).

Glycosuria is a rarity in such cases and ketosis seems to occur (Paton and Petch, 1954). Long (1940) reviewed the evidence, including that from experiments, that hypothalamic lesions cause glycosuria, and concluded that they do not permanently alter the control of blood glucose. He favoured the view that hypothalamic or brain-stem lesions cause disturbance via the sympathetic system and adrenal medulla. Our patient had no evidence of sympathetic overactivity, except possibly the small increase of basal metabolic rate. His history seemed to indicate the presence of polyuria due to glycosuria for a long period. The complete absence of ketosis, even with severe depletion of liver glycogen, still needs explanation.

Developing Ideas in Relation to Cushing's Syndrome

In typical cases the diagnosis of Cushing's syndrome is simple; in the causative type of adrenal cortical lesion the diagnosis may prove more difficult, and also in the less typical and related cases. It was only recently noticed how poor is the prognosis of the condition; of 32 patients, 17 were dead within five years (Plotz, Knowlton, and Ragan, 1952). In a study of a series of 40 patients, Soffer, Eisenberg, Iannoccone, and Gabrilove (1955) noted significant deviations from the classical form of obesity. Indeed, the facies may not always show the classical "moon" picture, but more nearly suggest benign obesity. The commonest abnormality, present in 80% of patients, is hypertension, which ultimately leads to irreversible systemic damage. The possible presence of a malignant tumour needs serious consideration before becoming inoperable or metastasizing. When appraising the views of our American colleagues it must be remembered that the occurrence of benign and malignant tumours is more frequent in North America than in Europe. Of 127 American cases, 40% had tumours (Sprague, 1953; Soffer *et al.*, 1955; Forsham *et al.*, 1955). European figures are more difficult to obtain, but the incidence in 57 cases appears to be about 7% (Luft, 1955; Querido, 1955).

It was once thought that the level of 17-ketosteroid excretion was a valuable sign (Forbes and Albright, 1951), but this is only sometimes true (Soffer *et al.*, 1955). The use of recent methods of assay of corticoids and their metabolites has been of help in the diagnosis of Cushing's syndrome, but not of the presence of tumours. In a series of 62 patients, 8 gave normal or doubtful values (Sprague, 1953; Soffer *et al.*, 1955). With a different technique Dustan *et al.* (1953) reported 8 out of 11 patients with normal values. It seems undoubted that a few patients with upper normal values will be found (Laidlaw *et al.*, 1955). It may, however, yet prove to be the case that an estimate of the free or unconjugated hydrocortisone and cortisone in the urine is of more definitive value (Gray, 1955; Cope and Harrison, 1955; see also Dustan *et al.*, 1953). Estimates of plasma corticoids and metabolites give a similar picture, and may be

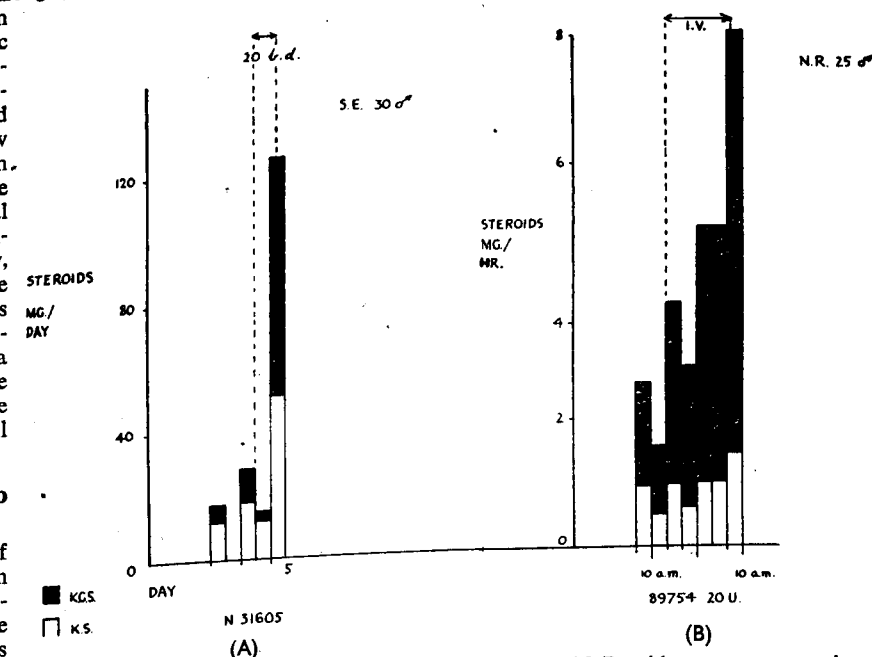


FIG. 17.—Response in urine steroids of patients S.E. and N.R. with non-tumorous adrenal cortices in Cushing's syndrome to corticotrophin. A. Corticotrophin intramuscularly. B. Intravenously. (Compare Fig. 4.)

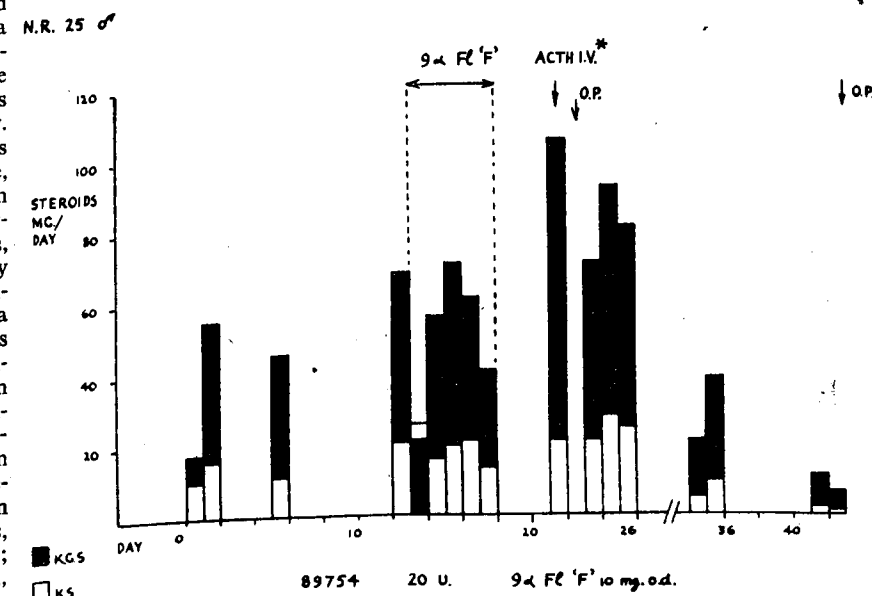


FIG. 18.—Responses of patient with Cushing's syndrome with non-tumorous gland. Failure of depression of steroids by 9α-fluorohydrocortisone, 10 mg. daily by mouth. Considerable increase in ketogenic steroid excretion after unilateral adrenalectomy (see text).

difficult to interpret because of the possibility of confusion with emotional factors (Bayliss, 1955).

An approach to the differentiation of malignant tumours from adrenal hyperplasia is the use of corticotrophin. Patients with overactive adrenals are very responsive (Fig. 17). Patient S. E. had adrenal hyperplasia and N. R. had adrenals of normal size but prominent zona fasciculata; both had pronounced Cushing's syndrome. Caution is needed in carrying out these tests, for cardiac failure may be precipitated. A rapid increase of blood corticoids or excretion of corticoid metabolites in patients of this type has also been noted by Burnett, Rukes, Kolb, and Forsham (1954) and by Laidlaw *et al.* (1955). The lability of the level of steroid excretion should be noted. In patient S. E. plasma hydrocortisone was 25 μ g. per 100 ml. and in N. R. values of 11 and 24 μ g. per 100 ml. were found.

On the other hand, the response of patients with adrenal cortical carcinoma to corticotrophin is said to be absent, on account of the autonomous nature of the tumour cells. This was not our experience in patient J. H. (Brooks, McSwiney, Mills, Prunty, Robertson, and Wood, 1956), who showed a significant rise of ketogenic steroids and ketosteroids with corticotrophin. The resting output of these steroids was high, but the plasma hydrocortisone was only 8 to 10 μ g. per 100 ml.

A second possible method of differentiation of tumour patients is that suggested by Venning, Pattee, McCall, and Browne (1952). The principle is to suppress cortical secretion of a non-tumorous gland by administration of a substance which will suppress corticotrophin secretion. Cortisone does this, but, since it also gives rise to significant quantities of corticoid metabolites, it is necessary to measure suppression of ketosteroids. This technique has been fairly successful in the hands of Jailer, Gold, and Wallace (1954), but cannot be regarded as very satisfactory (Wilkins, 1955). With the advent of 9 α -fluorohydrocortisone, which is active in very small amounts, the situation has theoretically changed (Thorn, Renold, Morse, Goldfien, and Reddy, 1955), as it produces insignificant amounts of measurable metabolites. Aldosterone is not powerful enough in its corticoid effects to suppress the anterior pituitary to a useful extent (Prunty, McSwiney, Mills, and Smith, 1954). Cope and Harrison (1955) have observed suppression of free hydrocortisone in the urine with 9 α -fluorohydrocortisone, but its effects in the hands of Nabarro and Walker (1955) have been variable. In Fig. 18 is seen its effects in patient N. R. No significant steroid suppression occurred.

Since the description by Conn (1955) of a patient with adrenal cortical tumour a new facet of the problem has appeared, and as many as 13 similar patients are now known (Conn and Louis, 1956; Brooks *et al.*, 1956). So far as can be determined at present, important features are hypertension, tendency to obesity, polyuria, and cramps with muscular weakness. These need not be present simultaneously. These patients also have low serum potassium levels and alkalosis. For many years these blood changes have interested the Mayo Clinic group, headed by E. J. Kepler; a recent survey of 83 patients with Cushing's syndrome has shown that 41% had alkalosis and 13% low serum potassium (Sprague and Power, 1953). These changes occurred in patients with both hyperplasia and tumour. An important additional biochemical finding in the group of atypical cases mentioned may be the presence of excess aldosterone in the urine. This can be present with normal corticoid metabolites and ketosteroids (Conn and Louis, 1956), or with elevation of these substances (Foye and Feichtmeir, 1955; Brooks *et al.*, 1956), or with an apparent increase of corticosterone (Mader and Iseri, 1955). Conn gave the unfortunate term "primary aldosteronism" to the condition to distinguish it from that state in which patients with subacute nephritis also excrete excessive aldosterone. Adrenal cortical tumours need not necessarily be present (Lancet, 1955; Conn and Louis, 1956), but adenomas are usual, and occasionally carcinoma (Foye and Feichtmeir, 1955; Brooks *et al.*, 1956). The exact relationship of aldosterone secretion to corticotrophin stimulation is not settled, but the pituitary hormone

does not appear to be essential (Gaunt, Renzi, and Chart, 1955; Falbriard, Muller, Neher, and Mach, 1955).

The lability of secretion of corticoid in these patients with Cushing's syndrome is also shown in the very pronounced rise in ketogenic steroids observed in response to unilateral adrenalectomy. From radiological evidence, I.V.P., and air insufflation it was thought likely that N. R. had a tumour of the left adrenal cortex. At operation it was found that the appearances were due to a large fibrofatty pad of tissue lying above the adrenal, which complicated the surgical procedure kindly carried out by Mr. R. H. O. B. Robinson. After the removal of this adrenal there was a sharp increase in ketogenic steroid excretion (Fig. 18) and the operation was followed by a severe sepsis of the area that was difficult to control. In addition there developed intractable haematemesis from large acute gastric ulcerations, from which the patient ultimately succumbed. This difficulty of healing has also been noted by Jepson *et al.* (1956) in a patient who did not have Cushing's syndrome but spontaneously responded in an exaggerated fashion with respect to the secretion of ketogenic steroids. The occurrence of spontaneous intestinal haemorrhage in Cushing's syndrome is apparently rare, Plotz *et al.* (1952) noting a death rate from this cause of less than 2%.

On the other hand, the occurrence of gastric bleeding in patients undergoing treatment with cortisone is quite well recognized. In Cushing's syndrome, where there is such lability of corticoid secretion, there may be risks in the post-operative period if only unilateral adrenalectomy is performed as a first-stage operation. The type of post-operative steroid response in this patient is also important. It resembles the response to corticotrophin, the ketogenic steroid:ketosteroid ratio being high, and is quite different from the response of the hirsute patient L. C. (Fig. 11).

Adiposity Resembling Cushing's Syndrome

Simpson (1951, 1953) made a study of a group of patients with obesity commencing in childhood who, he felt, had some form of altered adrenal cortical activity. Among the patients reviewed here several have had signs, particularly obesity and red striae, suggesting altered adrenal function (see L. D. and R. S. in Table VIII), but hypertension was mild or absent. Their response to corticotrophin does not show the pattern of Cushing's syndrome; indeed, in R. S. it was quite different. An extreme example is C. L., aged 18, who developed obesity at the age of 10; puberty was normal, but suddenly at 18 he developed very severe red lineae distensae (Fig. 19). He had a full plethoric face, a pre-diabetic sugar curve, and mild hypertension. His tallness seemed to be familial. X-ray studies, serum electrolytes, urinary ketosteroids, and ketogenic steroids were normal. Plasma hydrocortisone was 2.5 and 3.5 μ g.%. He showed a normal (not increased) response to corticotrophin (89754). He improved after pituitary irradiation and with reducing diet. We are inclined to agree with Simpson that there is an underlying abnormality of adrenal cortical function in these individuals which by present methods fails to be demonstrated. Such patients are not uncommon and their treatment remains a challenge.

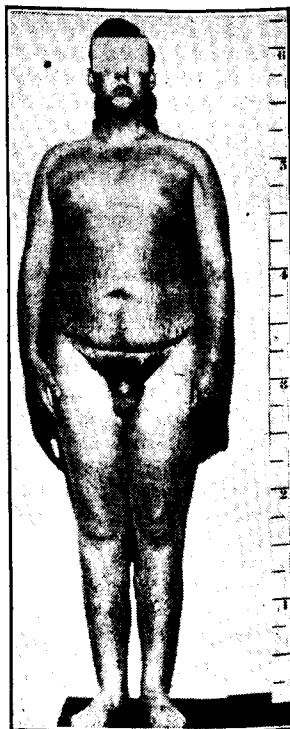


FIG. 19.—Case C. L. Obesity.

In conclusion, it seems that when allowances are made for varying activity of corticotrophin preparations, and conditions are otherwise standardized, different patterns of response of the adrenal cortex may be discerned. In addition to the hyperactive response seen in certain patients with Cushing's syndrome there are those interesting ones with a low basal activity but potentially very responsive to stimulation. Some mechanism other than the enzymatic lesion of pre-pubertal virilism appears to control the relative production of corticoid and androgen, and this may be disturbed in varying conditions, including hirsutism.

The part played by central nervous control of the anterior pituitary through the hypothalamus must be acknowledged. Information on the interaction of hormones from other glands on the activity of the adrenal cortex is scanty and needs to be increased; probably the thyroid is particularly worthy of further study. The effects of metabolic derangement on the function of the central nervous system, including the mimicry of some manifestations of space-occupying lesions, is of practical importance. With the discovery of aldosterone the problem of differentiating the hormonal abnormalities in Cushing's syndrome and allied states has increased in complexity.

Summary

Relevant knowledge of compounds secreted by the adrenal cortex and their metabolism is reviewed. Experiments are discussed which give information about the action of corticotrophin in man. Difficulties in evaluating the response due to variations in the activity of different batches of corticotrophin are stressed. After making due allowance for these difficulties, it is possible to define a "spectrum" of response in individuals with various pathological entities. Particular attention is drawn to the response of patients with idiopathic hirsutism, and the effects are contrasted with those in hypopituitarism and normal childhood on the one hand, and in adrenal cortical virilism on the other. Comparisons are made between the effect of exogenous corticotrophin and the endogenous stimuli produced by surgical trauma.

A condition of "basal hypo-adrenal corticalism" is defined and its significance discussed. The possibility of synergic action between corticotrophin and a factor of synergic action between corticotrophin and a factor associated with growth hormone, gonadotrophins, and thyroid hormones is considered. There seems little doubt that thyroid hormones are of great importance in the responsiveness of the adrenals. Evidence concerning the existence of a potentiating factor to corticotrophin for the stimulation of adrenal androgens is shown to be worthy of consideration. A similarity in behaviour of certain adult male obese subjects to that of hirsute women is noted and contrasted with others bearing a superficial resemblance to patients with Cushing's syndrome.

Attention is drawn to clinical problems in relation to alterations of cerebral activity in patients with Addison's disease and hypopituitarism and to difficulties which arise when space-occupying intracerebral lesions may be present. A patient with long-standing encephalitis has been studied, with particular reference to the secondary endocrinological phenomena which ensued, and the significance of these is discussed. Recent advances and ideas in relation to the diagnostic problems in Cushing's syndrome and in patients with adrenal cortical tumours, particularly when hypocalcaemia and renal symptoms are present, are considered and supplemented with additional observations.

ADDENDUM.—Since this manuscript was prepared additional confirmatory evidence has been obtained in another

patient in support of the effects of tri-iodothyronine on corticotrophin stimulation in hypopituitarism.

I should like to thank those colleagues whose assistance made much of this work possible, and especially Drs. R. V. Brooks, B. E. Clayton, R. R. McSwiney, and I. H. Mills, and many house-physicians; Professor W. G. Barnard and his staff for assistance in morbid anatomy; Miss P. Seimssen and the nursing staff of Holden Metabolic Ward; and the many people who gave technical assistance. Lastly, my thanks are due to the Governors of St. Thomas's Hospital for some financial assistance from endowment funds.

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EFFECTS OF HEAVY AND REPEATED MALARIAL INFECTIONS ON GAMBIAN INFANTS AND CHILDREN

EFFECTS OF ERYTHROCYTIC PARASITIZATION

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Since 1947, when the Medical Research Council established its laboratories in the Gambia, many workers investigating the importance of non-parasitic diseases in the African population have found great difficulty in assessing the contribution to the general picture of the inevitable malarial infection. McGregor and Smith (1952) and Walters and Waterlow (1954) found the twin threads of parasitization and malnutrition exceedingly complex and difficult to unravel. In no section of the community is this complication more in evidence than in infancy and early childhood—when plasmodial infection is severe and almost universal. This paper describes the result of an investigation in the Sukuta area of the Gambia that was undertaken to determine precisely the effects, both immediate and long-term, of repeated and heavy malarial infections on infants and young children.

Sukuta is one of the principal villages in the Kombo St. Mary District of the Gambia, and as such it possesses

an infant welfare centre which serves the surrounding villages within a radius of 10 miles. It is the centre of a dominantly agricultural Mandinka community which depends for food largely upon the cereals that are grown in the rainy season. Maize and digitaria are produced in small quantities in the early part of the rains, while staple cereals—rice, sorghum, and millet (*pennisetum* spp.)—are raised in the latter part. Groundnuts are grown principally as a cash crop, but some 10% of the yield is consumed annually as food. Cattle are kept in considerable numbers, but as they are seldom killed they contribute little to village food supplies. Milk yields are low, and when the requirements of calves are satisfied little remains for human consumption. Fish is relatively abundant in the coastal region, and considerable quantities are eaten even in the more inland villages.

In the area under consideration malaria is hyper-endemic. Transmission declines in the dry months from December and May, when it becomes negligible, but rises dramatically with the onset of the rains in June, to reach a peak in October and November. *A. gambiae* is the dominant vector in the inland reaches, but in coastal villages associated with *Avicennia* mangrove swamps it is of secondary importance to *A. gambiae melas*. *P. falciparum* is by far the most commonly encountered parasite, but *P. malariae* and *P. ovale* are not infrequently seen.

In June, 1951, the investigation described here began with the creation of two experimental groups of newly born African infants at the Sukuta Infant Welfare Centre. The infants were assigned to either group by random selection. Infants in one group received 6 mg. of chloroquine base per kg. of body weight each week, while those in the other group received only a lactose placebo and were thereby maintained as controls. When each group contained 26 members no further infants were included. The sister in charge of the centre was advised to regard the experimental children as being in no way different from the other infants attending the clinic. If, in her opinion, an infant of the control series required antimalarial treatment, she was at complete liberty to administer any of the standard treatment courses that are used in Gambian dispensaries. Similarly, any non-malarious illness developing in members of either group had to be treated in accordance with her normal practice. An essential point of the experiment was that the established custom of infant-feeding in a rural Gambian community should not be modified: no supplements, such as skimmed milk, were therefore permitted.

When the children of the protected series reached the age of 2 years the weekly dosage level of 6 mg. of chloroquine base per kg. was discontinued and a flat rate of 150 mg. of base substituted. Both groups of children were regularly inspected and examined in the field, and in October, 1954, they were admitted to the research ward of the Medical Research Council's Laboratories at Fajara for detailed investigation and comparison. The methods used in the investigations and the results obtained are here reported.

First Investigation

Methods

Members of the two groups were visited weekly by a nursing sister who administered chloroquine to the protected and placebo to the unprotected series. The chloroquine, in powder form, was mixed in a teaspoon with water and care was taken to ensure that each infant swallowed its

dose. Vomiting was noted to be a frequent sequel to treatment in the protected infants, and the practice of observing each baby for 30 minutes after drug administration was instituted. If vomiting did not occur within that period satisfactory retention was assumed. If, however, it occurred the dosage was repeated. As members of the protected series grew older the frequency of the vomiting decreased until it was no longer necessary to continue the observation period.

Thick and thin blood films were taken from each infant at each weekly inspection. The thick films were subsequently stained by Field's rapid method and examined microscopically under 1/12 in. oil immersion lens, 100 consecutive fields of each being examined. Thin films were fixed in methyl alcohol and stained by Giemsa's method.

At monthly intervals the members of both series were examined by a medical officer and details of weight, diet, and colour of hair were recorded. The sizes of liver and spleen were found by palpation, and haemoglobin values, as assessed by the Dare haemoglobinometer, were noted.

Results

Extreme difficulty was encountered throughout the investigation in preserving the size of the experimental groups, and, although each had contained 26 members initially, by the autumn of 1954 the number had dwindled through death and change of domicile to 20 protected and 13 unprotected children. Moreover, by this time 3 of the 20 protected children had each experienced a single short attack of malaria. These attacks originated in the failure, despite many attempts, to continue weekly chloroquine dosage. Mothers without warning would depart, taking their children with them on visits to distant relatives. On their return such children were examined closely for evidence of malaria contracted in their lapse from treatment, and, initially, all infected ones were excluded from the protected series. Ultimately these children who were known to have been infected for only a short period were retained. The three children referred to above were known to have been infected for less than 10 days.

By October, 1952, before movement of the parents had reduced the size of the groups, one child of the protected series and five of the controls had died, thus producing group mortality rates of 3.8% and 19.2% respectively. The difference in these rates is not statistically significant. All deaths took place in the first 16 months of life. The precise cause of death (acute gastro-enteritis) could be established only in the case of the protected child. All the unprotected children who died were known to have been heavily infected with malaria immediately before death. From October, 1952, to November, 1954, no further deaths occurred, even in those whose regular drug prophylaxis had lapsed.

Analysis of the dietary notes kept throughout the investigation showed that supplements to breast milk were started on the average at 4½ months. These supplements comprised paps of the common local cereals—rice, sorghum, and

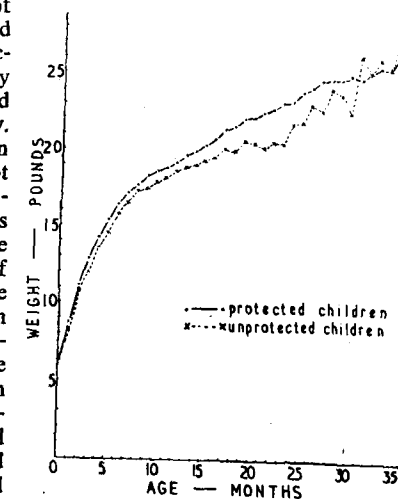


FIG. 1.—Average weight curves of protected and unprotected children during first three years of life.

millet. Weaning took place at the average age of 22 months, by which time the child was receiving a good mixed cereal diet with additions of meat and fish.

Fig. 1 expresses graphically the average weight curves of protected and unprotected children over the first three years of life. It will be noted that as age progresses and malaria infection becomes frequent the unprotected children lag behind their protected fellows. Nevertheless, at no time in the first three years is the weight difference statistically significant. By the end of the second year of life the unprotected children begin to make more rapid weight gains, and by the 36th month appear to have overtaken the protected children.

Figs. 2 and 3 contrast the weight development of a protected child with that of its control through successive wet and dry seasons. It is of interest to note that the subjects whose weights are recorded in Fig. 2 were homozygous (or uniovular) twin girls reared by their mother in identical circumstances.

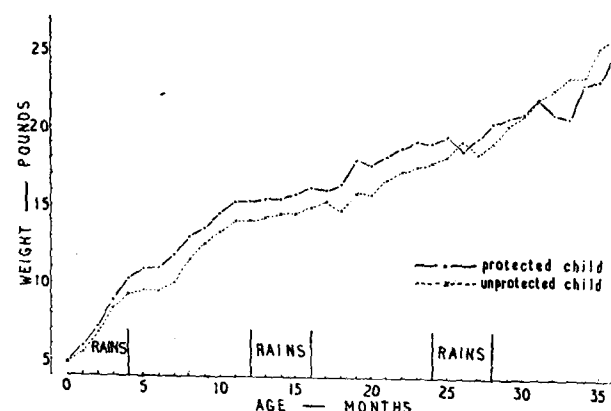


Fig. 2.—Weight development of a protected child and of its control. These two children were homozygous twins.

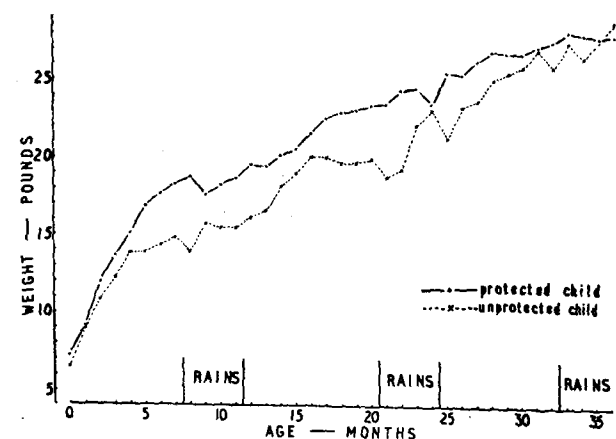


Fig. 3.—Weight development of a protected child and of its control.

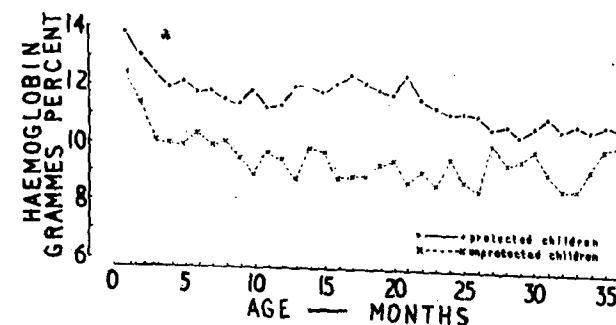


Fig. 4.—Mean Hb values of protected and unprotected children during first three years of life.

Both figures illustrate the tendency shown by all unprotected children to gain weight more slowly, and occasionally to lose weight in the wet malarious months than in the dry season.

Fig. 4 contrasts the mean haemoglobin values in children of both series from the end of the first month of life until the 36th month. The much lower level of the unprotected children will be noted.

In November, 1952, 25 protected children and 17 controls were examined. Table I contrasts the clinical findings.

TABLE I.—Clinical Findings (November, 1952)

	Protected Group	Unprotected Group
No. in group	25	17
Percentage with parasitaemia	0	100*
" " splenomegaly	0	88.3*
" " liver palpable below costal margin in mid-axillary line	4	88.3*
Percentage with hair dyspigmentation	32	53
Mean haemoglobin (g.%)	12.1 (S.D. 1.06)	9.5%* (S.D. 1.22)

* Values statistically significant.

Second Investigation

Methods

In October and November, 1954, 16 children of the protected series and 13 of the unprotected series were admitted to the ward of the Medical Research Council's Laboratories for detailed clinico-pathological investigation. Each child remained in hospital for five days, during which time liver biopsy was performed with the parents' sanction. Specimens of urine, stool, and blood from each child were examined in the following ways.

1. *Urine* was tested for specific gravity and the presence of protein, sugar, bile, blood, and casts.

2. *Stools*.—Microscopical examination of both fresh saline and salt-flotation preparations for protozoal and helminthic parasites. Densities of helminth ova were calculated by a modification of the Stoll technique.

3. *Blood*.—(a) Thick and thin films were examined for the presence of plasmodia. (b) Thick films, prepared at 11 p.m., were dehaemoglobinized, fixed in methyl alcohol, stained with haemalum, and examined for the presence of microfilariae. (c) Haemoglobin values were assessed, using the M.R.C. Grey Wedge photometer. In each case the mean of ten readings was taken. (d) Erythrocyte sedimentation rates were obtained by Wintrobe's method. (e) Packed cell volume was read after centrifuging for thirty minutes at 6,000 revolutions a minute. (f) Red- and white-cell enumeration was performed on a Neubauer "bright ruling" haemocytometer. (g) Sickling tests were made, employing the sealed cover-slip technique and using a 2% solution of sodium metabisulphite as a reducing agent. (h) Samples of serum were forwarded by air to the United Kingdom for various treponemal tests. (i) Total serum proteins were estimated by a semimicro-Kjeldahl method, using a selenium-sulphuric acid catalyst. For the estimation of serum albumin, serum globulin was precipitated by 25% sodium sulphate. The difference between total serum protein and serum albumin results was taken as the serum globulin value. Non-protein nitrogen was estimated separately after the serum had been deproteinized by a modified Folin-Wu tungstic acid reagent. (j) Electrophoresis of serum proteins was effected in a horizontal tank containing a barbiturate buffer (pH 8.6) to which a small quantity of fungicide (sodium salicylanilide) had been added. Serum (10–20 μ l.) was applied by coverslip to Whatman's No. 2 (chromatography) filter paper. A direct current (120 v.), obtained from a high-tension dry battery, was passed through the filter paper for 20–22 hours. Electrophoretograms were fixed by heat, stained with azocarmine "B" and "scanned" in a Joyce-Loebel densitometer.

Results

The results of the liver biopsy will be dealt with later in a separate publication. The detailed results of the other investigations are shown in Tables II–IX and Fig. 5.

All the children appeared fit and well, and no difference in physical agility or mental acuity could be detected between members of the two groups. The mean weight of protected children was slightly lower than that of the unprotected children, but the former were slightly taller (Table II).

No marked nutritional deficiencies were found in any child, and both groups were assessed as being in good nutritional condition (Table III).

All children of the unprotected series showed considerable enlargement of both liver and spleen (Table IV). In only two of the protected children could the liver be palpated below the costal margin in the mid-axillary line, and in only one child of this series could the spleen be felt. In this latter case splenic enlargement was small and the child was known to have experienced a short attack of malaria a few months before.

Examination of thick and thin blood films revealed that all the unprotected children were infected with malaria (Table V). In every instance the children were apyrexial, and the infection seemed to be completely asymptomatic. Parasite densities varied in individuals from 20 to 3,000 Parasite densities per 100 oil fields of thick blood films. The frequencies of infecting plasmodia were *P. falciparum* 100%, *P. malariae* 61.5%, and *P. ovale* 7.7%.

Examination of night films did not reveal the presence of microfilariae in the blood of any child. The incidence of infection with intestinal helminths was higher in the pro-

TABLE II.—Mean Ages, Heights, and Weights (October–November, 1954)

	Protected Children	Unprotected Children
No. in group	16	13
Average age (weeks)	161.68	161.15
Average birth weight (oz.)	103.75 (S.D. 19.92)	100.53 (S.D. 17.74)
Average weight in October–November, 1954 (oz.)	464.50 (S.D. 59.65)	466.15 (S.D. 45.03)
Average weekly weight gain since birth (oz.)	2.23	2.26
Average height in October, 1954 (in.)	35.82 (S.D. 1.39)	34.49 (S.D. 1.88)

1 oz. avoirdupois equals 28.35 g.; 1 inch equals 2.5 cm.

TABLE III.—Clinical Nutritional Assessment (October–November, 1954)

	Protected Children	Unprotected Children
No. in group	16	13
Skin changes: xerosis, crackling, P.G.F., follicular keratosis, dyssebacia	12.5% Good	* 15.38% Good
Muscle mass		
Bone changes: genu valgum, frontal bossing, beaded ribs, enlarged epiphyses	25.0%	46.14%
Mucosal changes: angular stomatitis, cheilosis, tongue changes	12.5%	23.0%

TABLE IV.—Incidence and Degree of Hepatomegaly and Splenomegaly (October–November, 1954)

	Protected Children	Unprotected Children
No. in group	16	13
Hepatomegaly:	12.5%	23.1%
1 F.B. below costal margin	Nil	46.2%
2 " " " " "	"	30.8%
3 " " " " "	"	Nil
Splenomegaly:	6.3%	7.7%
Just palpable	Nil	7.7%
1 F.B. below costal margin	"	30.8%
2 " " " " "	"	23.1%
3 " " " " "	"	23.1%
4 " " " " "	"	7.7%
5 " " " " "	"	"
6 " " " " "	"	"

TABLE V.—Incidence of Parasitic Infection (October–November, 1954)

	Protected Children	Unprotected Children
No. in group	16	13
Malaria	0	100%
Parasitaemia	0	38.5%
Hookworm	68.8%	38.5%
Ascaris	68.8%	0
Tapeworm	6.3%	0
E. histolytica	0	0

TABLE VI.—Urinary Findings (October–November, 1954)

	Protected Children	Unprotected Children
No. in group	16	13
Specific gravity (av.)	1019.6 (S.D. 11.89)	1017.6 (S.D. 6.59)
Albumin:		
Trace	18.8%	38.5%
Heavy	Nil	7.7%
Sugar	"	Esbach 1.125 g.%
Bile	"	Nil
Casts	"	7.7%
Blood	"	7.7%

TABLE VII.—Mean Haematological Values (October–November, 1954)

	Protected Children	Unprotected Children
No. in group	16	13
E.S.R.	31.1 (S.D. 12.05)	50.84 (S.D. 2.11)
Haemoglobin	11.28 g. (S.D. 0.91)	10.88 g. (S.D. 1.248)
R.B.C. per c.mm. (millions)	4.00 (S.D. 0.361)	3.688 (S.D. 0.416)
P.C.V.	34.37% (S.D. 1.61)	31.96% (S.D. 2.54)
M.C.V.	86.25 c. μ (S.D. 8.28)	86.92 c. μ (S.D. 5.48)
M.C.H.C.	32.81% (S.D. 1.83)	33.84% (S.D. 2.28)
W.B.C. (thousands)	9.288 (S.D. 2.84)	9.980 (S.D. 2.76)
Sickling trait	12.5%	Nil

TABLE VIII.—Mean Serum Proteins and Non-protein Nitrogen Values (October–November, 1954)

	Protected Children	Unprotected Children
No. in group	16	13
Chemical estimation:		
Total proteins	7.13 g. (S.D. 0.4429)	7.59 g. (S.D. 0.4309)
Albumin	3.92 g. (S.D. 0.5295)	3.83 g. (S.D. 0.3567)
Globulin	3.20 g. (S.D. 0.4017)	3.76 g. (S.D. 0.3640)
Non-protein nitrogen	20.85 mg. (S.D. 6.33)	19.07 mg. (S.D. 4.28)

tested series, but the density of these infections appeared to be greater in the unprotected children. The mean egg loads per gramme of faeces in protected and unprotected children respectively were: hookworm, 600 and 900; ascaris, 12,400 and 23,800; tapeworm, 1,600 and nil.

In only one case, that of an unprotected child, could any gross urinary abnormality be detected. This child showed a marked proteinuria (Esbach 1.125 g.%) but seemed physically fit and well and the N.P.N. value of her serum was within normal limits. No evidence of oedema could be detected on clinical examination. Microscopy of the uncentrifuged urinary deposit revealed both granular and hyaline casts, epithelial cells, and a few blood cells of both the red and white series. The blood of the child showed a fairly dense *P. malariae* infection, and while it is clear that the urinary condition could easily have been completely independent of this the possibility that it was a sequel to quartan malaria must be borne in mind.

While the mean haemoglobin concentration of each group showed practically no difference the mean erythrocyte concentration and the mean haematocrit value of the unprotected children were considerably lower than those of the protected series (Table VII). Both groups showed a degree of normocytic anaemia, that of the unprotected children being the greater. Erythrocyte sedimentation rates in the malarious children were much higher, despite the asymptomatic nature of the infections, than those of the non-malarious group.

In the serum of only one child, positive results were obtained in the Wassermann, cardiolipin Wassermann, Kahn, and treponemal immobilization tests. A positive pallida reaction was also obtained. This child was one of the two protected children in whom enlarged livers were palpated, and the possibility that luetic disease was responsible for the enlargement must be considered.

The mean total serum protein values, as determined by chemical estimation, were found to be approximately 0.5 g.% higher in the unprotected children (Table VIII). Fractionation of the serum proteins revealed that mean

albumin values for each group were almost identical but that the mean globulin value was higher in unprotected children. Non-protein nitrogen serum values were similar in both groups.

Fig. 5 shows the graphs obtained by "scanning" the electrophoretograms of an unprotected and a protected child. The strikingly high gamma-globulin fraction of the former will be noted.

When a pattern similar to the above had been prepared on standard graph paper for each child of both series it was cut out with scissors and weighed. A perpendicular to the baseline was then dropped from the lowest point of the trough between the curves representing the beta- and gamma-globulin fractions and, by cutting along this, the gamma portion of the pattern was severed from the remainder. This portion was then weighed and its weight as a percentage of the total graph calculated. In this way the mean serum gamma-globulin was estimated to be 24.43% (S.D. 5.74) of the mean total serum protein value in the unprotected children and 32.21% (S.D. 4.39) in the protected children. It is thus apparent, that the gamma-globulin content of the serum of the malarious children was almost one-third as great again as that of the non-malarious children.

It is unfortunate that the small size of each experimental group limited the value of the statistical analysis of results. Nevertheless we have thought that such analysis would prove helpful to the reader in assessing the relative importance of the difference between protected and unprotected children. Table IX therefore summarizes these differences in mean values observed, which were greater than twice the standard error of the difference. All other differences reported in this second investigation were less than twice this value.

TABLE IX.—Major Differences Detected Between the Protected and Unprotected Groups

	Difference Between Mean Values or Proportions of Groups	Standard Error	Difference Divided by Standard Error
E.S.R.	19.74	3.07	6.43
Splenomegaly	93.75	18.66	5.02
Hepatomegaly	87.50	18.66	4.68
Gamma globulin (by electrophoresis)	7.78	1.88	4.14
Serum globulins (by chemical estimation)	0.56	0.14	4.0
P.C.V.	2.41	0.80	3.01
Total serum proteins (by chemical estimation)	0.46	0.16	2.87
R.B.C.	0.312	0.145	2.15
Height	1.33	0.65	2.04

Discussion

Before discussing the results observed in this investigation it must be remembered that chloroquine afforded the treated children protection only against the erythrocytic phases of the malaria parasite. It is known that the drug has no action on sporozoites or on the exo-erythrocytic phases of infection, and it must be assumed that sporozoite entry and subsequent exo-erythrocytic development occurred

normally in both groups, but that in the treated children no further parasitic growth took place. It is clear, therefore, that only the erythrocytic phases can be held responsible for the production of the differences observed between treated and untreated children.

From the above results one is led to deduce that malaria exerted its maximal effects in the first 18 months of life and that by the age of 3 years the unprotected children had developed a considerable immunity to the disease, as witnessed by their ability to live asymptotically with fairly dense parasitaemia. While the difference in the mortality rates of the two groups, which were of small size, was not statistically significant, and while the cause of death of the five unprotected children could not be ascertained, the possibility that comes to mind first, and cannot be excluded, is that the difference was related to the presence or absence of overt malaria infection.

Study of the weight curves of children of both groups indicates that acute clinical malaria tended to retard growth. This retardation did not appear to be in any way permanent, for when the malarious children had developed enough resistance to the noxious effects of the disease they rapidly regained lost ground and, despite the persistence of moderately severe parasitaemia, by the third year of life were just as heavy as their protected fellows. It should not be forgotten, however, that at this age the grossly enlarged livers and spleens of the malarious children must have contributed a disproportionate sum to the total body weight, whereas that of the protected children represented presumably normal body tissue.

These observations, coupled with the fact that no marked difference in the incidence of signs of specific nutritional deficiencies could be found between the groups at any time, suggest that in children to whom a good diet is available malaria exerts its main effect on growth not by appropriating nutrients that would otherwise be used in building body tissue but by limiting the food intake of the host through the anorexia that the clinical attack produces.

The differences observed in the mean haematological indices, of which the erythrocyte concentration and the packed cell volume alone are significantly reduced in the malarious group, appear to be entirely due to malaria. Hookworm infection cannot have contributed to these differences, for not only was the density of infection low in each group, but the incidence of ankylostomiasis was twice as high in the protected as in the unprotected children.

Wilson and Miles (1946) state that there is conflict in the evidence that malaria tends to give positive reactions in the Kahn and allied serological tests. In the present investigation no positive reaction to the tests employed was obtained in the sera of the unprotected children despite the fact that all were fairly heavily infected. These children were, however, asymptomatic, and it is possible that had they been febrile positive reactions might have been obtained.

Within recent years considerable interest has been focused upon the question of whether malaria causes substantial enlargement of the liver (Colbourne *et al.*, 1950; McGregor and Smith, 1952; Waddy, 1952; McGregor, 1954; Black, 1954, 1955). The results reported above demonstrate clearly that such is indeed the case. They also show that hepatomegaly is attributable to the erythrocytic cycle of the malaria parasite, and that the pre- and exoerythrocytic cycles within the liver do not appear to influence the overall size of that organ. In view of the good nutritional status of the members of both groups malnutrition may be discounted as an additional factor in the production of hepatomegaly in these children. From clinical examination of the children showing liver enlargement no evidence of hepatic dysfunction could be adduced. The mechanism of enlargement and the associated histological changes will be discussed in a subsequent communication.

Of particular interest are the differences observed in mean serum protein values. It will have been noted that, whereas mean albumin levels were similar in both groups, mean total protein and globulin values were much higher in the un-

protected children. Analysis of electrophoretic patterns indicated that this difference was located principally in the serum gamma-globulin fractions. The precise reason for the existence of a much higher gamma-globulin level in the serum of the malarious children is not known, but when the controlled nature of the investigation is considered it is clear that malaria must have been at least a closely related factor. Study of the literature relating to serum protein changes in malaria reveals that most communications describe observations made during the acute attack. Observers have reported a fall in serum albumin and a rise in serum globulin with an overall reduction in total serum proteins (Fulton and Macgregair, 1949). These changes are transient, and protein values revert to original levels soon after eradication of the infection. It is apparent that, hitherto, little information has been gathered on the cumulative effects on serum proteins of several years of repeated and heavy plasmodial infection.

It is possible that almost three years of continued irritation of the reticulo-endothelial systems of the unprotected children by the products of disintegration of parasitized erythrocytes may have stimulated the production of abnormally large quantities of gamma-globulin. If this is so the high values obtained in the malarious children are of no special significance, since they have their origin in a non-specific process. However, it is equally possible that these high values may be caused, at least in part, by the production of specific humoral antibodies to the erythrocytic phase of the infecting plasmodium. The observations of earlier workers justify this hypothesis. Sotiriades (1936) reported that whole blood from highly immune subjects produced beneficial results when injected into patients suffering from acute attacks of malaria, while Coggeshall and Kumm (1937) and Eaton (1938) demonstrated the presence of circulating antibodies in the sera of monkeys recently recovered from the malaria. At this juncture further speculation on the mechanism of the production of the serum protein variations recorded would be valueless, and additional investigations are clearly indicated.

The difference in the mean erythrocyte sedimentation rates of the protected and unprotected children must be regarded as a sequel to erythrocyte parasitization in the latter. The high mean rate observed in the treated group, however, is puzzling. As these children were all fit and well and presented no sign of disease save for a moderate degree of intestinal helminthic infection in some cases, one wonders what part the unsuppressed hepatic phases of malaria played in raising these sedimentation rates. McGregor and Deegan (1954) observed that the mean erythrocyte sedimentation rate in a group of fit and healthy Gambian adults, who must have experienced severe repeated malarial infection in infancy and childhood, was, by European standards, abnormally high. They postulated that a possible reason for this could be that Gambian adults possessed a plasma protein pattern which differed greatly from the accepted European normal. The results of this present investigation support that view and, further, incriminate malaria as a major factor in the production of the altered pattern.

The results of urinary examination and of the evaluation of serum non-protein nitrogen levels suggest that with one possible exception the prolonged heavy malaria infections experienced by the unprotected children caused no permanent impairment of kidney function. Even in the exceptional case the relationship of quartan malaria to proteinuria is obscure, and it is possible that the two conditions were completely independent.

After more than three years of continuous chloroquine dosage no evidence of drug toxicity was found in any protected subject. Throughout this period complete suppression of the erythrocytic cycle of malaria was achieved in every subject who received regular weekly treatment.

Summary

To assess the effects of repeated heavy erythrocytic infection in African infants and young children an investigation in a hyperendemic malarial district of the

Gambia began in 1951. Twenty-six infants were protected from birth by weekly doses of chloroquine base (6 mg. per kg. for the first two years and thereafter 150 mg.). A control group of equal size of unprotected infants from the same population was maintained. The established custom of infant feeding in a rural Gambian community was not modified. Members of both groups were examined regularly for three years.

The unprotected children once infected with malaria were observed to grow more slowly and to become much more anaemic than the protected children over the first two years. Mortality rates for protected and unprotected groups were 3.8% and 19.2% respectively, all deaths occurring in the first sixteen months. As increasing resistance to malaria was acquired the unprotected children made rapid growth progress.

In October–November, 1954, 16 protected and 13 unprotected children were admitted to hospital for detailed investigation and comparison. The mean weight of protected children at a mean age of 161.68 weeks was 464.50 oz. (13.167 kg.) and that of unprotected children at a mean age of 161.15 weeks was 466.15 oz. (13.214 kg.). The mean heights of protected and unprotected subjects were 35.82 in. (90.9 cm.) and 34.49 in. (87.6 cm.) respectively.

All unprotected children were found to exhibit malarial parasitaemia (plasmodial frequency being: falciparum 100%, malariae 61.5%, ovale 7.7%), but to be asymptomatic.

The nutritional status of members of both groups was assessed to be good, the incidence of deficiency signs in protected and unprotected children respectively being: skin changes 12.5% and 15.38%; bone changes 25% and 46.14%; mucosal changes 12.5% and 23.0%.

All unprotected children showed considerable hepatomegaly and splenomegaly, while 12.5% of protected children were found to have enlarged livers and 6.3% enlarged spleens.

Hookworm and ascaris ova were found in the stools of 68.8% of protected and 38.5% of unprotected children; the density of infection was greater in the unprotected group.

A marked proteinuria associated with a *P. malariae* parasitaemia was noted in a member of the unprotected group. No other gross urinary abnormality was detected in any child.

The differences detected in mean haematological indices between the protected and unprotected groups respectively were: E.S.R., 31.1 and 50.84; Hb, 11.28 and 10.88 g.%; R.B.C., 4,000,000 and 3,688,000; P.C.V., 34.37 and 31.96%; M.C.V. 86.25 and 86.92 cubic microns; M.C.H.C., 32.81 and 33.84%; W.B.C. 9,288 and 9,980; sickling trait, 12.5% and nil.

Chemical estimation of serum proteins showed the mean total serum protein (7.59 g.%) and mean globulin (3.76 g.%) values to be higher in unprotected than protected children (7.13 and 3.20 g.%). Mean albumin values were almost identical (3.92 g.% protected and 3.83 g.% unprotected), as were mean N.P.N. levels (20.85 mg. per 100 ml. protected and 19.07 mg. per 100 ml. unprotected). By filter paper electrophoresis the gamma-globulin fraction in unprotected children was found to be almost one-third greater than in protected children. The serum of only one subject, a protected child, yielded positive results in the Wassermann, cardiolipin Wassermann, Kahn, and treponemal immobilization tests.

The results are discussed and are considered to indicate that erythrocytic malaria in Gambian children exerts its main effects in the first two years of life, chiefly through the clinical illness produced by the acute attack. Malarious children, once they have acquired sufficient resistance to the noxious effects of clinical malaria, appear rapidly to make good lost ground despite the persistence of moderately dense parasitaemia. A consistent relationship between hepatomegaly and erythrocytic malaria is defined. The view is expressed that the serum protein changes observed in malarious children may in part be due to the formation of humoral antibodies.

We wish to thank Dr. S. H. O. Jones, Director of Medical Services, Gambia, for his assistance throughout this investigation; the nursing sisters of the Gambia Health Services and of the Medical Research Council for their invaluable and continuous co-operation; and Dr. I. N. O. Price, of the Public Health Laboratory Service, for conducting the serological tests reported in this paper.

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STUDY OF TRANSFUSED PLATELETS IN A CASE OF CONGENITAL HYPOPLASTIC THROMBOCYTOPENIA

BY

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The following case of neonatal thrombocytopenia is of interest because of the rarity of the haematological disorder, which was apparently a primary aplasia of the megakaryocytes associated with a congenital skeletal defect of the forearms, and also because it was possible to give relatively large transfusions of platelets in view of the recipient's small blood volume. In the virtual absence of platelet production in the infant, the effectiveness and survival of these transfused platelets could be readily studied.

Case History

This child, a female, was born at term of the mother's second pregnancy. Its weight was 6 lb. 2 oz. (2,780 g.). The first pregnancy had miscarried at two months. Vaginal bleeding had occurred also in this pregnancy during the twelfth week. No consanguinity existed between the parents, who were in good health.

The infant was born with a deformity of both arms, due to the absence of both radii, resulting in diminutive forearms with abducted hands, but otherwise appeared healthy.

Progress was uneventful until the sixth week, when melaena occurred, immediately followed by the appearance of scattered petechiae and noticeable pallor. No drug with which blood dyscrasia could be associated had been given at any stage of the child's illness.

The infant was admitted to hospital on June 11, 1955, aged 6 weeks and weighing 7 lb. 7 oz. (3,370 g.). Nutrition and hydration were good. The child was alert and afebrile, but there was marked pallor with petechiae in the mouth and skin. The liver was palpable and enlarged. The spleen could be felt $\frac{1}{2}$ in. (2 cm.) below the costal margin. No lymphadenopathy was apparent. No other abnormality was found on physical examination. The urine was normal.

Investigations on Admission.—Hb, 5 g. per 100 ml.; white cells, 63,000 per c.mm., with a preponderance of granular cells and a marked shift to the left (for differential count, see Table I). The red cells showed frequent polychromatic forms and normoblasts. Blood group B, rhesus test positive (to anti-D), direct Coombs test negative. Platelet count

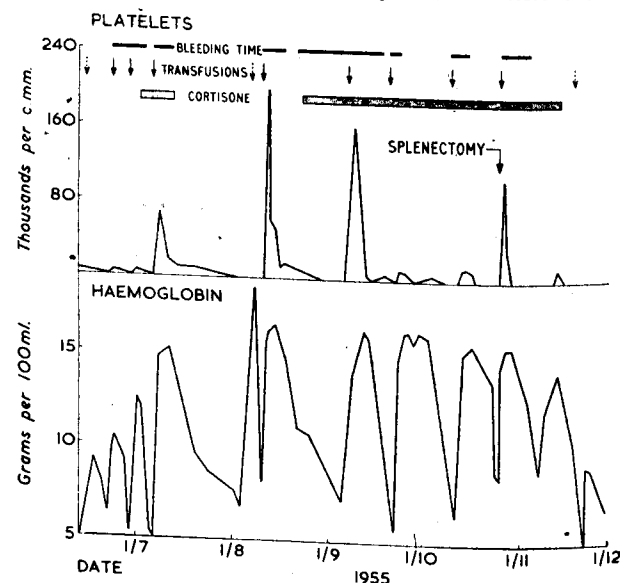


FIG. 1.—"Platelet transfusions" are indicated by arrows, and transfusions of stored blood by dotted arrows. The duration of a normal bleeding-time is shown by a continuous black line; where this is interrupted the bleeding-time was found to be longer than 10 minutes.

(Fonio's method), 3,600 per c.mm. Bleeding-time in excess of one hour. Clotting-time, clot retraction, and prothrombin times were within normal limits. Hess's test showed 15 petechiae in $\frac{1}{2}$ square inch (3.2 square cm.). Serum bilirubin, 0.4 mg. per 100 ml. Tibial marrow counts (Table I) showed a normoblastic hyperplasia, active leucopoiesis, and a striking absence of platelet precursors. Prolonged search of several films from each specimen failed to show any mature or early forms of megakaryocytes. A maternal blood count was normal, with a normal platelet count. The Wassermann reaction in the mother and child was negative.

After admission a tentative diagnosis of congenital hypoplastic thrombocytopenia was made, based on the absence of platelet precursors, the haematological condition being associated with skeletal abnormalities.

On June 14 a transfusion of stored blood was given. In spite of a satisfactory rise in haemoglobin there was no appreciable effect on the bleeding-time or the platelet count, and the stools continued to be heavily blood-stained. In view of the thrombocytopenia, platelet transfusions were given (for technique, see Appendix). The improvement on each occasion was striking but transitory (Table II). Clinically, there was fading of petechiae, and the stools changed from melaenic to normal. The increased number of circulating platelets persisted for as long as five days, while the bleeding-time and the capillary fragility were found to be normal for a longer period (see Fig. 1).

TABLE I.—Blood and Bone-marrow Findings

	Blast Cells	Premye- locytes	Neutro- phil Mye- locytes	Neutro- phil Metamy- locytes	Segmented Neutro- phils	Lympho- cytes	Monoc- ytes	Plasma Cells	Proery- throblasts	Early Normo- blasts	Inter- mediate Normo- blasts	Late Normo- blasts	Megakaryo- cytes
Marrow Counts (%)													
14/6/55	6.0	3.5	13.0	10.5	24.5	8.0	—	—	1.5	13.0	14.0	6.0	None seen
1/7/55	5.2	6.8	16.0	14.0	28.0	18.4	3.2	—	0.4	2.0	2.8	3.2	" "
23/9/55	3.6	4.4	15.8	15.4	24.0	24.8	—	—	0.4	1.6	7.6	2.4	" "
2/12/55	4.4	3.2	15.2	9.6	21.2	18.8	1.6	0.4	0.4	1.2	10.8	13.2	" "
Pre-transfusion Blood Counts (%)													
13/6/55	2.5	5.0	30.0	7.0	34.5	14.0	6.5	0.5	Normoblasts per 100 W.B.C.				Total W.B.C.
2/8/55	—	—	5.0	4.0	43.0	33.0	15.0	—	9				63,800
10/10/55	—	—	2.5	0.5	53.5	39.0	4.5	—	(Reticulocytes 5.6%)				26,100
1/11/55	—	—	1.0	—	64.0	30.0	5.0	—	28				18,800
9/11/55	2.0	1.0	1.0	7.0	48.0	34.0	5.0	1.0	12				131,000
1/12/55	—	—	—	1.0	50.0	44.0	—	—					36,300

TABLE II

Date	Volume of Blood	Platelet Content (per c.mm.)	Expected Rise (per c.mm.)	Actual Rise (per c.mm.)	Duration of Normal Bleeding- time
14/6/55	150 ml. (stored)	Nil	Nil	Nil	Nil
23/6/55	110 " (fresh)	—	—	3,300	5 days
29/6/55	250 " "	100,000	75,000	21,000	3 "
7/7/55	270 " "	195,000	146,000	65,000	4 "
6/8/55	200 " (stored)	Nil	Nil	Nil	Nil
11/8/55	220 " (fresh)	490,000	270,000	206,000	4 days
9/9/55	350 " "	536,000	430,000	150,000	12+ "
24/9/55	350 " "	113,000	84,000	12,000	4 "
13/10/55	350 " "	156,000	107,000	12,000	4 "
26/10/55	400 " "	668,000	486,000	104,000	8+ "
24/11/55	270 " (stored)	220,000	—	—	Nil

In addition to treatment with transfusion, cortisone was given by mouth. Therapy was begun with a dosage of 7.5 mg. daily, which was gradually increased to an ultimate dose of 24 mg. daily. Some control of the bleeding tendency appeared to be produced, as shown by improvement in tests of the bleeding-time and capillary fragility. There was no effect on the platelet count. In spite of anaemia the general condition of the child remained good, with satisfactory developmental progress (see Fig. 2, taken on October 11), and a slow weight gain from 7 lb. 7 oz. (3,370 g.) on admission to 14 lb. 3 oz. (6,435 g.) at death six months later.

After a poor response to two platelet transfusions, splenectomy was carried out on October 26. At operation the spleen was found to be slightly enlarged (weight 21 g.). Microscopy showed abundant splenic follicles with a simple pulp hyperplasia. There was no evidence of leukaemia, siderosis. As a pre-operative measure a particularly large platelet transfusion was given. There was no undue bleeding at the time of operation or during the post-operative period;



FIG. 2.—Showing the deformity of the forearms and degree of enlargement of the liver.

improvement was not maintained. Four days after an emergency transfusion of stored blood the haemorrhagic state became more marked; the infant developed signs of cerebral haemorrhage and died on December 2.

At necropsy an extensive cerebral haemorrhage was found. Absence of the radii was confirmed by dissection, no bony rudiment being demonstrable. Microscopy of the liver (weight 240 g.) showed small foci of haemopoietic tissue within the sinusoids. The lymph nodes generally were moderately enlarged, and microscopically showed similar haemopoiesis within the sinusoids. A sample of bone marrow taken three hours after death showed a hypercellular, actively normoblastic marrow. Megakaryocytes were not seen in these films, nor in subsequent bone-marrow sections. Small haemorrhages were present in the lungs, myocardium, meninges, and brain. The haemopoietic activity was considered to be in keeping with compensatory blood formation following continued bleeding.

Diagnosis

Thrombocytopenia in the neonate is an uncommon condition. A comprehensive review of such cases is given by Robson and Walker (1951). They classify congenital and neonatal thrombocytopenia into those cases in which there is a maternal history of purpura and those from normal mothers. In the latter category they distinguish transient idiopathic thrombocytopenic purpura, in which hyperplasia of the megakaryocytes is the usual finding, from other cases in which there is an aplasia of the megakaryocytes in the bone marrow. The earliest reference to this latter condition is that of Greenwald and Sherman (1929). Two further cases have been recorded (Landolt, 1948; Stefanini and Dameshek, 1955). In each of these cases the child had one or more congenital deformities associated with hypoplasia of the megakaryocytes. The case of Stefanini and Dameshek appears remarkably similar to our own, since the hypoplasia of the megakaryocytes was associated with a congenital absence of both radii.

It is significant in this case that the mother's blood picture was normal, and that she gave no history suggestive of a haemorrhagic diathesis. There was a history of threatened abortion at the second month. It is at about this time in intrauterine life that platelet production is thought to begin (Fruhling *et al.*, 1949). In addition, there was no evidence of secondary thrombocytopenia in the infant arising from such causes as acute infection, drugs, or leukaemia. The fall of haemoglobin associated with the presence of normoblasts in the peripheral blood raised the possibility of a haemolytic anaemia, which was excluded by the absence of jaundice, normal serum bilirubin, and the negative Coombs test. Aplastic anaemia associated with skeletal defects of the type described by Fanconi (1927) could be excluded by the bone-marrow findings, the high white cell count, and the absence of other features such as cutaneous pigmentation and microcephaly. It is suggested that this is a case of primary congenital aplasia of the megakaryocytes associated with other congenital deformities, as referred to by Hauser (1948).

Platelet Transfusion

Platelet transfusions may be given by a variety of techniques, all based on preventing platelets adhering to wettable surfaces. Duke (1910) reported the first successful platelet transfusion, but gave no details of his technique. Hirsch *et al.* (1950) succeeded in raising the platelet count of a case by using silicone-coated syringes and needles. Recently, with the development of plastic materials, it has been possible to use non-wettable tubing for continuous transfusion rather than the multiple-syringe technique used by Hirsch and Gardner (1952) and Stefanini and Dameshek (1953). The latter authors reviewed other methods of obtaining platelet suspensions. These included the use of dextran, the collection of platelets on columns of ion-exchange resin, or the centrifuging of blood at low temperatures to remove red and white cells. They concluded that the manipulations necessary for these methods so impaired the survival of platelets after transfusion that they defeated their own purpose. The method adopted here is both simple and convenient (see Appendix).

We confirm the striking decrease in haemorrhagic manifestations, bleeding-time, and capillary fragility which has been reported by other workers, notably Duke, Hirsch, and Dameshek. Besides the use of platelet transfusions in the present case, stored blood and cortisone were given (see Fig. 1). Stored blood did not have any appreciable effect on the haemorrhagic state or on the maintenance of haemoglobin. This is illustrated by the transfusion given initially and that given on August 6. After the latter transfusion the haemorrhagic diathesis became so marked, with generalized petechiae, bleeding gums, and the passage of bright red blood in the stools, that the haemoglobin fell from 18.5 to 8.5 g. per 100 ml. in three days. This state was arrested by a transfusion of fresh blood containing 490,000 platelets per c.mm., with an improvement of the capillary fragility to normal, and a reduction of the bleeding-time to within normal limits. These effects lasted for four days, after which no platelets could be found in the infant's blood. Eight such "platelet transfusions" were given, including three from a donor with a platelet count of approximately 1,000,000 per c.mm., followed by a similar improvement on each occasion. It can be seen from Fig. 1 that, irrespective of the number of platelets present in the infant's blood immediately following transfusion, the survival of significant numbers of transfused platelets in the circulation remained the same (from four to five days).

Some platelets presumably disappear during the first few hours, being used to control capillary haemorrhage. It is interesting to speculate on the mechanism for the removal of the remainder, since it has been observed by us, and by Mustard (1956), that platelets can be stored in acid citrate-dextrose mixtures at 4° C. for periods of at least three weeks. Tullis (1953) has shown that platelets can be stored in special media for longer periods than either red or white cells.

Blood containing 220,000 platelets per c.mm. at the time of transfusion, in which the platelets had a normal morphological appearance and staining properties in spite of storage in a siliconed container for four weeks, was used on November 24. No platelets were demonstrable in blood samples taken from the infant immediately after this transfusion. We conclude that platelets whose staining and morphological appearance are normal are not necessarily viable. For the administration of viable platelets, freshly taken blood is essential.

On each occasion that platelets were transfused, an estimate of the expected rise was made, based on the platelets present in the blood passing through the needle to the infant and the assessment of the infant's blood volume derived from its weight—reckoning a blood volume of 40 ml. per lb. (Russell, 1949). It was noticed that in the later transfusions the difference between the actual platelet count performed on the infant and the expected level was becoming greater. From Table II it can be seen that in the initial platelet transfusions yields of between 30 and 70% were

obtained. These figures are similar to those recorded by Hirsch and Gardner (1952). These yields fell to a level of only 10% prior to splenectomy. Following the transfusion on October 13 the platelet survival time became shortened, and subsequent studies revealed the presence of a platelet antibody. Serum taken on October 20 showed a titre of 1/16 with compatible platelets, and a sample taken terminally on December 2 showed a titre of 1/8, using the technique described by Stefanini *et al.* (1953).

The low titre of antibody in this case and its failure to rise in spite of repeated platelet transfusion might be accounted for by the immaturity of antibody-producing mechanisms in the neonatal period. Cortisone possibly also impaired antibody production. Unfortunately, antibody was not looked for in the serum on admission, but the clinical course and the persistence of thrombocytopenia and antibody make transplacental transfer of antibody from the mother extremely unlikely in this case.

Splenectomy was undertaken as a last resort, since after two months' treatment, including cortisone, there had been no sign of autogenous platelet production, and the frequency of transfusions was increasing. We were influenced also by the case reported by Stefanini and Dameshek (1955), in which splenectomy was followed by a rise in the platelet count to normal numbers. In the present case, although platelets returned in small numbers a fortnight after splenectomy, the improvement was only transitory.

Hirsch and Gardner (1952), in discussing the largest series of platelet transfusions recorded, pointed out that, of 42 transfusions given, only one failed to produce clinical improvement, and in this case there was no rise in platelets. We agree that haemorrhagic manifestations in states of thrombocytopenia can be dramatically arrested, but this effect is only transient, depending apparently upon the survival of the platelets. This method of treatment has the limitation that if repeated, especially in adults, sooner or later the platelet survival time becomes shorter owing to the production of a platelet antibody. We suggest that it is well worth while to administer fresh blood from siliconed containers through plastic tubing to cases with thrombocytopenia, in order to tide them over acute haemorrhagic episodes or operative procedures such as splenectomy.

Summary

A case of congenital hypoplastic thrombocytopenia associated with other congenital defects is described with post-mortem findings.

Similar cases are briefly reviewed and the differential diagnosis is considered.

The progress and treatment with platelet transfusions, cortisone, and splenectomy are described and discussed.

Repeated platelet transfusions have been found to be of value and a simple technique is outlined.

Information regarding the survival of platelets *in vivo* and *in vitro* following transfusion has been obtained.

The value and limitations of platelet transfusion are discussed.

APPENDIX: METHOD USED FOR PRESERVING PLATELETS

Blood for transfusion was taken from fasting donors with a wide-bore needle direct into a known volume of acid-citrate-dextrose solution in a siliconed glass bottle calibrated in cubic centimetres. The bottles were prepared by coating the inside with silicone fluid D.C. 550 diluted with ether 1 in 2. The bottles were rinsed with several changes of glass-distilled water, dried in the incubator, and sterilized by autoclaving at a pressure of 20 lb. per square inch (1.4 kg. per square cm.) for 30 minutes. The blood on each occasion was then administered within one hour by scalp-vein transfusion through a short length—about 2 feet (60 cm.)—of "polythene" tubing. Transfusions were given rapidly at the rate of 40–50 ml. an hour. By these methods it was anticipated that the loss of platelets in the transfer of blood from donor to recipient would be reduced to a minimum.

We thank Professor W. St. C. Symmers and Dr. J. Shore, of the Department of Morbid Anatomy, Charing Cross Hospital, for the histological and post-mortem reports on this case; Dr. David Stone for collaboration with the platelet transfusions; and Mrs. P. E. Rivers for technical assistance.

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PULMONARY OEDEMA DUE TO
ANGIOCARDIOGRAPHY
TREATMENT WITH INTRAVENOUS
HYDROCORTISONE

BY

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Serious reactions to contrast media containing iodine are a not uncommon sequel to angiocardiology. Dotter and Jackson (1950) reported 26 deaths out of a total of 6,824 investigations, an incidence of 0.38%. Respiratory difficulty, respiratory arrest, or pulmonary oedema occurred in 12 of the fatal cases. McAfee (1955) reported eight deaths in a series of 732 angiocardiology. He found that patients with primary pulmonary hypertension and pulmonary stenosis appeared to be especially liable to develop serious reaction. Two deaths were reported following selective angiocardiology: in one patient, with multiple pulmonary arteriovenous aneurysms, 35 ml. of a 70% solution of diodone was injected through a catheter in the right atrium; the patient died from acute pulmonary oedema after twenty-five minutes.

We report below the case-history of a patient who developed fulminating pulmonary oedema after the injection of sodium acetrizate into the pulmonary arteries.

Case Report

A man aged 39 had been well until a brief attack of unconsciousness during a strenuous game of football thirteen years previously. After this episode he became slightly breathless on exertion. He had a further syncopal attack, again precipitated by exertion, seven years ago. After a herniorrhaphy in January, 1955, he developed pulmonary infarction. There had been no other history of chest illness. He was admitted for investigation in November, 1955. On examination there were signs of pulmonary hypertension: a dominant "a" wave in the jugular pulse, an early ejection sound at the pulmonary area, and an accentuated pulmonary component of the second heart sound. The electrocardiogram showed right bundle-branch block. The chest x-ray picture showed moderate dilatation of the main branches of the pulmonary artery, with narrowing of the peripheral vessels.

The differential diagnosis included primary pulmonary hypertension, chronic thrombo-embolic pulmonary hypertension, and Eisenmenger's syndrome. Cardiac catheterization confirmed the presence of pulmonary hypertension. The pulmonary artery pressure was 90/20 mm. Hg, and the pulmonary vascular resistance was 10 units. The brachial arterial oxygen saturation was 91%. There was no direct or reversed shunt at any level. Selective angiocardiology was then performed to see whether any large pulmonary vessels were occluded. Promethazine hydrochloride, 25 mg., had been given one hour previously. A test dose of 1 ml. of sodium acetrizate was injected through the catheter into the pulmonary artery. As there was no reaction, 15 ml. was injected into the left pulmonary artery, and a film taken. Then 20 ml. was injected into the right pulmonary artery and a further film taken.

At 11.15 a.m., forty-five minutes after the injection, the patient complained of nausea, and became dyspnoeic and slightly cyanosed. He also coughed up small amounts of frothy blood-stained sputum. He was given 50 mg. of diphenhydramine hydrochloride by mouth, but his condition became steadily worse. By 12.30 p.m. he was very distressed and breathless, and fine crepitations due to acute pulmonary oedema were widespread. He was transferred to a "cardiac" bed, venous cuffs were applied to the thighs, and he was treated with morphine, adrenaline, aminophylline, and oxygen without benefit. At 2 p.m. 25 mg. of promethazine hydrochloride and 200 mg. of cortisone were given intramuscularly. Oxygen was bubbled through 45% ethyl alcohol in a fruitless attempt to reduce the frothiness of the sputum. His condition progressively deteriorated, and he developed signs of extreme peripheral vasoconstriction, with an unrecordable blood pressure. He became increasingly drowsy, and by 4 p.m. he was unrousable; his upper respiratory tract was choked with profuse frothy sputum which he was unable to expectorate. Death appeared to be imminent.

At this stage, laryngoscopy was performed by direct vision and a considerable amount of sputum aspirated; this brought slight improvement. An intravenous injection of 5 ml. of nikethamide caused the patient to recover consciousness and expectorate a large amount of frothy sputum. He then gradually relapsed into coma. Thirty minutes later, at 4.45 p.m., a further dose of nikethamide produced a similar result. Then from 5 to 6.30 p.m. he was given an intravenous infusion of 100 mg. of hydrocortisone (free alcohol) in 500 ml. of isotonic saline. During this time his condition steadily improved, his breathing became less distressed, and he recovered consciousness. There were fewer rales in his chest. When 5 ml. of nikethamide was given intravenously at 5.45 p.m. he produced much less sputum than after the previous doses. At 6.30 p.m. the hydrocortisone was stopped, and a slow drip infusion was continued with isotonic saline alone; 25 mg. of promethazine hydrochloride was given intramuscularly. At 10 p.m. pulmonary oedema recurred and responded again to the infusion of hydrocortisone, which was continued until 1.30 a.m. At 3 a.m. a second relapse occurred, and the signs of pulmonary oedema diminished within five minutes of starting the third hydrocortisone infusion. This was maintained for three hours, and thereafter his condition remained satisfactory.

Oral cortisone was subsequently given in gradually decreasing doses for nine days. During this time he was pyrexial, and developed signs of consolidation of the apical segment of the right lower lobe; this was confirmed by radiography, and attributed to pulmonary infarction.

Discussion

Of the 26 deaths reported by Dotter and Jackson (1950), sensitivity tests were performed in 19 cases and were negative. Yet the intravenous injection of 1 ml. of solution of diodone has itself caused death in four instances (Morgan, 1950; McAfee, 1955). In the present case, generalized pulmonary oedema must be attributed to a hypersensitivity reaction of

which no warning had been given from a preliminary test dose injected into the pulmonary artery. It is concluded that the administration of a test dose of contrast medium is an unreliable method of detecting hypersensitivity, and may in fact induce a false sense of security.

The treatment of the condition presented a difficult problem. As might have been expected, the methods of treatment applicable to pulmonary oedema occurring in left ventricular failure were ineffective here. Intravenous hydrocortisone, on the other hand, appeared to exert a specific and prolonged anti-allergic action in reducing pulmonary oedema. The antihistamine drugs proved of little value. Nikethamide was useful in reviving consciousness and the cough reflex so that fluid could be expectorated.

Intravenous hydrocortisone induced immediate improvement on three separate occasions, and undoubtedly saved this patient's life. Intramuscular cortisone, which was given initially, was presumably ineffective owing to poor absorption in the presence of severe peripheral vasoconstriction. The use of intravenous hydrocortisone in overwhelming allergic reactions is a rational therapeutic measure, and the present case history confirms its usefulness. Our experience indicates that the drug should be immediately at hand in all centres employing the intravenous injection of contrast media.

Summary

A case of gross pulmonary oedema following selective angiocardiology in a patient with primary or chronic thrombo-embolic pulmonary hypertension is reported. Recovery was clearly attributable to prolonged intravenous infusion of hydrocortisone. A test dose of sodium acetrizate failed to provide warning of hypersensitivity.

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FREQUENCY IN THE FEMALE DUE TO URETHRO-TRIGONITIS CAUSED BY INTESTINAL INFECTION

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In his Hunterian Lecture of 1933 Winsbury-White proved by means of injected animal specimens that infection of the genital organs in the female caused marked pathological changes in the urethra and trigone of the bladder. This fact had been readily accepted as occurring in the male as a result of the anatomical relation of the prostate to the bladder neck, but it was not recognized as occurring so readily in the female. By the routine use of a urethroscope, characteristic changes at the bladder neck were found to be invariably associated with disturbances of micturition.

This is the original work which established urethro-trigonitis as a clinical entity and the commonest condition found in female patients attending a urological clinic, but, as Winsbury-White (1947) states, chronic urethro-trigonal changes are not uncommon in women with healthy cervixes. And it is not uncommon even in patients who had had the genital organs removed some time prior to the onset of the urethro-trigonitis.

General Review of Urethro-trigonitis in the Female

In a review of female patients suffering from urethro-trigonitis and attending a urological clinic over the last seven

years it was found that the incidence of this condition was remarkably constant from year to year, varying only between 25 and 30% of the total female attendances of 453. The majority of cases occurred between the ages of 30 and 50, but it might occur in any of the age groups. The most common symptom was frequency of micturition, which was pronounced in 80% of the patients. Dysuria was present in 50%, as was urgency of micturition. In spite of the old teaching that residual urine is rare in the female, an intravenous pyelogram in all cases revealed that 66% of these cases had a definite volume of residual urine left after micturition. The laboratory reported that 16% of the catheter specimens taken as a routine contained pus cells and that organisms were present in only 12%, the predominant organism being *Bact. coli*. Winsbury-White states that urethro-trigonitis is a predisposing cause of *Bact. coli* infection of the urinary tract, and that it does not produce such an infection by itself but only by causing conditions which favour the onset of infection by reason of obstruction of the bladder neck. The diagnosis was made by routine examination with a urethroscope, and characteristic changes in the urethra and bladder neck were noted in every case. The cervix was examined as a routine, and an erosion or evidence of cervicitis was present in 66% of cases; of the remainder there was no evidence of genital infection.

In each case the internal sphincter was dilated as a result of the urethroscopic examination, and dilatation was repeated in accordance with Winsbury-White's method at not less than six-weekly intervals and to a dilatation not greater than F.28. In 25% treatment was speeded up by fulguration of the polypi and granulations and hillocks: 66% were cured and 28% much improved.

Urethro-trigonitis Not due to Infection of Genital Tract

There remain, therefore, 34% of cases in which no infection of the cervix or genital organs can be found to account for the pathological changes in the urethra and trigone.

In a number of patients an association between the large intestine and the neck of the bladder had been noticed: the first instance was that of a patient in whom an acute attack of diverticulitis of the sigmoid colon followed each dilatation of the urethra and in whom marked urethro-trigonal changes had been found on urethroscopy. On further inquiry the patient stated that when she had an attack of diverticulitis the symptoms of urethro-trigonitis were very much worse.

A frequent complaint in these patients is of discomfort and even pain in the left iliac fossa, which may be associated with some irregularity of the bowels. On abdominal palpation there is not infrequently definite tenderness over the sigmoid and pelvic colon, which may in some patients be palpable.

Out of 43 cases examined radiologically by means of a barium enema, 11 showed lesions of the large intestine which were closely related to symptoms of urethro-trigonitis verified by urethroscopy. Of the 11 cases, 8 showed numerous diverticula of the lower colon with radiographic appearances strongly suggesting inflammatory changes in the surrounding bowel. Two patients had been previously diagnosed as having diverticulitis with rigidity and thickening of the sigmoid colon. In one case a barium enema showed a carcinoma of the recto-sigmoid junction though there had been no initial symptoms suggesting a neoplasm of the bowel but only those of urethro-trigonitis.

Chronic constipation was not accepted as a likely cause of urethro-trigonitis, as it does not of itself produce inflammatory changes in the wall of the bowel; nor were lesions of the anal canal included as a cause, although on anatomical grounds there would seem to be no reason why they might not form a source of infection.

In the absence of animal experiments, which made Winsbury-White's work so conclusive, a study of the relationship of the lymphatics of the lower part of the large intestine with those surrounding the bladder neck, although

not showing such a close relationship as that of the cervix to the floor of the bladder, nevertheless shows a ready lymphatic connexion. This is well shown by Rouvière (1932), and there would seem to be no reason why infection should not spread from the lymphatics of one organ to those of the other, which would appear, on clinical grounds, to be the case.

The results of treatment of the bowel condition combined with that of the bladder neck go far to support this theory. Dilatation of the bladder neck and even fulguration of polypi and granulations have not produced very encouraging results in such cases, but when the lesion of the bowel is alleviated the urethro-trigonitis responds to treatment very much more readily. Thus the bladder neck was treated in exactly the same way as when the infection came from the cervix, care being taken not to irritate the urethra by too frequent dilatation—that is, not more than once every six weeks and usually at less frequent intervals.

Treatment of the bowel depends on the type of lesion and its extent. In the less extensive lesions, in which surgery is not called for, the institution of a low residual diet which does not irritate the mucosa of the bowel and limits fermentation, combined with regulation of bowel action by "petrolagar" with or without phenolphthalein, alone may give much improved results, but infection can be further limited by the administration of phthalylsulphathiazole in an initial dose of six 0.5-g. tablets followed by two tablets every six hours for fourteen days. This course can be repeated at fortnightly intervals until the infection has been greatly diminished. (In the more resistant cases an initial course of streptomycin and sulphaguanidine followed by phthalylsulphathiazole may be necessary.) As a result of this routine the symptoms of urethro-trigonitis were improved in each of the cases treated.

Summary

Symptoms of urethro-trigonitis were present in 25 to 30% of female patients attending an out-patient clinic, and this condition was verified by urethroscopy in which characteristic changes were found present at the bladder neck. These changes have been proved to arise from lesions of the cervix and genital tract, and were found in 66% of these cases. Of the remaining 34%, a third were found to have radiologically demonstrable lesions of the large intestine. Treatment of the intestinal infection, combined with dilatation and, where necessary, fulguration of the bladder neck, gives excellent results as compared with dilatation and fulguration alone.

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The Ministry of Education on September 13 asked local education authorities to review their arrangements for providing primary and secondary education for children in hospital and to see that they are as comprehensive as possible. Though much has been done, the Ministry claims that "there are still some educable children in hospital for whom no provision has been made." This may be provided either by teachers visiting or by setting up hospital schools. In 1955 there were 120 hospital schools in England and Wales, with 6,476 children on the roll; 1,425 other children were receiving individual tuition. Where there is no hospital school or regular teaching group, the Ministry of Health has asked hospitals to inform education authorities about the admission of any child likely to remain in hospital who is yet well enough to have some lessons. The circular calls for a good supply of library books, commenting: "Reading matter given by well-intentioned visitors may not always be suitable or adequate."

ACCIDENTAL CARBON MONOXIDE POISONING

DANGERS OF INADEQUATE VENTILATION

BY

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Of late there have been frequent expressions of concern at the increasing number of deaths from accidental coal-gas poisoning. A high proportion of such accidents are associated with various predisposing or contributory conditions in the victim, which have been described collectively as "the 4 D's of accidental carbon monoxide poisoning"—the decrepit, the diseased, the drugged, and the drunk. Others are caused by faulty appliances or by ill-advised amateur adaptations, and occasionally responsibility can be traced to defects in gas-pipes or joints which are actually outside the premises occupied by the victims.

The danger of coke braziers and coke-burning stoves is well known, but deaths still occur from these sources, through either ignorance or disregard of warnings. It is insufficiently appreciated, however, that even coal-burning stoves and fires may be dangerous in certain circumstances, and that gas-fires and other appliances, though free of defects in themselves, may also be a source of danger if the conditions do not ensure free and complete combustion of the coal-gas. The following cases, resulting in the deaths of three healthy adult males, illustrate the circumstances in which fatal poisoning from such sources may arise, and point to the need for a greater awareness of the potential danger.

Case 1

A man aged 50, employed as watchman on a building site, was in the way of spending part of the night asleep in a workmen's hut, and one morning he was found lying dead on the bunk with which the hut was fitted. The post-mortem appearances, external and internal, pointed to death from carbon monoxide poisoning, and the blood contained 55% carboxyhaemoglobin. There was no other significant finding at necropsy, apart from recent pleural adhesions over the left lung and older adhesions over the right lung. The man had recently resumed work after several weeks in hospital suffering from pneumonia.

The hut was of the wheeled type, adapted for towing, and the door at the rear was divided horizontally into two parts, upper and lower. There were two small windows, each capable of being opened. Inside the hut there was a fixed stove, with a chimney leading out through the roof. The capacity of the interior of the hut was approximately 600 cubic feet (17 cubic metres). On the night in question, which was very cold with a gusty wind blowing, both halves of the door had been closed and only one of the windows was slightly open. A fire had been burning in the stove, and this had apparently been well stoked before the man lay down to sleep. There was also an oil-lamp burning.

It was quite certain that no coke had been used in the stove, the only fuel available being coal of normal household quality. The stove and chimney were in good condition, without obvious defects. In these circumstances it was thought desirable to confirm the possibility of a lethal concentration of carbon monoxide having accumulated in the hut, and with this in view a fire of the same coal was lit in the stove and allowed to burn for about one and a half hours. The stove had previously been cleared of ashes and the fire burned freely. One window was slightly open. Samples were then taken of the flue (chimney) gases, with

the hut door open and closed, and also of the air above the stove, with the following results:

CO in flue gases (hut door open) 980 parts per million
CO in flue gases (hut door closed) 1,460 " " "
CO in air above stove (hut door closed) .. 310 " " "

The increase in the CO content of the flue gases on closing the door is marked, and clearly indicates inadequate ventilation, with consequent impaired combustion. The CO content of the air above the stove is significant, for, on the day of sampling, the down draught was only very slight and intermittent. It is obvious that with the door shut, and with frequent short periods of down-draught such as would occur in windy weather, a lethal concentration would accumulate quite rapidly in such a relatively small space. The time of exposure of any occupant would not require to be greatly prolonged before a fatal result ensued.

Cases 2 and 3

Two men, aged 31 and 32, booked lodgings for the night and retired to their bedroom about 9 p.m. In the morning the bedroom door was found locked, and, as no response was obtained to repeated knocking, entry was eventually obtained by a window, and the two men were found dead in bed. The gas-fire in the room was burning, apparently satisfactorily, but both men had died from carbon monoxide poisoning, the blood in each case showing a concentration of 72% carboxyhaemoglobin. The necropsy revealed no other feature of significance.

A washed nylon shirt and other garments were found hung up in front of the fire as if to dry, and it appeared that the fire had been lit by the men before retiring and had burned all night. The door of the room was fitted with a draught excluder, the window had been closed and the curtains were drawn. The capacity of the room was slightly less than 1,400 cubic feet (31 cubic metres) and the atmosphere in the room in the morning was very hot, dry, and oppressive, almost like an oven, although there was no strong or obvious smell of coal-gas.

The gas-fire stood in a tiled fireplace from which a long flue or chimney led to the exterior. There was some blackening of the tiles above the fire, and the chimney was found to be partially choked. The gas-fire consisted of seven elements or radiants, and, although these were broken in places, the flames appeared satisfactory and combustion complete. There was no defect in the gas-tubing or joints.

After the fire had been allowed to burn for about half an hour with the door and window closed, however, there was noticeable lengthening of the inner cones of the flames, indicating incomplete combustion. The sequence of events leading to the deaths was fairly certain. The exclusion of air entry into a room of small dimensions had resulted in insufficient oxygen for complete combustion, and the choked chimney had caused spilling of the products of incomplete combustion back into the room. Although the actual rise of CO concentration was not determined, it is obvious that a potentially lethal concentration would be quickly achieved in such a relatively small room, and the sleeping occupants would remain quite unaware of the increasing danger.

Conclusion

These fatal cases of accidental carbon monoxide poisoning provide a timely reminder of: (1) the danger of using stoves in confined spaces, even though these are in good order and fuelled with good quality coal, unless adequate positive ventilation is ensured at all times, whether the doors or windows be closed or not; and (2) the danger which may arise from gas-fires, even if these and their fittings are in perfect order and they appear to be burning satisfactorily, if there is not also adequate ventilation and extraction of the combustion products.

I am indebted to Dr. E. A. C. Chamberlain, of the Scientific Department of the Scottish Division of the National Coal Board,

for his co-operation in the investigation of Case 1 and for the results of the tests which he carried out in connexion therewith; and to Mr. David Beavis, Controller of the Edinburgh Division of the Scottish Gas Board, for the report of the investigation carried out by his department in connexion with the other two fatalities.

LOCAL HYDROCORTISONE FOR HUNNER'S ULCER OF THE BLADDER

PRELIMINARY REPORT

BY

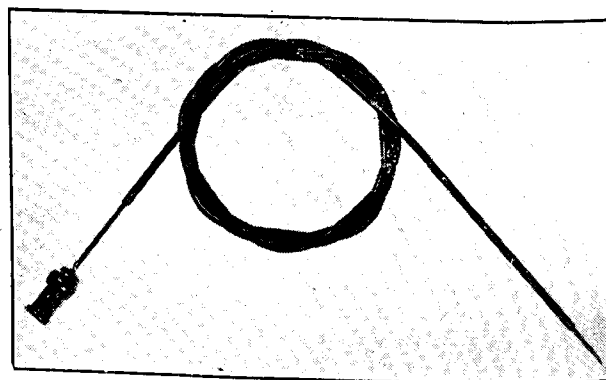
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Local infiltration with hydrocortisone has been used effectively in the treatment of a variety of non-specific inflammatory and fibrotic processes. It appeared reasonable to expect that a similar resolution of focal inflammation with relief of symptoms would be produced by this means in cases of Hunner's ulcer of the bladder. Three patients with this condition have therefore been so treated.

Technique

The injection is carried out cystoscopically through a specially devised "needle" (see photograph). A size 0 hypodermic needle is filed through 1.5 cm. from its point



and lengthened by the interposition, between the two portions, of a size 5E ureteric catheter from which the eyelet end has been removed. The catheter is found to grip the needle securely, and there is no risk of the point becoming detached.

At cystoscopy, using an irrigating instrument and with the patient in the lithotomy position, the affected region of the bladder is identified. The needle, with a stylet in position almost to the point, is passed through the catheterizing or operating channel of the cystoscope and inserted into the bladder wall at or near the ulcer. An assistant is required to withdraw the stylet and inject about 0.5 ml. of hydrocortisone suspension. In all, 5 ml. containing 25 mg. of hydrocortisone per ml. is injected through several punctures into and around the involved area. Penetration of the bladder wall obliquely is found to minimize the tendency of the suspension to flow back from the puncture wound during the injection and after withdrawal of the needle. Ballooning of the vesical mucosa may be produced, but it is probably preferable to inject more deeply into the bladder muscle.

Results

The patients were women aged 63, 68, and 73 years, and were known cases of Hunner's ulcer of two, three, and six years' duration. Treatment by bladder distension under anaesthesia, zinc ionization, and vesical irrigation had formerly been carried out on many occasions. In January, 1956,

each one had one session of hydrocortisone therapy. All have shown marked symptomatic improvement which began a few days after the injection. In the case of the patient with the shortest history of the condition the result was dramatic. On admission to hospital she was passing urine every 30 to 45 minutes during the day and night. Other methods of treatment in the preceding two years had produced amelioration of symptoms for a few days only. For four months after the hydrocortisone injection she micturated every two to three hours during the day and once or twice at night. Recently there has been a gradual recurrence of the original complaint.

The total duration of the remission produced by hydrocortisone is not known, but it is to be expected that, when symptoms recur, further infiltration will again be effective, as is the case with other chronic inflammatory conditions. The results obtained with these patients would appear to justify a more extended trial of local hydrocortisone for Hunner's ulcer, especially in the early case before diffuse fibrosis has developed. Since this investigation began Schulte and Reynolds (1956) have reported satisfactory results of a similar technique using hydrocortisone and hyaluronidase.

I am grateful to Professor Charles Wells for his encouragement and for permission to carry out this procedure.

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OBSERVATIONS ON THE FOOD HABITS OF MYOPIC CHILDREN

BY

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In the course of an inquiry into the development of myopia in children, which included questions about their diet, I was struck by the number of children who have rigid likes and dislikes of certain foods to the extent of consistently refusing some items.

The main sources of first-class protein are milk, cheese, meat, fish, and eggs. Over a period all the children attending a school clinic for refraction were asked whether they consistently refused one or more of these foods. The refusal to take milk as such or as a mainly milk drink was counted as an absolute refusal. It is interesting in this connexion to find a number of children who refuse their school milk—thereby providing others with a double or sometimes treble portion.

It was possible to divide the children into groups of myopes who were rapidly deteriorating, slowly deteriorating, or stationary. A fourth group consisted mainly of hypermetropes with a few emmetropes.

Results

Tables I, II, and III show that myopes are more fussy about some of their food than other children. This was noted as a generalization by Miller (1940), though not in rela-

TABLE I.—Refusals of Protein Sources

	Active Myopia Rate > 1 D per Annum		Active Myopia Rate 1 D per Annum		Stationary Myopia		Others	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
No. of refusals	9	26	42	59	27	49	73	76
Refusals per head	0.55	0.65	0.47	0.50	0.44	0.45	0.24	0.42

TABLE II.—Percentage of Children Refusing Protein Sources

	Myopes (264)	Others (149)
Refusal of milk	16%	5%
" " cheese	18%	14%
" " meat	3%	4%
" " fish	12%	8%
" " eggs	4%	2%

The percentage figures shown in the different categories are not mutually exclusive.

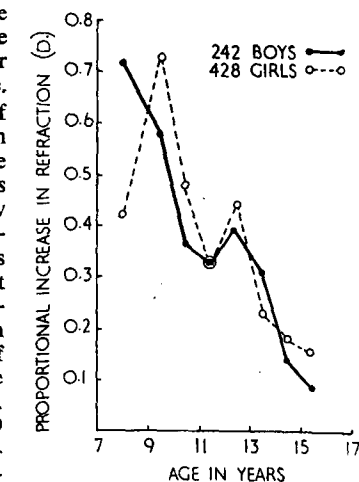
TABLE III.—Percentage of Children Refusing Two or More Sources

	Active Myopes	Stationary Myopes	Others
No. refusing two or more sources	136	128	149
Percentage refusing two or more sources	11	7	5

tion to these particular items. With increasing fussiness there is an increase in the activity of the myopia. The boys with highly active myopia show a refusal rate more than twice that of boys who are not myopic, and the girls a rate over 50% higher. Double refusals are twice as frequent amongst active myopes as amongst others.

That girls are more particular than boys about their food is well known, and in all these groups this is confirmed, though it is small in stationary and slowly deteriorating myopes. Though the rate of refusal is higher in girls than in boys in each group, it does not equal the rate of refusal for boys in the next group with a higher rate of myopic change.

Between the ages of 8 and 17 the refraction of girls changes more often than that of boys (Brown, 1938). My own figures agree substantially with this observation. The Chart shows the mean proportional changes in refraction per annum of male and female myopes aged 8 to 16. Between the ages of 9 and 13, and again between 14 and 16, myopia in girls increased at a faster rate than in boys.



Proportional change in refraction of myopes per annum.

The percentage refusing a particular source of protein do not provide any conclusive information. The most striking difference is in milk consumption. Over three times as many myopes refused milk as others.

Conclusion

It must not be concluded that myopia in children is associated dietetically exclusively with a different pattern of protein consumption, still less with a deficiency in the accepted sense of the word. There is evidence (to be published later) that other food factors are implicated, and in most individual cases the food pattern is in no way basically abnormal even though the myopia may be increasing rapidly.

Before coming to a conclusion on the exact significance of these findings, the unusual growth of myopes (Gardiner, 1954, 1955) must be linked with more detailed dietary intakes (to be published). None the less, the positive finding in this investigation is that myopic children are more particular about their sources of first-class protein than other children. There is an indication that this may be connected with their

myopia because girls are more prone to pick and choose than boys and because the more active the myopia the higher the rate of refusal per head.

Summary

The refusal rates of items of first-class protein are shown to be higher in myopic children than in other children.

It is debatable whether this is connected with their myopia.

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Medical Memorandum

Dissecting Aortic Aneurysm Presenting as a Cerebral Catastrophe

It is a well-known fact that a dissecting aneurysm of the aorta can present in many guises, and neurological symptoms and signs are by no means rare. More commonly, however, it is the spinal cord and the pelvic nerve plexuses which are affected, and thus a flaccid paralysis involving one or both lower limbs is a more familiar picture in these patients.

The following case emphasizes that aortic aneurysm can closely mimic apoplexy or subarachnoid haemorrhage.

CASE REPORT

A collier aged 54 had enjoyed good health all his life until at 2 a.m. on September 30, 1954, while working on night shift in a coal-mine, he suddenly collapsed, became unconscious, and was admitted to hospital in deep coma. His blood pressure was 160/90 mm. Hg. The left pupil was larger than the right, all abdominal reflexes were absent, and there was a bilateral extensor plantar response. He had a left-sided hemiplegia, more marked in the face and arm than in the leg. The cerebrospinal fluid was clear, under normal pressure, contained 1 lymphocyte per c.mm., and 55 mg. of protein per 100 ml.; the globulin was slightly increased. Both the Wassermann reaction and the Lange colloidal gold curve were negative. Thirty-six hours after admission he regained consciousness, although weakness of his left arm and the left side of his face persisted for a further three days. By the evening of October 5 he felt much improved. At no time did he complain of any pain in his chest. At 10 p.m. he suddenly collapsed in bed and died almost instantaneously.

Necropsy Findings.—A dissecting aneurysm of the thoracic aorta was revealed. There were two large rents in the intima, measuring 17 and 10 mm. respectively, situated about 2 cm. above the aortic valve. From that point dissection had taken place upwards along the arch of the aorta as far as the origin of the left subclavian artery. The dissection had extended upwards into the innominate, the left common, and, to a less extent, the left subclavian artery. The innominate artery was partially, and the left common carotid artery almost completely, obstructed by prolapse of media and intima into the lumen of the vessel due to pressure of blood clot. Finally, dissection had also extended downwards and burst into the pericardial sac, which contained 600 ml. of partially clotted blood. There was widespread atheroma of the thoracic aorta with ulceration of the intima in two places. The heart showed a moderate degree of left ventricular hypertrophy, and there were numerous fatty plaques of atheroma in both coronary arteries. The abdominal aorta likewise contained atheromatous patches, but there was no ulceration. The lungs

and abdominal viscera were congested. The brain and meninges showed no demonstrable disease. A Kahn test of the blood obtained after death was negative.

COMMENT

Shennan (1934) produced a very comprehensive review of altogether 300 cases of aortic aneurysm, including 17 cases of his own. He quoted a total of nine cases with cerebral symptoms due to compression or thrombosis of one or both common carotid arteries. Since then several excellent papers have been published on the subject. Weisman and Adams (1944) described 11 cases of dissecting aneurysm with neurological complications. Most of these cases presented with a flaccid paralysis of one or both lower limbs due to occlusion of the common iliac arteries. Only one of their cases showed blockage of one of the carotid arteries; this patient had presented with mental confusion and dysphasia, but not hemiplegia. Baer and Goldburgh (1948) found hemiplegia due to occlusion of one of the common carotid arteries in 2 out of 44 cases of dissecting aneurysm. MacCuish (1953) described a patient who, like the present case, showed sudden coma and hemiplegia as the presenting features.

The comparative rarity of cerebral symptoms in these cases, though dissection commonly extends along the whole course of the aorta, is attributed by Weisman and Adams to the good collateral circulation produced by the circle of Willis. In the present case both the innominate and left carotid arteries were partially occluded; this may account for the severity of the cerebral signs. Partial recanalization of the innominate artery and establishment of a collateral circulation via the vertebral arteries may explain why our patient recovered consciousness and why his hemiplegia gradually wore off until eventually he died owing to rupture of the aneurysm into the pericardial sac.

Schnitker and Bayer (1944) seek the origin of dissecting aneurysm in a localized patch of medial degeneration and not in a primary defect of the intima, as is thought by many. The aetiology in the present case, however, was almost certainly atheromatous; the presence of plaques of atheroma in the aorta, the patient's age, and the negative serological tests all support this view.

A very unusual feature of the case under discussion was the complete absence of pain in the chest, which has been described as the first symptom in practically all the hitherto published cases. A correct ante-mortem diagnosis was thus rendered even more difficult in the present case.

My thanks are due to Dr. C. W. Healey, under whose care the patient was admitted.

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Two food taboos encountered by the East African Medical Survey during a survey of the dietary pattern in Kwimba District, Sukumaland, are described in the *Annual Report of the East African Council for Medical Research 1954-5*. Two series of observations were made during the survey, the first in August, September, and October, the second in March and April, on account of the seasonal rains. Dr. H. Trant led the team. The taboos concerned a "mud" fish and goats' milk. Dr. Trant notes: "The former is not eaten at all by women and the latter is used only for newborn babies as a first day's food. Very occasionally a small boy herding goats may take a drink of milk, but if this is known he is always held up to derision. One authority has suggested that this is really a 'snob' prohibition which came into common custom at the time when the people concerned started to own cattle."

Reviews

PATHOLOGY

An Introduction to Pathology. By G. Payling Wright, D.M., F.R.C.P. Second edition. (Pp. 636+xii; illustrated. 40s.) London, New York, Toronto: Longmans, Green and Co. 1954.

Pathology. By Peter A. Herbut. (Pp. 1,227; illustrated. £6.) London: Henry Kimpton. 1955.

The original purpose of Payling Wright's *Introduction to Pathology* was to revive an interest in the scientific study of the causation of disease, and the mechanisms which underlie disease processes, by employing the experimental disciplines of biology and physiology. Its first edition, published in 1950, has certainly engendered a keener perception of the scope and content of general pathology as an essential introduction to the study of human disease. A second impression appeared in 1951 and a third in 1952. The second edition, published in 1954, has been revised. It will be welcomed not only by the student as a reliable guide to the general principles of pathology, but also by his teachers, and it will be appreciated by all thoughtful clinicians. Many new references and illustrations have been included and two new chapters added. One of these deals with the origin and nature of allergy and the tissue changes which occur in hypersensitivity reactions. The other is concerned at a general explanatory level with the cell and tissue changes which are brought about by ionizing radiations. Reviewing this second edition provides the opportunity to comment on the author's ability to examine a mass of historical, clinical, and pathological evidence, discard the non-essentials, and frame a sound and valid generalization.

Professor Herbut's book is "an attempt to reduce an encyclopaedic amount of information to the confines of a single volume. To achieve this end a rather rigid pattern is necessarily followed throughout the text and the material is presented with little if any adornment." As there are 1,378 illustrations and 6 colour plates, and the price is £6 sterling, this absence of adornment clearly refers to the text, which is terse enough to be almost irritating.

"Pathology" for this author means the descriptive morbid anatomy and histology of human disease, and most of the text is concerned with this aspect of the subject. An exceptionally full but strictly factual account of the structural changes which accompany each disease is followed by a brief catalogue, with a profusion of commas, of its clinical signs and symptoms and of the diseases with which it may be confused. This method of parallel description, packed with detail on the anatomical side and far too brief on the clinical aspects, is claimed to provide "a bird's eye view of the disease as a whole" and is called clinico-pathological correlation.

Professor Herbut has certainly reduced "an encyclopaedic amount of information," but from the size of his book he appears almost to have succeeded in writing another encyclopaedia, which will be valuable as a work of reference for the busy hospital pathologist who is responsible for morbid anatomical and histological diagnosis. From this point of view the book has a place in pathological literature, and its publication will introduce some of us to an American morbid anatomist of wide experience and mature judgment. His approach is realistic and will instruct the student in the art of clinico-pathological diagnosis. In another sense it is dangerous, for it may leave him with the impression that the science of pathology is solely concerned with descriptive morbid anatomy. This criticism would have been met if the accounts of the morbid anatomy of specific diseases had been prefaced by a full explanatory introduction along the accepted lines of general pathology.

G. HADFIELD.

FERTILIZATION

Fertilization. By Lord Rothschild, G.M., Sc.D., F.R.S. (Pp. 170+ix; illustrated. 18s.) London: Methuen and Co. Ltd. New York: John Wiley and Sons Inc. 1956.

When it is realized that no book on fertilization has appeared for more than twenty-five years the significance of this small monograph, with its bibliography of some 400 references—most, of course, comparatively recent—at once becomes apparent. The further fact that it is written by one of the outstanding contributors to our knowledge of the subject makes this book something of an event for all students of fertilization. Of course, it is apt to be rather heavy going for anyone not specifically interested in the subject. After all, a whole book devoted to "the life of the egg from the attachment of the fertilizing spermatozoon to the fusion or apposition of the male and female pronuclei," which process, "except in mammalian eggs, usually takes a little less than one hour," is bound to go into the minutiae to a considerable extent, and these must be of very limited interest, except to the student of the subject. The latter, however, will find himself more than well served, not merely because this is the best and most extensive review of the subject he can have met, but because, unlike most modern reviews, this book expresses the writer's definite and very authoritative opinions on controversial matters. It also contains the novel feature of a list of experiments which Lord Rothschild thinks would be well worth while doing. The book includes chapters on the morphology of fertilization; sperm-egg interacting substances; the metabolism of eggs; metabolic, structural, and other changes at fertilization; polyspermy, bioelectric measurements, and the specificity of fertilization. Lord Rothschild apologizes—though he scarcely need do so—for the omission of such matters as androgenesis and gynogenesis, merogony and parthenogenesis. He has included, in addition to an excellent general index, an index of the names of plants and animals quoted—a most important feature in view of the confusion which has sometimes resulted from the failure of authors of papers on this subject to name accurately the species on which they were working. G. I. M. SWYER.

EAR, NOSE, AND THROAT DISEASES

Diseases of the Ear, Nose, and Throat. By William Wallace Morrison, M.D. Foreword by Arthur W. Proetz. Second edition. (Pp. 756+ix; illustrated. 84s.) Staples Press Ltd. 1956.

This somewhat lengthy book could be shortened with advantage by the omission of material which is now obsolete and historical, such as the description of Killian's operation on the frontal sinus, and also such unnecessary discussion of the definition and treatment (with figure) of synechia following operations on the nose. The arrangement of the subject-matter is rather haphazard; for example, new growths of the external meatus are sandwiched in between the various types of dermatitis affecting this region. The illustrations, 359 of them, are small and cramped and often difficult to interpret. Each section is prefaced by the appropriate anatomy and physiology, which, despite the criticism of some, would appear to be very desirable in view of the woeful ignorance of undergraduates on this particular subject. A useful list of references concludes each chapter. The section on sulphonamides and antibiotics is thoroughly up-to-date, and there is a further chapter devoted to headache and the neuralgias of the head and neck which will be read with interest and benefit. An account is given of the prophylaxis of the common cold, and, though this is interesting, the measures advocated are quite impractical. There is no mention of anosmia under the symptoms of choanal atresia, and pharyngeal diverticulum is apparently described under oesophageal diverticula, which is rather confusing. These are just two instances of matters which give grounds for criticism, but there are many more. There is a useful appendix of symptoms and of formulary. Of course there is much that is of value in a book of this size, and it will prove a useful addition as a work of reference. J. P. STEWART.

BRITISH MEDICAL JOURNAL

LONDON

SATURDAY SEPTEMBER 22 1956

HYPOMETABOLISM

The basal metabolic rate (B.M.R.) is a measure of the metabolic response of the body tissues to thyroid hormone. A reduction in the B.M.R. below the lower limit of normal occurs in a number of conditions such as thyroid disorders, starvation and malnutrition from any cause, nephrosis and other conditions associated with generalized oedema, and some cases of schizophrenia. The lowered metabolism in oedematous states may be due to inclusion of the fluid retained in the oedematous tissues in the body-weight, from which the B.M.R. is calculated, and to diminished heat loss from the insulation provided by the fluid. In malnutrition the activity of the thyroid gland is reduced as a consequence of diminished secretion of thyrotrophic hormone from the pituitary. The cause of the hypometabolism in some cases of schizophrenia is less certain, but the fact that such patients can tolerate large doses of thyroid extract without any increase in B.M.R. or the development of the symptoms and signs of hyperthyroidism that would occur in a normal person suggests that the responsiveness of the tissues is inexplicably diminished. Hypometabolism due to diminished secretion of thyroid hormone is on rare occasions caused by an enzymic defect partially preventing the normal biosynthesis of hormone in the thyroid gland,¹⁻⁴ and the associated enlargement of the gland is a compensatory attempt to correct this deficiency. Although uncommon, and sometimes familial, these cases are of scientific importance because they give clues to the

chemical steps in the synthesis of thyroid hormone. More often hypometabolism due to diminished secretion of the thyroid hormone is secondary to a reduction in the amount of physiologically active thyroid tissue. This occurs in congenital athyrosis (cretinism), in juvenile myxoedema (the predominant manifestation at this age is failure of skeletal growth), idiopathic atrophy in adults (myxoedema), after removal of too much thyroid tissue or as a sequel to too much radio-iodine in the treatment of hyperthyroidism, as a temporary phenomenon in acute thyroiditis, in Hashimoto's struma lymphatosa (in which the thyroid gland is hard and often there are associated positive serum-flocculation reactions),⁵ and as a consequence of a reduction in the secretion of thyrotrophic hormone resulting from pituitary insufficiency from any cause. In all these conditions the symptoms and signs of hypothyroidism can be relieved with thyroid extract; experimental data indicate that the daily normal output of the adult thyroid gland is equivalent to about 3 gr. (0.2 g.) of thyroid extract.

The exact nature of the thyroid hormone is still uncertain. Formerly the only active iodinated substance in the plasma was thought to be L-thyroxine, and this was accepted as the thyroid hormone.⁶⁻⁸ Synthetic L-thyroxine has a metabolic activity such that 0.1 mg. is equivalent to about 1 gr. (65 mg.) of thyroid extract. Being a pure substance of known composition, it is preferred by some authorities to thyroid extract for the treatment of hypothyroidism. Recent chromatographic studies have detected other highly potent iodinated substances in thyroglobulin⁹ and in plasma.¹⁰⁻¹¹ The most important of these is L-triiodothyronine, which is perhaps the tissue-active form of thyroid hormone and is slowly liberated from the stable reservoir of thyroxine. Quantitatively L-triiodothyronine is at least five times as potent as L-thyroxine in the treatment of myxoedema¹²⁻¹³: it is much more rapid and transient in its effect, producing a rise in the B.M.R. within a few hours, whereas thyroxine takes at least five days to exert an effect. Apart from myxoedematous coma, where speed of action is essential, triiodothyronine has no apparent advantage over thyroxine in the treatment of hypothyroidism, and indeed the rapidity of its action makes it potentially more dangerous in patients with associated heart disease.

The diagnosis of adult myxoedema is usually easy if the possibility of the condition is remembered. Recognition of less severe degrees of hypothyroidism is more difficult. Symptoms usually comprise listlessness, lack of physical and mental energy, and vague arthritic and muscle pains. Physical findings include

in most cases a reduction in the size of the thyroid gland, dryness of the skin, and lack of sweating. Confirmation of the diagnosis is obtained most satisfactorily by measurement of the B.M.R., which is below the lower limit of normal, and by the electrocardiogram, which shows flat T-waves—both abnormalities being corrected by administration of thyroid extract, thyroxine, or triiodothyronine. In the past there has been a tendency to diagnose minor degrees of hypothyroidism without sufficient evidence; this has been particularly noticeable in the U.S.A., where many physicians have their own B.M.R. machine and patients commonly inquire about the level of their "basal."

Recently another possible variety of hypometabolism has been described by Freedberg and his co-workers as "nonmyxoedematous hypometabolism."¹⁴⁻¹⁵ Four male patients whose symptoms comprised lack of energy, fatigue, somnolence, nervousness, irritability, aching of the muscles and joints, sensitivity to cold, and diminished potency were found to have periorbital puffiness without other signs of myxoedema and a B.M.R. of -25%. Other measurements of thyroid function—serum protein-bound iodine, radio-iodine uptake, and serum cholesterol—were normal. These patients failed to respond to thyroid extract or L-thyroxine alone, but did so to large doses of L-triiodothyronine or to smaller doses in combination with thyroxine. The suggested explanations for these therapeutic results include a defect in the gastro-intestinal absorption of thyroid extract and thyroxine, failure at the tissue level to convert thyroxine to triiodothyronine, impaired permeability of the cells to thyroxine but not to triiodothyronine, and a deficiency in triiodothyronine, which may be necessary for the optimal utilization of thyroxine. Other explanations might lie in the potency of the thyroid extract used and in the dosage and duration of treatment with thyroxine. Pending the outcome of further investigations and confirmation of the present findings by other workers, it would be wise to keep an open mind on this type of hypometabolism. To administer, without further investigation, triiodothyronine to any patient who complains of some or all the symptoms outlined above is not in keeping with the best in modern medical practice and will only delay elucidation of the nature of this hypometabolic state. Many such patients will be suffering from psychoneurosis: at best triiodothyronine will then do no good; at worst it may serve to increase their difficulties by inducing palpitations or, as pointed out by Dr. H. E. S. Pearson¹⁶ in our correspondence columns last week, more serious cardiac trouble.

BROWN INDURATION OF LUNG

Pulmonary haemosiderosis, or brown induration of the lung, is well known to occur in cases of mitral stenosis accompanied by hypertrophy of the right ventricle. In this condition A. C. Lendrum and colleagues¹ described a focal distribution throughout the lungs of nodules consisting of four to twenty adjacent alveoli filled with siderocytes (macrophages engorged with haemosiderin). In addition, ferrous impregnation of the elastic tissue of the alveolar walls and small arteries results in fracture of the affected elastica, with giant-cell reaction, even to the extent of the development of giant-cell granulomata.² An identical picture may also be seen in patients with systemic hypertension who survive several attacks of left ventricular failure. Lendrum and colleagues¹ suggest that this type of pulmonary haemosiderosis is due to long-standing right ventricular preponderance, with resultant varicosity and repeated haemorrhages in the anastomoses between the bronchial and pulmonary circulations in the region of the respiratory bronchioles. Recently A. H. Cameron³ has described two cases of pulmonary haemosiderosis associated with bronchiectasis. Cor pulmonale and hyperplastic changes in the small vessels of the lung indicated that there had been pulmonary hypertension in both patients, and it is suggested that pulmonary hypertension and inflammatory vascular engorgement are the factors responsible for the haemorrhage from bronchiolar mucosa.

It is, perhaps, less widely known that a very similar pathological state may arise in young people who do not suffer from any preceding disease of the heart or lungs. To this has been given the name idiopathic pulmonary haemosiderosis (or essential brown induration of the lung). This condition bears no relationship to haemochromatosis, in which there is an abnormality of iron metabolism not present in pulmonary haemosiderosis. In 1948 W. G. Wyllie and others⁴ reviewed the pathological and clinical features of idiopathic pulmonary haemosiderosis as seen in 7 cases at the Hospital for Sick Children, Great Ormond Street, and in 17 cases culled from the literature. The histological appearances are the same as those seen in pulmonary haemosiderosis secondary

¹ Lendrum, A. C., Scott, L. D. W., and Park, S. D. S., *Quart. J. Med.*, 1950, 19, 249.

² —, *J. Path. Bact.*, 1950, 62, 555.

³ Cameron, A. H., *Thorax*, 1956, 11, 105.

⁴ Wyllie, W. G., Sheldon, W., Bodian, M., and Barlow, A., *Quart. J. Med.*, 1948, 17, 25.

⁵ Browning, J. R., and Houghton, J. D., *Amer. J. Med.*, 1956, 20, 374.

⁶ Wynn-Williams, N., and Young, R. D., *Thorax*, 1956, 11, 101.

⁷ King, A. B., *Proc. roy. Soc. Med.*, 1949, 42, 87.

⁸ Gellis, S. S., Reinhold, J. L. D., and Green, S., *A.M.A. Amer. J. Dis. Child.*, 1953, 85, 303.

¹ Stanbury, J. B., and Hodge, A. N., *J. clin. Endocr.*, 1950, 10, 1471.

² Hutchinson, J. H., and McGirr, E. M., *ibid.*, 1954, 14, 869.

³ Hubble, D., *Lancet*, 1953, 1, 1112.

⁴ Stanbury, J. B., Kassenaar, A. A. H., Meijer, J. W. A., and Terpstra, J., *J. clin. Endocr.*, 1955, 15, 1216.

⁵ Luxton, R. W., and Cooke, R. T., *Lancet*, 1956, 2, 105.

⁶ Harrington, C. R., and Barger, G., *Biochem. J.*, 1927, 21, 169.

⁷ Taugo, A., and Chaikoff, I. L., *J. biol. Chem.*, 1948, 176, 639.

⁸ Laidlaw, J. C., *Nature (Lond.)*, 1949, 164, 927.

⁹ Roche, J., Michel, R., Lissitzky, S., and Michel, O., *C. R. Acad. Sci. (Paris)*, 1951, 234, 997.

¹⁰ Gross, J., and Pitt-Rivers, R., *Lancet*, 1952, 1, 439.

¹¹ Michel, R., *Ann. Rev. Physiol.*, 1956, 18, 457.

¹² Gross, J., Pitt-Rivers, R., and Trotter, W. R., *Lancet*, 1952, 1, 1044.

¹³ Blackburn, C. M., and Keating, F. R., *J. clin. Invest.*, 1954, 33, 918.

¹⁴ Freedberg, A. S., Kurland, G. S., and Hamolsky, M. W., *New Engl. J. Med.*, 1955, 253, 57.

¹⁵ Kurland, G. S., Hamolsky, M. W., and Freedberg, A. S., *J. clin. Endocr.*, 1955, 15, 1354.

¹⁶ Pearson, H. E. S., *British Medical Journal*, 1956, 2, 657.

to heart disease, with this exception. Whereas in the latter the damage is focal because of haemorrhages in individual respiratory bronchioles, each related to a group of alveoli, in idiopathic pulmonary haemosiderosis the haemorrhage is intra-alveolar and diffusely spread throughout the lungs. The pathogenesis is unknown, but most workers have stressed the possibility of a primary defect of the elastic tissues of the walls of the small blood vessels and alveoli. The changes are slight to begin with and the clinical features appear insidiously. As larger parts of the lungs become affected, anoxaemia results in dyspnoea and cyanosis.

The condition, though sometimes seen in adult life,^{5,6} occurs mainly in children.⁴ There is no obvious hereditary tendency. The clinical course is episodic, and remissions of variable duration and completeness occur. The presenting signs are tachycardia and cyanosis associated with dyspnoea, pallor, fever, and, in some cases, jaundice. Cough and vomiting or abdominal pain are often troublesome. There may be signs of congestive cardiac failure such as cardiac enlargement, over-filling of the veins of the neck, gallop rhythm, and enlargement of the liver and spleen. Frank haemoptysis, an uncommon symptom in young children, has been a feature in most of the cases recorded. The test for occult blood in the faeces is often positive. A few rales and rhonchi may be heard over the lungs, but the paucity of physical signs contrasts sharply with the grossly abnormal x-ray appearances. These consist of a generalized mottling most pronounced towards the roots of the lungs. As the acute episode subsides a reticular pattern develops, which may clear completely between the earlier attacks. Lobar collapse may also occur. The blood shows a hypochromic anaemia, often severe, which may respond to iron. In addition, there are "pseudo-haemolytic" features such as a reticulocytosis, the presence of nucleated red cells in the blood films, slight jaundice, indirect positive van den Bergh reaction, excess urinary urobilinogen, and the presence of cold auto-agglutinins. Absence of methaemalbumin excludes intravascular haemolysis. The anaemia has been interpreted⁴ as the result of recurrent pulmonary haemorrhages, and the peculiar pseudo-haemolytic features are explained by the fact that the blood is not shed outside the body but within it—that is, into the lungs. The presence of cold auto-agglutinins may be an antibody response to the destruction of red blood cells within the lungs. Acute episodes may subside quickly or last for several months, but in the intervals the patient is debilitated, underweight, and easily made breathless. Ultimately clubbing of the fingers

develops. The prognosis is bad, and death results in due course from asphyxia and loss of blood.

The diagnosis is usually based on the characteristic radiographic appearances. The striking anaemia and the absence of distinctive physical signs over the lungs may lead to an erroneous diagnosis of iron-deficiency or haemolytic anaemia, but the presence of dyspnoea and cyanosis often associated with haemoptysis should indicate the need for a chest radiograph. The diagnosis may be confirmed by finding macrophages containing haemosiderin in the sputum, in stomach contents obtained by aspiration, or in material obtained by lung puncture.^{7,8} The diagnosis can be accepted only in the absence of an organic defect of the heart such as mitral stenosis. The x-ray appearances are closely similar to those seen in chronic miliary tuberculosis, xanthomatosis, Gaucher's lipoidosis, and sarcoidosis, which are excluded by appropriate investigations. It seems probable that some cases of miliary tuberculosis reported before the days of antibiotics to have improved spontaneously were really examples of idiopathic haemosiderosis.

Treatment has usually been confined to the administration of oxygen for anoxia and blood transfusion for anaemia. J. R. Browning and J. D. Houghton⁵ have reported benefit in one case from giving A.C.T.H. and cortisone.

LEUKAEMIA AND EXPOSURE TO X RAYS

The potential leukaemogenic nature of ionizing radiations is once again emphasized in a recent report by Dr. Alice Stewart and her colleagues,¹ whose findings suggest that exposure of children to x rays during their prenatal life may be an aetiological factor in the development of leukaemia in infancy and childhood. These workers studied the past histories of 547 children who had died from leukaemia or malignant disease in England before the age of 10 and during the years 1953 to 1955, comparing these with the histories of the same number of control children. They found an apparently significant excess of deaths from leukaemia, and also from other malignant diseases, among the children of mothers who had been subjected to x-ray examination of the abdomen during the relevant pregnancy. No similar excess of deaths was found among children who in the post-natal period had been subjected to diagnostic x-ray examination or to whom either sulphonamides or antibiotics had been administered. So far the histories of only about one-third of the children certified as dying from leukaemia or malignant disease during

the period in question have been reported upon, and when the final data are available the excess of deaths among children irradiated in prenatal life may well be different from that found at present. The preliminary findings, however, certainly appear to justify the authors' contention that prenatal irradiation may predispose children to the development of leukaemia or malignant disease during infancy and early childhood.

The report of Dr. Stewart and her colleagues follows closely upon that made by M. Faber² to the Fifth International Congress on Radiobiology, held in Stockholm last month, on the preliminary results of a study of the frequency of either diagnostic or therapeutic exposure to x rays in the histories of adult sufferers from various types of leukaemia. This work was based on the histories of cases of leukaemia recorded in the Danish Cancer Registry. In the belief that the incidence of chronic lymphatic leukaemia is not increased by exposure to x rays, Faber noted the differences in the frequency of a history of exposure to therapeutic or diagnostic x rays among patients with this form of leukaemia and those suffering from acute leukaemia or from chronic myeloid leukaemia. He found that a history of exposure to x rays was given with significantly greater frequency by patients with acute leukaemia or with chronic myeloid leukaemia than by those with chronic lymphatic leukaemia.

These studies of Faber and of Stewart and her colleagues suggest for the first time that the comparatively low doses of x rays received during diagnostic procedures may induce leukaemia. Prior to these publications evidence had accrued from other human studies that much larger doses of radiation than are used in x-ray diagnosis are leukaemogenic. The well-known facts from Hiroshima and Nagasaki have been supplemented by the results of a survey of the incidence of leukaemia among patients treated with x rays for ankylosing spondylitis, as reported by W. M. Court Brown and J. D. Abbatt,³ and recently more extensively by W. M. Court Brown and R. Doll in the report⁴ of the Medical Research Council's Committee on the Hazards to Man of Nuclear and Allied Radiations. Further, C. L. Simpson and her colleagues⁵ have reported an increased incidence of both leukaemia and cancer of the thyroid in children given mediastinal irradiation for thymic enlargement.

It can now be accepted without reserve that ionizing radiations can cause leukaemia in man. The nature

¹ Stewart, A., Webb, J., Gile, D., and Hewitt, D., *Lancet*, 1956, 2, 447.

² Faber, M., Fifth International Congress on Radiobiology, Stockholm, August, 1956.

³ Court Brown, W. M., and Abbatt, J. D., *Lancet*, 1955, 1, 1283.

⁴ The Hazards to Man of Nuclear and Allied Radiations, 1956, H.M.S.O., London.

⁵ Simpson, C. L., Hempelmann, L. H., and Fuller, L. M., *Radiology*, 1955, 64, 840.

⁶ Court Brown, W. M., Sixth International Congress on Haematology, Boston, August, 1956.

of the relationship between the incidence of leukaemia and the dose of radiation and, consequently, an understanding of the scale of risks involved remain to be discovered. It will be of the greatest importance to determine by direct observation, or to predict with some degree of confidence, whether a threshold dose of radiation exists below which exposure is not associated with an increased risk of inducing leukaemia. Court Brown and Doll⁴ thought that the possibility of very small doses of radiation having a leukaemogenic effect could not be ruled out; their further studies, as recently reported by Court Brown⁶ to the Sixth International Congress of Haematology at Boston, give added weight to the suggestion that over low ranges of dose there may be a simple proportional relationship between the incidence of leukaemia and the radiation dose. In such circumstances no threshold dose of radiation would exist. It may well be, however, that the foetus is more sensitive to the leukaemogenic effects of radiation than either the child or the adult.

The preliminary results reported by Faber and by Stewart and her colleagues are in keeping with the concept that low doses of radiation, such as are received during diagnostic procedures, may increase the probability of the development of leukaemia, but further studies will have to be undertaken to test this hypothesis and to establish it in a convincing manner or to repudiate it on sure grounds. In the meantime two precautionary steps can be taken. The first is to develop techniques of x-ray examination which will reduce as far as possible the amount of radiation received during any single exposure, and for this purpose more attention might well be paid to the use of image intensifiers. The second step was clearly stated by the Medical Research Council's committee,⁴ which concluded, so far as peacetime hazards were concerned, "that, as all such radiations are potentially dangerous, their use should be the subject of constant and close scrutiny, and that adequate justification should be required for their employment on however small a scale." The findings of Stewart and her colleagues reinforce this plea for "adequate justification" especially for an x-ray examination of the abdomen during pregnancy.

PAINLESS CARDIAC INFARCTION

The occurrence of cardiac infarction without pain continues to excite interest, and recently the circumstances in which it might occur were reviewed in these columns.¹ Patients may not complain of pain, because it is overshadowed by some other symptom, especially severe dyspnoea,² syncope due to heart block,³ or vomiting and acute circulatory failure. Rarely, arterial embolism

may indicate that cardiac infarction has occurred a few days earlier.⁴ Not infrequently, cardiac infarction presents as angina of effort⁵; H. L. Blumgart and his colleagues⁶ found evidence of old complete occlusion of at least one major coronary artery at necropsy in all cases of angina pectoris without valvular lesions or hypertension. However, undoubtedly some cases of cardiac infarction are symptomless. A low threshold to pain, altered perception of pain, slow infarction, and ischaemic destruction of nerve endings leading to analgesia have all been suggested as explanations.⁷⁻⁹ The pain of myocardial infarction is certainly due to cardiac ischaemia, and the speed of the infarction and the presence and number of available collateral vessels will influence the amount of pain which accompanies the occlusion. Thus the occurrence of a major coronary artery occlusion in the absence of collateral vessels is likely to be followed by intense ischaemia and severe pain,^{9,10} but when small areas of infarction occur in subjects with a collateral circulation the incidents may be "silent" until heart failure, arrhythmia, or sudden death occur, pain being absent or trivial.

In a recent paper W. Evans and G. C. Sutton¹¹ have drawn attention to this important problem in an investigation of 70 cases of painless infarction in 56 men and 14 women. They were careful to exclude the occurrence of pain by direct questioning of each patient soon after the onset of the illness, and to accept such symptoms as aching, sensations of pressure, "indigestion," and substernal discomfort as being equivalent to pain, and therefore necessitating exclusion from the series. Cardiographic evidence of infarction was insisted upon. In 26 of the 70 patients the absence of pain was associated with "restricted infarction," which the authors define as infarction which is limited in its distribution, and which gives rise to less obvious cardiographic changes which may escape detection unless carefully sought. Evans and Sutton believe that the absence of pain in this group was due not to the small size of the infarct but to the slowness of infarction, which in turn depends on the rate of arterial narrowing and the efficiency of the collateral circulation. In 21 of the 70 cases there was an auricular arrhythmia, usually fibrillation. Hypertension (associated with sinus rhythm in 9 and auricular fibrillation in 7) was present in 16 of the 70 cases. In 4 patients Stokes-Adams disease may have played a part in suppressing pain, while severe vomiting in two cases and cerebral embolism in one case could be considered as the equivalents of pain. The reason for the absence of pain in the group with auricular arrhythmias and hypertension is not entirely clear. Dyspnoea did not overshadow the pain, nor did heart failure play any part. Evans and Sutton considered the absence of

pain in the hypertensive patients to be due to the increase in myocardial muscle mass, which may determine a slower rate of myocardial necrosis following coronary occlusion. The part played by the arrhythmias in suppressing the pain is uncertain, and it would be of interest to know the incidence of auricular fibrillation in a comparable series of their patients with painful cardiac infarction. Certainly the onset of auricular fibrillation in older subjects may be the result of ischaemic heart disease, though cardiographic evidence of infarction is not always present.

Evans and Sutton have underlined the importance of not demanding a history of typical cardiac pain for the diagnosis of cardiac infarction, and of considering the possibility in patients who present with such signs and symptoms as acute dyspnoea, syncope, vomiting, and arterial embolism. The possibility of infarction should especially be borne in mind in older subjects with unexplained auricular fibrillation with or without hypertension.

ATTACK ON INSECTS

A few months ago we drew attention to the fact that in many parts of the world strains of insect pests are emerging which are resistant to insecticides.¹ There is some connexion between the intensity at which insecticides are applied and the speed at which resistance develops. In Britain, for example, where the climate does not foster insect pests so freely as in warmer climates, there are fewer cases of resistance, and the almost ubiquitous immunity of houseflies to D.D.T. and other chlorinated hydrocarbon insecticides has developed more slowly. While the problem of resistance is not restricted to pests of medical importance, there are more definite cases of this type than among the far more numerous agricultural insect pests. Apart from the housefly, which is almost everywhere resistant to D.D.T. and its analogues, body lice and bed bugs are resistant in a number of places, though rarely in Europe; four different strains of anophelines which are malaria vectors are resistant (in Greece, Java, Saudi Arabia, and the U.S.A.) and several strains of culicine mosquito. The housefly is in most places resistant to gamma B.H.C., chlordane, dieldrin, and like substances; the German cockroach is resistant to this group in parts of the U.S.A.; one anopheline malaria vector (in N. Nigeria) is resistant and so are several culicines. The housefly has been reported resistant to organo-phosphorus insecticides in Denmark, where these compounds have been widely used.²

Altogether, there have been reports of resistance of over 20 species of insects of importance in public health, though in a few cases the evidence is not completely substantiated.³ This is certainly disturbing, though the trouble is still localized for most of the insects concerned, and many of them show only one type of resistance so far. It is important to watch for the emergence of resistance and to counteract it if possible. The only feasible alternative reactions at present are to attempt

control by other than chemical methods or to change to different insecticides. The need for change has called attention to the prolific family of organo-phosphorus insecticides, to which only low levels of resistance have been recorded so far.² Several of them, now in use abroad, are no more dangerous to man than the chlorinated compounds; they include malathion, diazinon, chlorthion, "dipterex" and D.D.V.P. (apparently only the first is on the market in Britain). It must be admitted, however, that none of the known organo-phosphorus compounds has the long residual action of D.D.T. or dieldrin.

A possible line of defence against resistance which does not seem to have been adequately investigated is the combined use of insecticides of totally different types. Resistance is theoretically due to the survival (and breeding) of a few individual insects with abnormally high resistance to a particular type of poison. Addition of a different kind of poison might well prevent their survival.

RELAXIN

In many species, and especially in rodents, relaxation of the symphysis pubis occurs in late pregnancy. That this is under hormonal control was first shown in 1926 by F. L. Hisaw.¹ He called the substance responsible relaxin and detected it in the serum of pregnant rabbits. Subsequently, it has been shown to exist in several other pregnant mammals,²⁻⁴ and can be obtained from extracts of rabbit placenta and sow's corpora lutea.^{1,2,5} The substance is non-steroidal, and is thought to be a polypeptide, though no pure preparations have yet been made. Earlier doubts of the existence of such a substance, the effects of which, in guinea-pigs at least, could be reproduced by oestrogen and progesterone alone⁶⁻⁹ can no longer be entertained, since A. A. Abramowitz *et al.*¹⁰ have shown that 500 times the amount of relaxin necessary to produce a positive response in the guinea-pig was without either oestrogenic or progestational effect. Moreover, Hisaw *et al.*¹¹ further succeeded in differentiating the actions of

relaxin and progesterone and showed that the latter acts only by stimulating the secretion of relaxin itself. Though relaxation can be produced by oestrogen alone, the dose required to prime animals for the action of relaxin is small and without effect by itself. It remains possible, however, that relaxin acts as a potentiator of oestrogen, since it is ineffective in the absence of prior oestrogen treatment; but, if so, its action in so potentiating oestrogen must be very powerful.¹²

More recently interest has turned to the uterine relaxation which may follow administration of aqueous extracts of corpora lutea. This was first convincingly demonstrated on the guinea-pig uterus *in situ* by J. C. Krantz, H. H. Bryant, and C. J. Carr¹³ in 1950 and confirmed in 1953 by L. C. Felton, E. H. Frieden, and H. H. Bryant.¹⁴ These latter authors studied the chemical properties of the "uterine relaxing factor" (U.R.F.), found it to be a protein or polypeptide, and concluded that there was a close relationship between it and relaxin. Whether U.R.F. and relaxin are identical remains uncertain.

Clinical interest in these substances arises from two uses to which the uterine-relaxing property of extracts of sow's corpora lutea have been put—the treatment of dysmenorrhoea and of premature labour. G. S. Jones and F. Smith¹⁵ produced a report in 1954 on its use in the treatment of dysmenorrhoea; they showed that the active principle is not destroyed in the stomach and appears in the blood serum within 30 minutes after oral administration in human beings. In a series of 90 women who complained of dysmenorrhoea, symptoms were controlled by the treatment in 61, the results being regarded as sufficiently promising to warrant further trial. G. H. Rezek¹⁶ has also reported good results in a series of 298 patients, complete relief of symptoms being obtained in some 70% of cases within fifteen minutes following an initial oral dose of 3,000 "units." There were no undesirable effects.

Of no less interest are two reports on the use of U.R.F. in premature labour. J. T. Majewski and T. Jennings¹⁷ obtained good results in all but 4 of 21 patients in premature labour by giving 4,000 units initially, followed in one hour by 3,000 units, and thereafter 1,000 units hourly (all orally) until contractions ceased. E. Abramson and D. E. Reid¹⁸ treated by intramuscular injections five patients who went into premature labour between the 29th and 31st weeks. In each case the pregnancy continued until the 36th to 40th weeks, with the delivery of a normal infant. Finally, E. Eichner *et al.*¹⁹ made careful studies on the effects of intravenous and intramuscular injections of U.R.F. in labour and were able to modify and slow labour in all patients to whom adequate dosage could be given for over two hours before delivery. They further drew attention to the cervical softening which was induced by treatment in 30 of 39 patients and found that certain types of dystocia associated with disorganized contractions responded with normal labour and rapid delivery. It may not be too much to claim that the rather neglected "third ovarian hormone," as relaxin has been called, appears to have an interesting future in obstetrics and gynaecology.

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THE CLINICAL PSYCHOLOGIST IN THE MENTAL HOSPITAL

BY

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Senior Clinical Psychologist, Crichton Royal, Dumfries

The appearance of trained clinical psychologists in mental hospital practice is a comparatively recent phenomenon. It is therefore not surprising not only that many mental hospitals are still without psychologists but that those that do employ them are not all using them in the same way. Indeed, many medical men have but a sketchy notion of the training and capabilities of the clinical psychologist and are therefore not clear about what duties may properly be assigned to him. It is hoped that this article may make matters clearer by giving an account of how clinical psychologists are employed at the Crichton Royal, Dumfries, where the first psychologist was appointed twelve years ago.

Training of the Psychologist

Arrangements for the selection and training of clinical psychologists are set out in the Ministry of Health circular P.T.A. 39 and the appropriate covering memoranda.

No psychologist is now accepted for clinical training unless he has an honours degree in psychology. He is then required to gain a further three years' experience with mental patients, usually in a mental hospital, under the supervision of a senior psychologist, before he can be regarded as being fully trained. At the end of this time, if he is to be allowed to continue, he must gain a proficiency certificate from his employing authority. This period of hospital experience may be reduced if he has also received postgraduate training in clinical psychology in a university department. The psychologist, then, comes into the mental hospital with a background of academic knowledge of normal psychology, in contrast to the psychiatrist, who begins with a training in general medicine. Thus, whereas the psychiatrist is interested in eliciting symptoms which may lead him to diagnosis and so to treatment, the psychologist is concerned more with describing the patient in terms of personality traits of intelligence, temperament, and character. The psychiatrist's training has given him a knowledge of the abnormal, the deviant, and the pathological; whereas the psychologist's training has given him a knowledge of the normal range of human behaviour.

Work of the Psychologist

The work of the psychologist in the mental hospital may be classified under four heads: diagnosis, research, treatment, and teaching. It is unlikely that he will be able to give an equal amount of attention to each of these. All psychologists engage in a large amount of diagnostic interviewing and testing, which probably forms the major part of their work. The relative amount of time spent on research, treatment, and teaching depends on the psychologist himself and on the hospital in which he works. The man who is interested in research often does little or no treatment, and vice versa. As Sir Thomas Lewis (1930) pointed out, the research and clinical attitudes are not easily adopted by the same person concurrently. Whether or not the psychologist is called upon to teach depends on the presence in the hospital of medical officers training for their D.P.M. or of a school of nursing. Where psychology lectures are to be given the clinical psychologist is best fitted to give them.

Diagnosis.—The psychologist in his diagnostic work aims at providing information about a patient which will help the

psychiatrist to assess the nature of the illness. The tests he uses are based on scientific research and depend as little as possible on personal subjective impressions and as much as possible on objective measurement. The intellectual level of the patient, as well as signs of intellectual impairment or deterioration, is always an important factor, and the psychologist is equipped to make objective assessments of all these. Disorders of perception or thinking may give the first indications of a cerebral lesion or functional psychosis. These can be fairly easily demonstrated by test procedures. The various so-called "projective techniques," such as the Rorschach ink-blot test and Murray's thematic apperception test, give valuable information about a patient's personality. The former gives indications of how the patient operates: anxiously, depressively, obsessively, and so on; the latter yields information about his attitude and opinions with regard to his parents, death, violence, sex, and the like. Tests such as these not only help in diagnosis but are valuable research tools and often form a useful basis for psychotherapy.

Research.—So far as a psychologist has had training in scientific methods he is able to render valuable assistance in designing and in carrying out research projects; he can also give advice on scientific research in general. Since university courses in psychology usually include statistics, the psychologist is able to advise on statistical methods in medical research in the hospital. Recent psychological research at the Crichton Royal has included work on the effects of E.C.T. on memory and efficiency, the psychological changes in senile dementia, and the changes in attitude of alcoholics after treatment.

Treatment.—Not having a medical training, the psychologist does not, of course, undertake any of the physical treatments. He can, however, undertake the psychotherapy of suitable cases under the general supervision of the psychiatrist, who remains in charge of the case. As this form of treatment is very time-consuming, this part of the psychologist's work can be of great assistance to the psychiatrist. Since the former is never concerned with problems of administration, he tends to be regarded by the patient in a somewhat different light from either the psychiatrist or the nurse. Consequently it sometimes happens that the patient finds it easier to confide in the psychologist in the first instance. Some aspects of the patient's rehabilitation, too, are often more easily handled by the psychologist.

Teaching.—In lectures to medical officers training for their D.P.M. the psychologist should be able to supply the academic framework for the psychological knowledge necessary for the diploma, and in lectures to student nurses he should be able to relate psychological theory to practical issues on the ward. It is particularly necessary to encourage nurses to observe and understand themselves as a basis for understanding their patients.

Role of the Psychologist in the Hospital

There has been a tendency at some hospitals to use psychologists as "scientific medical auxiliaries," much in the same way as radiographers, E.E.G. recordists, or biochemists. In this case the psychologist is based on his own separate department, which he leaves only when it is necessary to visit the ward to test the patient. In some cases the patient may even be brought to the psychologist in his department. This arrangement has obvious limitations. The presence of the psychologist in the ward to see a patient on request may be interpreted by the latter as indicating a serious turn of events in his treatment. As the psychologist is a stranger to the patient, rapport has to be established before he can usefully begin to test the patient, and this often involves the need for prolonged reassurance and encouragement. On the other hand, if the psychologist is based on the ward and is there every day and all day, he soon becomes recognized as part of the ward team of doctors and nurses. Patients indeed come to accept the psychologist as one of the group

of people he sees regularly, concerned as a team in his day-to-day treatment. The psychologist is not then a strange expert called in for a special purpose but is a well-known figure with whom most of the patients have a talk some time or other. When the psychologist works in this way the value of the material he gains from the patient is greatly enhanced. The patient knows him and has come to trust him, and it is recognized in the ward that patients go and see him. Therefore there is no strain; there is no initial discussion to be undertaken with a patient before valuable material can be elicited.

Another way in which the part the psychologist plays on the ward can be useful has already been mentioned: whereas the doctor and nurse are inevitably in positions of authority, the psychologist is not so. He is not required, nor is it necessary, for him ever to give orders to the patient or to anybody else. His advice may often be sought, but he never assumes authority. This often provides opportunities for the patient to work out his problems when he needs some non-authoritarian figure to consult.

When a psychologist is based on a ward in the way that has just been described, the sphere of his work is inevitably restricted, as he will be available for work only on the ward in which he is based. On the other hand, the value of his work is so much enhanced, and the fullness and richness of the psychological material he obtains is so much increased, that there can be no doubt of the value of this system of working. Unless his efforts are concentrated on a single ward the potentialities of the psychologist in the mental hospital setting may not be fully realized and he may get so little done that is really worth while that his usefulness may begin to be doubted. On the other hand, if his potentialities are exploited by putting him on the ward, his usefulness will become apparent.

At a time when mental illness and neurosis are becoming major concerns in national life, the increasing employment of clinical psychologists in this way may play a part in meeting some of the difficulties which at the moment beset work in mental hospitals.

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NORMAL AND ABNORMAL BONE SYMPOSIUM AT QUEEN'S COLLEGE, DUNDEE

[FROM A SPECIAL CORRESPONDENT]

The properties of bone, its growth and repair, and some of its clinical abnormalities were among the subjects discussed at a symposium and postgraduate lecture held at Queen's College, Dundee, on September 5. The Master of Queen's, Professor D. R. Dow, opened the meeting.

Breaking Stress

Professor G. H. BELL and Mrs. JEAN OLIVER (department of physiology, Queen's College) reported on the strength of bone in various pathological conditions. In Professor Bell's earlier studies it had been shown, they said, that the breaking stress of individual bones could be calculated from simple bending tests. The breaking stress was a measure of the quality of the bone material. In rats, while changes in the calcium intake might affect the size and therefore the strength of the bones, they did not alter the quality; similarly, pituitary, thyroid, and parathyroid hormones and oestrogens had little or no effect on bone quality. In rickets, however, the breaking stress was diminished in parallel with the reduction in the ash content of the bone, but apparently neither the bone's inorganic nor its organic constituents were altered. Recent studies with Mrs. Oliver on experimental lathyrism in rats had shown that in this condition bone quality was reduced even when there was no corresponding

change in the quantity or quality of the inorganic component. At the end of this contribution Mr. I. S. SMILLIE asked why the breaking stress of a bone—for example, the neck of the femur—was reduced in old age. No answer to this conundrum could be found. One suggestion was that the explanation might lie in some variation in the connective tissue.

Dr. J. W. SMITH and Professor R. WALMSLEY (department of anatomy, St. Salvator's College) then discussed fatigue in bone. Dr. SMITH said that, while stress fracture from repeated strains during normal activity was a well-known clinical entity, previously it had never been proved experimentally that bone could be fractured in this way. He then proceeded to describe experiments in which stress fractures had been induced, illustrating in a film the apparatus used. He had found that the breaking stress was directly related to the elasticity of the bone being tested, and that the stress and static loads were the same for any given piece of bone. His experiments had been on dead bone, and so did not take into account any remodelling that might occur in the living subject.

Professor WALMSLEY took the matter a stage further by describing research he had carried out to correlate the elasticity of a bone with the collagen arrangement in its haversian systems. By means of stained sections he demonstrated that the collagen in a haversian system is disposed in alternate circular and longitudinal layers. He had taken a horse's radius, where the anterior cortex is under tension and the posterior cortex under compression, and calculated Young's modulus of elasticity for these two sections of the cortex. Section of the anterior surface of the bone, where the figure for the modulus was relatively high, showed the longitudinal fibres to be most marked, whereas section of the posterior cortex, which had a much lower modulus figure, showed the circular fibres to predominate. In the ensuing discussion Professor P. LACROIX asked if the sections had been examined under polarized light. Professor WALMSLEY said the findings were the same as those demonstrated by staining. The mineral content of bone was increased on the side under compression, he added.

Growth and Repair

These aspects of the subject were discussed both in the symposium itself, where Mr. J. A. GILLESPIE (department of surgery, Queen's College) reported on his studies on the effect of nervous influences on bone growth, and in the open postgraduate lecture given after the symposium by Professor P. LACROIX (department of anatomy, Louvain), this year's praelector in the faculty of medicine at St. Andrews. Mr. GILLESPIE's experiments had led him to believe, he said, that neither the peripheral nor the autonomic nerves exerted any trophic action on bone. Nor did changes in blood flow to the limb alter the rate of growth. In a paralysed limb the quantity, not the quality, of the bone was affected. The basic rate of bone growth was due, he said, to the inherent growth energy of the cells of the epiphyseal plate and inner layer of the periosteum, and this basic rate was increased by the stimulus of muscle action. In his view the degree of muscle paralysis in a limb was directly related to the subsequent shortening. If maximum use was made of a paralysed limb, the shortening would be reduced to a minimum. However, Mr. G. MITCHELL (Edinburgh), speaking on the basis of preliminary clinical observations, did not think the degree of paralysis in poliomyelitis could be related to the limb shortening. But he thought the paralysis of muscles whose origins were close to a rapidly growing epiphysis was an important factor in leading to serious shortening of a limb, and Miss M. FORRESTER-BROWN (Edinburgh) agreed with him, citing paralysis of the gastrocnemius as an example.

Professor LACROIX began by reviewing his experiments on the induction of bone growth. In normal epiphyseal cartilage, he said, a layer of subperiosteal cartilage was laid down,

SIR,—In his article "Intracranial Aneurysm: A New Method of Surgical Treatment," Mr. J. E. M. Dutton (*Journal*, September 8, p. 585) makes a number of statements in connexion with the material used that are difficult to understand and may prove misleading.

(1) "So far the self-curing acrylic, methyl-methacrylate, has been found most suitable." Methyl-methacrylate monomer will polymerize *spontaneously*, but so slowly as to be useless for the purpose indicated. The so-called "self-curing" acrylic resins contain not only methyl-methacrylate but also chemical activator systems designed to bring about rapid polymerization without the application of heat. The chemical activator systems employed in various brands of self-curing resins vary widely in their properties, including the heat generated during polymerization, the degree of polymerization achieved, and their effects on the tissues. It would seem important to specify the type of self-curing resin employed.

(2) "Polymerization is complete in 15 to 20 minutes, and by that time the material has set quite firm." In a simple mixture of methyl-methacrylate monomer and polymer a "gel" or "dough" will be formed as a result of solution of the polymer powder in the monomer liquid, but unless the temperature is raised above about 60° C. no significant polymerization will occur.² If the material used by Mr. Dutton has set quite firm after 15 to 20 minutes, then presumably one of the chemically activated preparations is being used. However, the firm set does not indicate completion of polymerization; even after several hours as much as 1% of monomer may remain. This may be of importance when irritant effects come to be considered. If the material used is one which depends for its polymerization on benzoyl peroxide in the polymer powder, the proportion of residual monomer is likely to be even greater if the powder has been autoclaved, as advocated.

(3) "An acrylic compound was selected because . . . there is no shrinkage during polymerization. . . ." During polymerization methyl-methacrylate monomer undergoes a reduction in volume of approximately 21%. Of course, if the monomer is mixed with polymer powder, shrinkage of the mixture will be less than with monomer alone. This shrinkage may be within acceptable limits for a particular purpose, but there cannot be "no shrinkage."

(4) ". . . and there is neither clinical nor experimental evidence yet of any adverse local reaction to its presence." If, as I suspect, Mr. Dutton is using one of the chemically activated "self-curing" resins, then there is extensive evidence of their injurious effects on the tissues when used in certain other situations, even if there is no evidence of damage when used intracranially.³⁻¹⁵—I am, etc.,

London, W.C.1.

IVOR R. H. KRAMER.

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The Abuse of Antibiotics

SIR,—I am, in Stratford-on-Avon, sometimes privileged to look after visitors from across the Atlantic. It is most striking how many of them carry a comprehensive range of antibiotics as part of their luggage—sometimes with and sometimes without instructions on their use. Occasionally this modern form of travelling first-aid box has been the parting gift of some "well-wishing" family physician. Moreover, I do in fact find it is common practice for visiting Americans to have taken some form of antibiotic, usually oxytetracycline—be it for bowel infection, sore throat, common cold, or "chill"—before they call upon my services.

This seems to me one of the worst forms of the abuse of antibiotics. I cannot recall one instance of an antibiotic being correctly used by these self-treated patients. Either it was not indicated (which is practically synonymous with contraindicated), or, when indicated, the patient has been scared of using an adequate dosage. This is of course further evidence of the extent of the abuse of antibiotics. I would like to hope, however, that in this instance it has not arisen from any misunderstanding of the medical services, of antibiotics in particular, that are available to these very welcome guests to our country.—I am, etc.,

Stratford-on-Avon.

E. O. EVANS.

Medical Education

SIR,—I should like to draw further attention to a small item briefly mentioned in the valuable educational number of the *Journal* (September 1, p. 523), in point to the availability of annual summer schools abroad for British medical students, a benefit at present made use of by only a very small minority.

I have myself recently returned from one such course in Denmark, and in retrospect can appreciate something of the value obtained in observing the methods and ideas of another nation tackling fundamentally similar problems in both medical education and practice. In fact, I might go so far as to say that the informal discussions, the contrasts and comparisons, and the criticism, both objective and subjective, which inevitably mature in such a climate must surely play an integral part in the training of the "educated, thinking man" which the First World Conference on Medical Education appears to have agreed as being the aim of a Utopian teaching system.

The Danes fully realize the value of international contact at student level: a traditional scarcity of dissection material, which there is no attempt to remedy, enforces an annual exodus from the medical schools of Copenhagen and Aarhus during the summer vacation to a number of the other principal European universities, many reaching our own shores. To the Dane this is in fact a very definite stage in his education. Perhaps planners of the schooling of generations here to come might take yet one more note for future reference.—I am, etc.,

Oxford.

D. M. HILL.

SIR,—In your issue of September 1 (p. 494) I find in the article by Dr. A. Morgan Jones the following statement: "In the days of pre-scientific medicine it was natural to regard anatomy as the basis of pathology and medicine. . . . Further, anatomy was the basis of the surgeon's training. . . . All this has changed, and physiological knowledge has become the basis of medical diagnosis and treatment and even of surgery." Furthermore, he states that inclusion of anatomy on its present scale in the medical curriculum "is a dreadful and stultifying waste of time for the average doctor."

I strongly disagree with this; for one thing, how can you get physiological results without the basic knowledge of the anatomy of the part being worked upon, and even the elementary knowledge of the whereabouts of the gland or organ it is desired to investigate? Another point, take a simple injury to the ankle. I cannot imagine approaching this without a knowledge of anatomy.—I am, etc.,

Virginia Water, Surrey.

V. C. CAMERON.

Preventive Medicine and the Medical Student

SIR,—May I draw special attention to Dr. C. M. Fletcher's excellent article on the teaching of social and preventive medicine, and especially to the heading "Diagnosis and Management of Social Factors in Disease" (*Journal*, September 1, p. 497)?

He asks, quoting Professor Leslie Banks, "Why is this patient here and how could his illness have been prevented?" This question has been in the minds of many for

years. In 1919 Sir James Mackenzie established the Institute for Clinical Research "to investigate disease before the occurrence of any structural change in any organ of the body." Basing my knowledge on the inspection of Army recruits, civil appointments and insurance cases, inspection of school- and pre-school children, and from my experience as resident M.O. in several hospitals and as G.P. and M.O.H., I wrote in 1936,¹ "The investigation of disease in its early stages is one of the most valuable factors in prevention."

The medical curriculum has often been under review and criticism, and Dr. A. Morgan Jones (p. 494) goes so far as to write: "It is probable that the whole structure of the medical course should be reorganized." My contention is that the curriculum does not deal with prevention as a definite and distinct part of the final examination. The result is that the medical student is turned out pathologically minded and has not been trained so as to imbue a preventive-minded conscience.

I have very definite views on this. The Certificate of Public Health came to an end because it was not applied to the training of the medical student and was taken up only by the few interested in prevention.² I have advocated, and repeat without apology, that preventive medicine as a distinct subject should form part of the final examination and thus be placed on an equal footing with medicine, surgery, and obstetrics. Dr. Fletcher, referring to the recommendations of the General Medical Council, states: "A specialist in of the social and preventive medicine should be a member of the examining board." This specialist naturally should be a selected medical officer of health as the person skilled and engaged in this work in his official capacity. I have advocated that a medical officer of health should be included on the staffs of consultants in all teaching hospitals. There is a great opportunity here for teaching social and preventive medicine.³ This has been backed up by the Guillebaud Committee. As the Diploma of Public Health is one of the higher qualifications I suggest it would be more in keeping with the special nature of the duties of the medical officer of health that the D.P.H. should be renamed Doctor of Public Health, and thus give the M.O.H. equal status to other specialists with higher qualifications in their specialty gained in postgraduate study.

I submit that future students must be trained to be competent to deal with the preservation of the health as well as the diseases of the family.—I am, etc.,

Southport.

S. T. BEGGS.

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Is Tonsillectomy Necessary?

SIR,—I am grateful to Dr. John C. Ryle (*Journal*, September 8, p. 603) for drawing my attention to M.R.C. Special Report No. 227.¹ Its contents are indeed relevant to the problem of tonsillectomy. I fear Dr. Ryle did not have time to read the whole document, for if he had he would have noticed that on page 124 is to be found not only the answer to my question but also so excellent and fair a summing up of the whole matter that I beg leave to quote it in full.

"Summarizing our experience set out above, we may say that there is no evidence whatever that wholesale tonsillectomy [my italics] results in a diminished incidence of the infections under discussion. The argument may be put forward that, if tonsillectomized boys and girls had not undergone the operation, they might have suffered more severely than they did, and the effect of the operation was to render them at least as resistant to infection as their unoperated companions. Since we have no means of knowing what would have happened in these circumstances, this argument is unanswerable. There is some slight indication that the incidence of rheumatism, otitis media, and mastoid disease is actually higher in the tonsillectomized group, but here again we do not know whether it might have been even higher in these individuals if tonsillectomy had not been performed.

"Hitherto we have been dealing with all the available data at our disposal, irrespective of when the operation was performed. It was considered advisable to examine in detail the experience

of 364 boys in whom the tonsils were removed during school life, and for whom we had sickness records before and after operation. The details are set out in Table LVIII.

"It will be seen that for the nasopharyngeal group of infections, these boys before operation had an attack rate which was 8.7% greater than the expected rate obtained from the age-distribution and rates of all boarding schools combined. After tonsillectomy, however, the attack rate for nasopharyngeal infection was actually 0.5% less than the expected rate. Taking all sickness into account with regard to time lost, we find that this group of boys before operation lost one and a half days more than the average, but after operation they lost a quarter of a day less than the expected number. There is little doubt that in these boys the results of tonsillectomy appear to have been successful particularly in causing a diminished attack rate of nasopharyngeal infection, but it must be remembered that probably the majority of these operations were performed on the advice of school medical officers who selected their cases with care.

"Few to-day would encourage the retention of diseased or obstructive tonsils, or would cast doubt on the real value of the operation in properly selected cases as demonstrated above; but it is a little difficult to believe that among the mass of tonsillectomies performed to-day (1938) all subjects for operation are selected with true discrimination, and one cannot avoid the conclusion that there is a tendency for the operation to be performed as a routine prophylactic ritual for no particular reason and with no particular result."

I can only add the observation the unnecessary tonsillectomy still seems to be unnecessary and that necessary tonsillectomy still seems to be necessary.—I am, etc.,

London, S.E.26.

JOHN BURKINSHAW.

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Gas Gangrene Risks

SIR,—Those who have had experience of war surgery will be critical of the views expressed by several correspondents blaming the presence of gas-forming organisms for the occurrence of gas gangrene in wounds. That this is not the direct cause has been proved repeatedly, since it is common to find such organisms in clinically healthy wounds. Simple facts are easily forgotten, but it will be calamitous if younger surgeons have to learn all over again the lessons of the last devastating war. The relation of pathogenic anaerobes to gas gangrene is straightforward: gas gangrene develops only in dead tissue. Hence the brilliant results following the teaching of Professor Trueta on correct wound excision, when war wounds remained clean after proper excision, even though wounds were teeming with these organisms.

Our theatres and tools should of course be as germ-free as possible, but even more important is the practice of correct surgical principles.—I am, etc.,

Swindon.

F. LOUIS.

Torsion of Spermatic Cord

SIR,—May I comment on recent papers and letters on the clinical features of torsion of the spermatic cord by Mr. J. A. Baty (*Journal*, May 5, p. 1014), Mr. R. Burkitt (*Journal*, August 11, p. 345), and Dr. D. G. Chambers (*Journal*, September 1, p. 552)? There seems to be some diversity of opinion, as stated or suggested by these authors, regarding the position of true testicular pain. Some years ago I demonstrated,¹ and I like to think logically and conclusively, that pain produced in the testis is invariably situated in the early embryonic position of the organ—about the level of the internal abdominal ring—and not in the scrotum. Why? A simple illusion, determined by anatomical structure and permanently fixed early in pre-natal life. Later migration by normal development—e.g., of testis, appendix, diaphragm, etc., or artificial displacement as in Aristotle's experiment (crossed fingers) and pedicle skin transplants—can neither destroy nor correct the illusion when the original innervation is maintained.

In this connexion (the common observation and fact that pain is frequently situated at a distance from the tissue in which it is produced or excited) one is somewhat surprised

and perturbed to note that in some medical schools (*not* St. Andrews) students still trot out McKenzie's theory—viscero-cutaneous reflex—as the explanation for these distant pains. One wonders who is responsible, physiologists or clinicians, for perpetuation of this illogical and fantastic view, which is akin to the widespread belief in ventriloquism. Both I should say are anatomical and physiological impossibilities, and deserve decent and honourable interment—R.I.P.

Mr. Burkitt, quoting O'Connor,² writes, "The condition [torsion of spermatic cord] is probably much commoner than is generally realized, most cases . . . never being diagnosed at all." This is probably true, the reason being, as suggested by Mr. Tom McNair, Edinburgh (personal communication), that the unknowledgeable clinician ignores the testis (and its cord) as a possible cause of low abdominal pain. Hence the removal of many normal appendices with no relief of symptoms. "Them's my sentiments" (W. M. Thackeray, *Vanity Fair*).—I am, etc.,

Dundee.

F. R. BROWN.

REFERENCES

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- ² O'Connor, V. J., *Surg. Gynec. Obstet.*, 1933, 57, 242.

Rare Type of Anonychia

SIR,—We should be most grateful for an introduction to any family showing the dominant, inherited abnormality illustrated in the accompanying photograph. This condition is not seriously disabling except on those rare occasions when it is associated with ectrodactyly.



We have been making genetical linkage studies on a Rotherham family with this form of anonychia and more material is now required, so we hope that any practitioner who may have noticed the condition will communicate with us at the Galton Laboratory, University College, London, W.C.1.—We are, etc.,

London, W.C.1.

SYLVIA D. LAWLER.
J. H. RENWICK.

Inhaled Foreign Bodies

SIR,—Mr. C. L. N. Robinson and Dr. W. W. Mushin (*Journal*, August 11, p. 324) have rightly drawn attention to this important subject. As they say, foreign bodies are liable to inhalation, particularly by young children.

In 1954 I published an account in the *Journal* (January 16, 1954, p. 125) of three children who had inhaled radio-translucent foreign bodies. In this account and in an annotation on the subject in the same issue (p. 144) the importance of bronchoscopy in the search for foreign bodies was stressed. In the last two years I have seen five more children who had inhaled radiotranslucent foreign bodies. In three of these the initial episode had been forgotten. All five presented with respiratory disorders ranging from "a slight wheeze" to signs of advanced lung sepsis that had not responded to chemotherapy. In one the chest x-ray was normal, though full inspiratory and expiratory films were impossible owing to the child's age. All had inhaled

nuts, which were removed at bronchoscopy. In four they were peanuts, which seem to have a peculiar fascination for children and are presumably easily inhaled on account of their small size.

If a child is alleged to have "swallowed something down the wrong way" or, with something in its mouth, to have choked, gagged, or coughed, no effort should be spared to locate a foreign body by all methods, including bronchoscopy. Similarly, if a respiratory disorder in a child has not responded to usual treatment, even if a parent cannot remember any choking episode, the possible presence of a foreign body should not be overlooked.—I am, etc.,

Derby.

BERNARD M. LAURANCE.

Shoe-fitting

SIR,—While agreeing with Dr. W. G. Booth (August 25, p. 479) on the uselessness of the shoe-fitting fluoroscope, the need for trained shoe-fitters, and the high incidence of hallux valgus in teen-age girls, I cannot agree that this deformity is caused primarily by bad fitting of footwear. Bad fitting means the selection of the wrong footwear and therefore implies that correct footwear is available. This is not the case. Hallux valgus is caused by wearing wrongly designed footwear—footwear that causes angulation of the hallux at the metatarso-phalangeal joint.

If a 16-year-old girl with undeformed feet stands erect with her bare feet together, the big toes are in contact all along their inner border. When correctly shod the toes should be accommodated in exactly the same position. Footwear that cause the toes to point outwards cause deformity. My own work¹ has shown that slight deviations from the normal are important and can cause deformity. These principles of design are accepted by all the leading manufacturers of children's footwear. Shoes with straight inner borders are available in many makes in small sizes, but they are very rare in the late teen-age styles. One well-known brand of children's footwear shows a variation of nearly twenty degrees between the early and late teen-age styles, but all carry the same trade-mark and sales publicity. Correctly designed footwear for the adolescent and the adult is virtually unobtainable.

Why then do manufacturers depart from the principles of good design in teen-age styles? No reason is given, but, as the trend is most marked in girls' footwear, it seems that preparation for fashion footwear plays a large part. Fashion footwear is the trade's best money-maker, and this type of footwear is designed without regard for the shape or function of the foot and invariably deforms. For example, "low-cut shoes of 'court' type are necessarily deforming, for the pointed toe is essential to its security."

To-day 75% of the girls leaving school have acquired hallux valgus because their shoes are badly designed and could never be correctly fitted. All hallux valgus is preventable, but first we must secure an adequate supply of correctly designed footwear, for until then neither shoe-fitter nor parent can play their part.—I am, etc.,

London, S.E.15.

CHARLES A. PRATT.

REFERENCES

- ¹ Pratt, C. A., *Your Children's Feet*, 1951, Watts and Co.
- ² Haines, R. W., and McDougall, A., *Lancet*, 1954, 2, 1311.

Recurrence of Tetanus

SIR,—A Tamil girl, aged 3 years, was admitted to hospital on November 4, 1955, with a history of inability to open her mouth for three days, and generalized spasms, which had occurred several times a day for two days. There was a history of discharge from the right ear for one week.

On examination there was trismus, a risus sardonicus, and opisthotonos. No abnormality was found in the heart or lungs. The abdomen was tense. A diagnosis of tetanus was made and an intramuscular injection of 100,000 international units (1950) of tetanus antitoxin given on admission. Sedation was accomplished by the use of rectal paraldehyde and chloral by mouth. Elixir mephenezin and penicillin

were also given, while chloramphenicol drops were instilled into the ear. The discharge from the ear was negative for *Cl. tetani* on culture. The antitoxin was repeated in a dose of 30,000 units once daily for three days, commencing the day after admission. The child was discharged after seventeen days.

She was readmitted on March 8, 1956, with a history of generalized spasms, with inability to open her mouth, from the previous evening. The mother also mentioned that a discharge from the child's ear had been noticed three days previously. She had been in good health previous to this. On examination all the signs of tetanus were found. No discharge from the ears was seen. 100,000 units of antitoxin was given on admission, and 40,000 on the day following. In addition the usual treatment was given. The discharge from the ear was negative for *Cl. tetani* on culture. The child was discharged 20 days after admission. The child was seen again on August 28, 1956. She was found to be in good health, with no residual stiffness.

I must thank Dr. Stanley Silva for permission to report this case.—I am, etc.,

Colombo.

TREVOR PHILLIPS.

Swaphook Tenotomy

SIR,—I was asked to visit a lady who had walked into a woodshed and trod on a sickle. On examination I noticed a neatly placed half-inch (1.3-cm.) transverse cut one inch (2.5 cm.) above the back of the os calcis. The calf muscles on the same side looked preternaturally athletic, while at the classical point where Mrs. Achilles had grabbed her infant son my finger and thumb could be opposed by nothing more substantial than two layers of skin; and through this skin, by pushing it forward, one could palpate quite easily the back of the ankle-joint. Needless to add, my patient was unable to plantar-flex her foot. She received expert surgical treatment (not from me, of course), but it took all of six months to undo the damage done by that swaphook tenotomy. Now, however, I am glad to write she has made a complete recovery and is still on my list (N.H.S.).—I am, etc.,

Buxted, Sussex.

W. R. E. HARRISON.

Soya Flour in Infantile Eczema

SIR,—Dr. B. Isserlin's letter (*Journal*, September 1, p. 553) raises the question of an easy source of supply of soya flour. Soya Foods Ltd. supply a full-fat processed soya flour under the name "soyolk," which can be easily converted into soya bean milk. "One of the best methods to make soya milk from soyolk is to scald in boiling water in the proportion of 1 cup of soyolk to 5 cups of water, cool and strain through fine cheese cloth. The white opaque liquid is soya bean milk" (extract from leaflet).—I am, etc.,

London, N.W.10.

FELIX S. BESSER.

Old Students of University College London

SIR,—I should be grateful if you would grant me a little space in your columns to try and make contact with old students of University College London, of whom we calculate there must be some 30,000 either in this country or overseas. Unfortunately, we have got records of the careers and up-to-date addresses of only a very small proportion of this number. The college authorities are anxious to get in touch with old students, to invite them when possible to appropriate college functions, and on occasion to seek their advice. It is only when some honour, public appearance, or other matter is recorded in the press that the college can add to its records of the individual concerned.

The college authorities hope that old students will write, even just a postcard, to the secretary of University College London, Gower Street, London, W.C.1, giving their addresses, dates at college, and subjects studied, and will keep the secretary informed of changes of address.—I am, etc.,

London, W.C.1.

IFOR EVANS.

Obituary

S. D. RHIND, M.C., M.B., F.R.C.S., F.R.A.C.S.

Mr. S. D. Rhind, consulting surgeon to the Wellington Hospital, New Zealand, and a former editor of the *New Zealand Medical Journal*, died recently after an illness of several months' duration. He was 62 years of age.

Sydney Devenish Rhind was born at Christchurch in 1894, but was educated in England. From Berkhamsted School he went on to St. George's Hospital, qualifying M.R.C.S., L.R.C.P. in 1916. He entered the New Zealand Medical Corps immediately after qualification, and served with the 1st New Zealand Expeditionary Force. In 1918 he was awarded the Military Cross. After demobilization he returned to St. George's, where he held a number of house appointments, and graduated M.B., B.S. from London University in 1922. In the following year he was admitted a Fellow of the Royal College of Surgeons of England. He was elected a Fellow of the Royal Australasian College of Surgeons in 1937.

In 1924 Rhind went back to New Zealand and became assistant surgeon at the Wellington Hospital; later he was appointed full surgeon and ultimately consulting surgeon. For many years he was senior surgeon of the hospital, where he took a particular interest in the teaching of final-year students. He was appointed editor of the *New Zealand Medical Journal* in 1934, in succession to Sir James Elliott, under whom he had been assistant editor for three years. He occupied the editorial chair until 1939, when Dr. J. O. Mercer became editor. Rhind was an energetic editor and was responsible for a number of improvements in the *New Zealand Medical Journal* in the matter of both content and format. A member of the B.M.A. for nearly forty years, he was chairman of the Wellington Division in 1937-8; honorary secretary of the New Zealand Branch from 1940 to 1944; president of the Branch from 1945 to 1947; and in 1946 he returned to England to attend the Annual Representative Meeting as representative of the Branch. He married Miss Vera Anderson in 1924 and had two daughters.

Dr. J. R. SLESSOR died with tragic and startling suddenness on June 3 at the age of 48. He was taken ill while attending a patient and died within a few hours. The elder son of Dr. R. A. Slessor, with whom he was in partnership, James Runcieman Slessor was born at Fraserburgh on March 2, 1908, and received his medical training at Aberdeen University, where he graduated M.B., Ch.B. in 1930. After holding resident appointments at the Royal Cornwall Infirmary, Truro, he became a ship surgeon for about two years. Before settling in practice with his father at Fraserburgh in 1938, he worked for several years as a locumtenent in carefully selected practices in many different parts of England and Scotland. This and his sea experiences were undoubtedly to his great advantage, for very few had such a full knowledge of cities and men as he had. During the second world war he served with the R.A.F., mostly overseas in North Africa and Malta, holding the rank of squadron leader. After his return, besides being engaged in a very busy practice, he took a great interest in the affairs of his native town, being a member of the local school management committee. A keen sportsman, he was a past captain of the local golf club. From the beginning of the National Health Service he was a member and vice-chairman of North Aberdeenshire hospitals board of management. Greatly interested in the welfare of ex-Service men, the work

he did for the Fraserburgh branch of the British Legion, of which he was chairman, was monumental. These were not all the interests of his very full and helpful life, and certain of his medical neighbours will miss, but remember with gratitude, his wonderful companionship on several long motor tours abroad. Dr. Slessor was a widower—his wife, a daughter of a Birmingham medical practitioner having died in 1948—and he is survived by a son and two daughters.—J. C. W.

Dr. H. C. WRIGHT, who was in general practice at Newcastle-upon-Tyne for many years, died on August 28 at the age of 68. Henry Cecil Wright was born on February 10, 1888, and studied medicine at Manchester University, qualifying L.M.S.S.A. in 1913. After qualification he held resident appointments in hospitals in Macclesfield and elsewhere. Shortly after the first world war he settled in practice in Newcastle-upon-Tyne and was for many years in partnership with the late Dr. J. E. Basham. He soon built up a large practice and became very popular, for he was a good doctor of the old school and inspired confidence in his patients. One of the kindest and friendliest of men, he had a keen sense of humour and a genial, disarming smile. He was an active member of the British Medical Association and was elected to serve as chairman of the Newcastle Division in 1932-3. He was also an active member and secretary of the Medical Institute in Newcastle for many years. Dr. Wright took a great interest in football and cricket, especially the latter, which he played well himself in his younger days. Latterly he had taken up bowls. His passing has left a void which will be hard to fill and he will be missed by a host of friends and patients.—J. H. B.

Dr. JOHN L. GAMMIE, junior depute medical officer of health for the City of Edinburgh, died suddenly on August 30 at the age of 52. He studied medicine at Aberdeen University, graduating M.B., Ch.B. in 1926 and two years later obtaining the D.P.H. with distinction. After graduation he held house appointments at Aberdeen Royal Infirmary, Woodend Hospital, Aberdeen, and the Aberdeen City Fever Hospital, returning to Woodend Hospital in 1930 as senior resident medical officer after a period in general practice in Aberdeenshire. He joined the Edinburgh public health department in 1932 as senior medical officer and depute tuberculosis officer, and was appointed junior depute medical officer of health for the city in 1937. On the outbreak of the second world war he willingly undertook the duties of medical officer in charge of the Edinburgh civil defence casualty service. He was appointed, in 1946, a part-time lecturer in the department of public health and social medicine of the University of Edinburgh, and he also held the post of lecturer in health education to the Moray House Training College for Teachers. As depute medical officer of health he made a particular study of environmental hygiene and infectious disease control and was frequently consulted by family doctors throughout the city.

H. E. S. writes: The sudden death of John Gammie has come as a rude shock to his many friends. He was a man with outstanding gifts of mind, and his wide knowledge of medicine and of affairs in general, together with a pawky Aberdonian wit, made him a clear, informative, and interesting lecturer and speaker and a most agreeable and entertaining companion and colleague. To those who knew him best, however, he will always be remembered as a loyal friend who inspired feelings of affection and regard of an unusual degree and depth. His personal qualities were not always revealed on short acquaintance, but all who worked with him were quick to recognize his generous nature and kindness of heart. Not many, however, knew of the help and service he gave quietly and unobtrusively to those who came to him in trouble or difficulty. For them he never spared himself in time, thought, or material assistance, and not a few present in the large congregation gathered to pay their last respects must have looked back with deep gratitude to the help and guidance given them by John Gammie when things seemed dark and hopeless.

Two colleagues write: With the untimely death of John Gammie, Edinburgh has lost a well-known personality and his colleagues a good comrade. At first meeting John Gammie's brusque, abrupt manner may have been something of a barrier to closer acquaintance, but those who came into more frequent contact with him learnt to appreciate what lay under the surface—kindliness, friendliness, a sense of humour, and a willingness to help. In his professional work he applied to every problem clarity of insight and common sense, and though he was ready to listen to others his decisions were his own and he carried them out in a practical way with his feet firmly on the ground. As a university teacher he was a clear and interesting lecturer and was equally effective with a lay audience, especially an audience of young people, for John Gammie had the "common touch." His knowledge and experience were great, both in the clinical and in the administrative fields of public health, and his interest was not confined to his profession alone. He had a considerable appreciation of the arts, particularly of literature, and his gift of quotation from the poets often surprised his acquaintances. His colleagues will miss him, and their sympathy goes out in full measure to his wife and young son.

Medico-Legal

DEATH AFTER STABBING

HOSPITAL TREATMENT VINDICATED

A committee of inquiry has found that "exemplary" treatment was given at the Hull Royal Infirmary to Walter Beaumont, aged 27, after he had been stabbed by James Clinton, aged 21, a member of the U.S. Air Force. The Leeds Regional Hospital Board has accepted the committee's report and expressed full confidence in the Infirmary's medical and nursing staff.

On July 25 Clinton was convicted of the murder of Beaumont by stabbing him in the stomach. On August 21 the Court of Criminal Appeal quashed the conviction after exercising its power, rarely used, to hear fresh evidence.¹ Between the conviction and the appeal a doctor who had observed Beaumont's treatment in hospital communicated to Clinton's legal advisers his view that the bronchopneumonia from which Beaumont died resulted not from the stab wound but from the administration of tetracycline after the patient had shown himself to be intolerant to it, and from the injection of excessive amounts of fluid. At the appeal Dr. Keith Simpson, pathologist, London, and Mr. Guy Blackburn, surgeon, London, gave evidence in support of this view.

The Leeds Regional Hospital Board therefore set up a committee of inquiry, with three independent medical assessors, to inquire into Beaumont's case. The assessors were Professor J. H. Biggart, professor of pathology and dean of the faculty of medicine, Queen's University of Belfast, Professor J. Bruce, regius professor of clinical surgery, University of Edinburgh, and Dr. F. M. Parsons, assistant director of the Medical Research Council's surgical research unit, General Infirmary, Leeds. The following members of the medical staff from the Hull Royal Infirmary attended when the committee met on September 5: Mr. P. Walton, consultant surgeon, Mr. M. A. Morkos, surgical registrar, and Dr. A. J. Shillitoe, consultant pathologist.

The report of the medical assessors is as follows:

Report of Assessors

"At the invitation of the Leeds Regional Hospital Board, we attended an inquiry into the management and the circumstances connected with the death of Beaumont in Hull Infirmary on May 12, 1956. We were afforded every opportunity of perusing the case records, and statements of those

¹ *British Medical Journal*, September 1, p. 556.

concerned in the care of this patient, and of discussing all aspects of this patient's treatment and death with the appropriate medical attendants. We were greatly impressed by the frankness of those discussions, and the readiness with which all our questions were carefully and scrupulously answered. We also had the advantage of examining the material and the histological preparations pertaining to the autopsy. We consider, therefore, that all the relevant evidence was placed at our disposal.

"Before enunciating the observations we wish to make, we want to place on record our opinion that Beaumont's treatment at Hull Infirmary was exemplary, and in particular, we wish to pay a tribute to the care and devotion shown by the surgical registrar, Mr. Morkos, who, at Mr. Walton's request, moved into residence in the hospital and stayed there, scarcely leaving the patient's side from the time his post-operative state took an obviously serious course.

"From our scrutiny of the post-mortem material and of the case records, we are able to make the following observations:

"(1) There is histological evidence of severe damage to the kidney tubules (lower nephron nephrosis), which could only have originated soon after his injury, and was sufficient to have resulted in death.

"(2) The autopsy showed extensive pulmonary lesions. These were septic in type, and vascular and perivascular in situation, indicating that they had resulted from the transport of small infected clots. The lesions contained coccal organisms, and there is no evidence of the presence of fungi or yeasts such as are sometimes seen in patients treated with antibiotics.

"(3) Early meningitis was demonstrable at autopsy, and we regard this as further evidence of a blood-borne infection.

"(4) Death was hastened by the development of a catastrophic post-operative enteritis. We have carefully considered the relationship of this to the administration of terramycin. We are aware that this complication sometimes arises in patients treated with terramycin and other broad spectrum antibiotics, but in these cases the cause of enteritis can be established as due to antibiotic-resistant staphylococci rather than to any inherently poisonous property of the drugs. In the present case, the culture of the stools failed to yield staphylococci, and we must therefore regard the cause of the enteritis as an open question, since a similar and fulminating enteritis sometimes occurs after operations, especially on the abdomen, without any antibiotic therapy. In one view, the latter type of post-operative enteritis is the sequel to a period of low blood pressure, and the occurrence of hypotensive lesions in the kidney lends support to such a possible explanation in this case.

"(5) The use of terramycin initially in Beaumont's case was in our opinion not incorrect, and there is good evidence of its value in the treatment of peritonitis. Its withdrawal at the onset of diarrhoea was correct. By this time, the patient had developed a fulminating gastro-enteritis as well as chest lesions, and these did not respond to penicillin. It was possibly unwise of the resident surgical officer to resort again to terramycin; but since there was reasonable doubt about the cause of the enteritis, and there was reasonable doubt about the cause of the enteritis, and since the patient was gravely ill and febrile despite the administration of penicillin, the renewal of terramycin therapy was not stration of penicillin, the renewal of terramycin therapy was not unreasonable and certainly not blameworthy. In any event, the small quantity of terramycin which was then administered had no influence of any kind on the outcome of the case. We believe, in fact, that before the second course was started, the patient's state was irreversible.

"(6) It seems to us that the management of the fluid-electrolyte state should be considered in relation to three periods of the man's illness.

(a) In the pre-operative and operative period, the management of the fluid-electrolyte situation in our opinion was adequate.

(b) In the early post-operative phase, the control of the fluid therapy was appropriate.

(c) In the late post-operative period, following the development of severe enteritis complicated by serious renal impairment and by lung infection, a highly complicated biochemical disturbance developed. The fluid loss from the bowel was enormous and resulted in profound dehydration, one evidence of which, apart from the careful clinical observations of Mr. Morkos, was the concentration of haemoglobin in the blood (114%). As soon as possible Mr. Morkos enlisted the aid of the hospital biochemist, who thereafter performed daily estimations on which the day-to-day administration of fluids was based. The amount of fluid administered may appear

large to those unfamiliar with the management of severe gastro-enteritis or cholera, which this man's diarrhoea resembled. It was perhaps fortunate that Mr. Morkos had had some experience of the treatment of cholera, and had the courage to apply this experience in the management of this extremely difficult case. That the amount of fluid given was in no way excessive is borne out by the absence at autopsy of the usual findings of overhydration, as, for example, oedema of the lungs, fluid in the serous cavities, or generalized dropsy.

"It is our impression that Beaumont was on the point of death on the fifth post-operative day when, in view of the gravity of his condition, a surgeon of Mr. Walton's experience found it necessary to advise the police authorities to take a dying deposition. The fact that he survived for a further three days was due, in our opinion, to the energetic and competent measures adopted by the staff of the hospital. In the event, and in the light of all the evidence, however, this man's life was unsavable and his death was not in any way attributable to the treatment he received in hospital."

Full Vindication

The medical members of the Board present, after hearing the report of the assessors, endorsed it without reservation. In the opinion of the members present at the inquiry the report provided a full vindication of the staff of the Hull Royal Infirmary, and they requested that the following should be made known to the Board:

"(1) Whilst a patient at the Hull Royal Infirmary, the deceased man was treated by a medical team consisting of a consultant surgeon, a surgical registrar, a resident surgical officer, and a house-man. The direct responsibility for the patient at all times vested in the consultant surgeon. Three days before the patient died, the surgical registrar, a Fellow of the Royal College of Surgeons, voluntarily agreed to leave his home and family in Hull and to take up residence at the Infirmary in order that he could give the most constant and close attention to the patient, thus removing all onus of responsibility from the more junior members of the medical team.

"(2) In addition to the normal nursing staff on duty in the ward a special nurse was assigned to the patient, who was under constant nursing attention up to the time of his death."

Vital Statistics

Week Ending September 8

The notifications of infectious diseases in England and Wales during the week included: scarlet fever 253, whooping-cough 2,315, diphtheria 4, measles 1,092, acute pneumonia 171, acute poliomyelitis 105, dysentery 330, paratyphoid fever 8, and typhoid fever 15.

Infectious Diseases

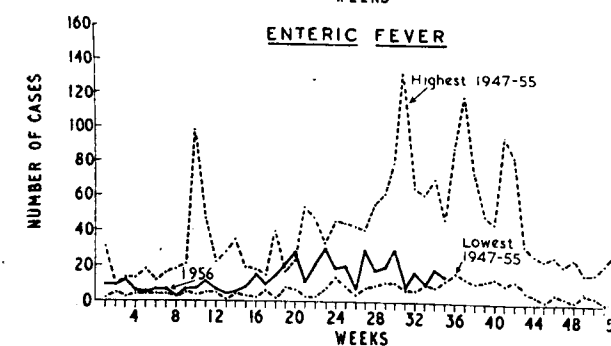
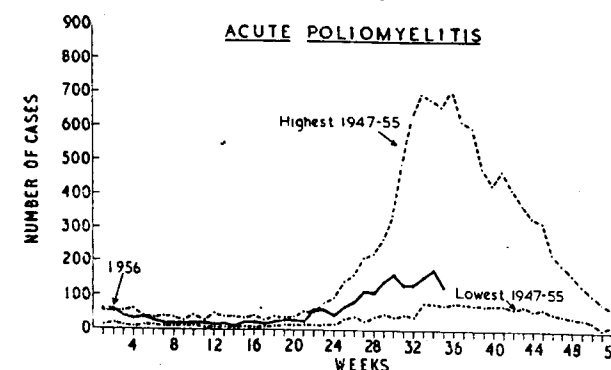
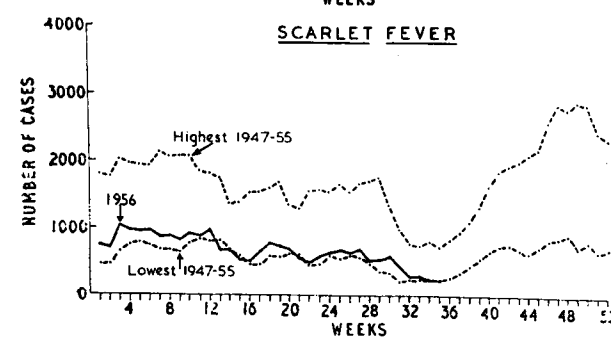
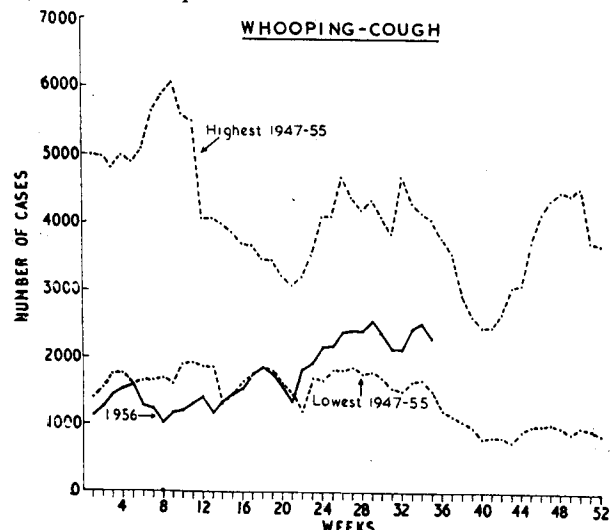
A further fall was reported in the incidence of infectious diseases in England and Wales during the week ending September 1. The decreases in the number of notifications included 484 for measles, from 1,866 to 1,382, 233 for whooping-cough, from 2,515 to 2,282, 75 for dysentery, from 379 to 304, 53 for acute poliomyelitis, from 177 to 124, and 27 for food-poisoning, from 247 to 220.

The largest falls in the incidence of measles were 56 in Staffordshire, from 76 to 20, 46 in Cornwall, from 111 to 65, and 44 in Norfolk, from 71 to 27. The largest decrease in the incidence of whooping-cough was 34 in Durham, from 110 to 76. Five cases of diphtheria were notified, being 4 more than in the preceding week. 246 cases of scarlet fever were notified, 1 more than in the preceding week, and there were no large fluctuations in the local returns.

The number of notifications of dysentery was the lowest for two years. The largest returns were Lancashire 59 (Liverpool C.B. 16), London 33, Yorkshire West Riding 33 (Leeds C.B. 14), and Middlesex 20.

Graphs of Infectious Diseases

The graphs below show the uncorrected numbers of cases of certain diseases notified weekly in England and Wales. Highest and lowest figures reported in each week during the nine years 1947-55 are shown thus -----, the figures for 1956 thus ———. Except for the curves showing notifications in 1956, the graphs were prepared at the Department of Medical Statistics and Epidemiology, London School of Hygiene and Tropical Medicine.



INFECTIOUS DISEASES AND VITAL STATISTICS

Summary for British Isles for week ending September 1 (No. 35) and corresponding week 1955.

Figures of cases are for the countries shown and London administrative county. Figures of deaths and births are for the 160 great towns in England and Wales (London included), London administrative county, the 17 principal towns in Scotland, the 10 principal towns in Northern Ireland, and the 14 principal towns in Eire.

A blank space denotes disease not notifiable or no return available. The table is based on information supplied by the Registrars-General of England and Wales, Scotland, N. Ireland, and Eire, the Ministry of Health and Local Government of N. Ireland, and the Department of Health of Eire.

CASES in Countries and London	1956					1955				
	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire
Diphtheria ..	5	1	2	0	2	6	0	3	0	
Dysentery ..	304	33	152	8	1	400	53	240	11	4
Encephalitis, acute	1	0		0		4	2		0	
Enteric fever:										
Typhoid ..	9	2	0	0	6			0	0	
Paratyphoid ..	6	0	4 (B)	2	1 (B)	34	10	3	3	
Food-poisoning ..	220	13		0		560	58		0	
Infective enteritis or diarrhoea under 2 years ..					12				38	161
Measles* ..	1,382	172	53	19	50	2,618	58	23	17	27
Meningococcal infection ..	26	1	13	1	1	21	1	9	0	
Ophthalmia neonatorum ..	21	0	5	0		36	2	0	1	
Pneumonia† ..	175	6	126	1		179	6	91	3	
Poliomyelitis, acute:										
Paralytic ..	53	4				206	28			
Non-paralytic ..	71	4	11	0	23	192	26		53	0
Puerperal fever§ ..	185	34	12	1		216	38	13	0	
Scarlet fever ..	246	17	57	12	12	228	20	48	10	12
Tuberculosis:										
Respiratory ..	481	51	102	17		599	60	133	17	
Non-respiratory ..	72	7	18	7		76	6	17	3	
Whooping-cough ..	2,282	190	345	28	31	1,511	63	67	109	76

DEATHS in Great Towns	1956					1955				
	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire
Diphtheria ..	0	0	0	0	0	0	0	0	0	1
Dysentery ..	0	0	1	0		1	1		0	
Encephalitis, acute		0			0		0			0
Enteric fever ..	0	0	0	0		1	0	1	0	
Infective enteritis or diarrhoea under 2 years ..	3	0	0	0	1	3	0	2	0	2
Influenza ..	5	0	2	0	0	4	0	0	0	0
Measles ..	0	0	0	0	0	0	0	0	0	0
Meningococcal infection ..		1	0				0	0		
Pneumonia ..	144	24	10	8	4	147	19	6	5	0
Poliomyelitis, acute	2	0			0	6	2			0
Scarlet fever ..		0	0	0	0		0	0	0	0
Tuberculosis:										
Respiratory ..	48	3	3	2	2	57	7	4	3	1
Non-respiratory ..		0	0	0	0		2	0	1	1
Whooping-cough ..	0	0	0	0	0	0	0	0	0	0
Deaths 0-1 year ..	182	26	25	2	6	190	27	28	4	9
Deaths (excluding stillbirths) ..	4,369	631	511	92	152	4,112	574	446	67	131
LIVE BIRTHS ..	7,307	1042	867	198	360	7,044	1049	807	252	320
STILLBIRTHS ..	216	38	16			172	16	31		

* Measles not notifiable in Scotland, whence returns are approximate.
† Includes primary and influenzal pneumonia.
§ Includes puerperal pyrexia.

Medical News

Melanocyte-stimulating Hormone.—In a letter to the September 5 issue of the *Journal of the American Chemical Society* Professor C. H. LI and his colleagues at the hormone research laboratory at California University report the isolation of pure melanocyte-stimulating hormone (intermedin) from the posterior lobe of pigs' pituitary glands. They also report the hormone's structural formula: it is a peptide consisting of 18 amino-acids, with a minimum molecular weight of 2,177. In their formula, Professor Li and his colleagues point out, one sequence of seven amino-acids in it "also occurs, identically, in all the corticotrophins that have been studied hitherto." This, they suggest, in all probability explains the intrinsic melanocyte-stimulating activity of pure corticotrophin preparations. In the corticotrophin molecule, they continue, "this central sequence apparently acquires, by virtue of a different specific order of amino-acids on each side of it, an adrenal-stimulating activity as well."

25th Anniversary at Welsh National School of Medicine.—Next month the Welsh National School of Medicine is celebrating the 25th anniversary of the granting of its charter in 1931. This constituted the Welsh National School of Medicine, in its present form, as the clinical school of the University of Wales. On October 12 Professor JETHRO GOUGH, professor of pathology in the School and director of the Institute of Pathology, himself a past student of the School, will deliver the opening address of the session to the students. This is a break with tradition to mark the occasion, as the speaker is usually a visitor. In the evening there will be an anniversary dinner at the City Hall. On October 12 and 13 all the departments of the School and the preclinical departments at University College will be open to past students and visitors. Special exhibitions are being arranged in the departments. If any past students of the Welsh National School of Medicine wish to attend the dinner, and have not so far received an invitation, they should communicate at once with the Secretary of the School, Mr. F. DODSWORTH, at 34, Newport Road, Cardiff.

"Student's Guide to London."—The National Union of Students has produced a first-rate guide for the 10,000 new students arriving in London this year. A limited number of copies are available to others, at 2s. net, from the N.U.S., 3, Endsleigh Street, London, W.C.1. The guide gives advice on such practical topics as lodgings and travelling in London, how to make the money go round, vacation work, and where to find inexpensive food and entertainment, the latter ranging from a visit to the House of Commons, sport, or the theatre, to jazz and drinking clubs. Much else of value to the student—and his elders—is included, both serious and gay. Thanks to the generous support of advertisers, the guide is free to the new students for whom it is primarily intended.

Cruelty to Children.—The scale of operation in Britain of the National Society for the Prevention of Cruelty to the Children may not be generally appreciated. During the year ended February 29, 1956, the society dealt with 36,697 cases involving 98,277 children, of whom about 43% were under school age. The types of case were: neglect (22,097), assault or ill-treatment (3,624), moral danger and immoral offences (805), "beyond control" (524), abandonment (67), "exposure or causing to beg" (47), unregistered foster children (39); in addition aid or advice was sought in 9,494 cases. The society relatively seldom prosecuted: only 840 cases were prosecuted or brought before Juvenile Courts, whereas nearly 35,000 cases were dealt with by warning or advice. In its annual report the society draws attention to two problems of particular importance: the failure to report known cases, and the widespread existence of mental cruelty to children. "In almost every bad case which we handle,"

states the society, "it is borne in upon us that someone must have known what was happening but failed to speak and so connived at the continuance of sufferings which could have been prevented. To meet this worrying problem we proclaim as widely as possible that the society never divulges the names of its informants unless malice is proved." Mental cruelty is stated to pose probably the greatest current problem confronting those working for the happiness and welfare of children. Anyone knowing of a child who is being ill-used or neglected; or who is being denied necessary medical treatment through the negligence of its parents; or of a parent who is worried about any matter concerning his or her children and needs advice, is asked by the society to communicate with the director, N.S.P.C.C., Victory House, Leicester Square, London, W.C.2 (Telephone: Gerrard 2774), or with any of the society's local offices. All further steps are then taken by the society.

Queen's University, Belfast.—Dr. J. G. GIBSON, senior lecturer in psychiatry at the London University Institute of Psychiatry, has been appointed to the newly created Chair of Mental Health at Queen's University, Belfast. Dr. Gibson graduated M.B., B.Ch. at Belfast in 1942, proceeding M.D. in 1947. He obtained the M.R.C.P. (London) in 1949, and the D.P.M. (England) in 1954. Among his appointments he has held posts as assistant resident in psychiatry at the Massachusetts General Hospital, Boston, and teaching fellow in psychiatry at the Harvard Medical School. Dr. Gibson is also honorary consultant at the Bethlem Royal and Maudsley Hospitals. Dr. I. J. CARRÉ, medical registrar at the Children's Hospital, Birmingham, has been appointed to a lectureship in child health at Queen's University.

Chair of Pathology at Dalhousie.—Dr. W. A. TAYLOR, formerly lecturer in the department of pathology at Glasgow University, has been appointed to the Chair of Pathology at Dalhousie University, Halifax, Nova Scotia, and director of the pathology division of the Nova Scotia Department of Public Health. After graduating B.Sc. at Glasgow University with first-class honours in physiology in 1942, Dr. Taylor was elected to a Rockefeller studentship in America. On his way there he was torpedoed off Newfoundland and set ashore by a corvette at Halifax. In America he spent a year at Stanford University Medical School, San Francisco, and two years at Cornell University, New York. On his return to Glasgow in 1945 he graduated in medicine, and joined the staff of the university pathology department at the Western Infirmary, where he remained until March, 1955, when he left to become associate professor at Dalhousie.

Contact with Poland.—At the request of the Polish Ministry of Health the British Council has arranged for Sir ROBERT MACINTOSH, Nuffield Professor of Anaesthetics at Oxford, and Professor IAN AIRD, director of the surgical unit at the Postgraduate Medical School of London, to visit Poland next month. This is the first visit of its kind to Poland for some years. Sir Robert Macintosh will arrive there on October 6, after a three-weeks visit to Moscow at the invitation of the Medical Academy and the Soviet Ministry of Health, to be the guest of the Polish College of Surgeons until October 18. He will be joined by Professor Aird on October 19, and they will then lecture for ten days in Warsaw. An exhibition of British medical books and periodicals will be shown in Warsaw during their visit.

W.H.O. Regional Director for Europe.—Dr. P. J. J. VAN DE CALSEYDE, director-general of health at the Belgian Ministry of Health, was nominated by the World Health Organization's regional committee for Europe on September 12 for the office of regional director for Europe. This post fell vacant on the death of Dr. NORMAN D. BEGG last May.

Good-bye to the Sanitary Inspector.—For the last time sanitary inspectors met this week at their association's annual conference, this year at Bournemouth, under their old title.

By the Sanitary Inspectors (Change of Designation) Act, 1956, which took effect last month, their title has been changed to Public Health Inspector.

Memorial to James Bridie.—At the Glasgow Citizens' Theatre on September 17 Mr. J. B. PRIESTLEY unveiled a bronze plaque in memory of JAMES BRIDIE (Dr. O. H. MAJOR), the Glasgow physician and playwright, who founded the theatre. The ceremony was presided over by Dr. T. J. HONEYMAN, and the playwright's son, Dr. RONALD MAJOR, also a physician in Glasgow, proposed the vote of thanks.

Ciba Foundation.—Sir RUSSELL BRAIN, President of the Royal College of Physicians, has been appointed a trustee of the Ciba Foundation.

Visiting Professor at Birmingham.—Professor WALTER BAUER, Sterling professor of clinical medicine at Harvard, and physician-in-chief at the Massachusetts General Hospital, will be visiting professor of medicine at Birmingham University during October.

Dr. Nora Wattie, principal child welfare medical officer of Glasgow Corporation, was elected president of the Royal Sanitary Association of Scotland at the association's annual meeting in Montrose on September 17.

COMING EVENTS

Ministry of Supply.—Medical Services Exhibition, illustrating aspects of occupational health as applied at the Ministry's research and other establishments, will be held at the Pillar Hall, Board of Trade/Air Ministry Building, Whitehall, London, S.W.1, September 24–28, from 10 a.m. to 6 a.m.

Middlesex Hospital Medical School.—Annual dinner for past and present students will be on September 28 at 7 for 7.30 p.m. at the Savoy Hotel. Mr. F. W. ROQUES will be in the chair. The usual "Refresher Course" for past students will be held from September 28 to 30. Details from the medical school secretary, Middlesex Hospital, London, W.1.

Royal College of Obstetricians and Gynaecologists.—An admission ceremony will be held on September 28 at 3.30 p.m. in the College House, 58, Queen Anne Street, London, W.1, when Viscount NUFFIELD and Lord WEEKS (formerly Sir Ronald Weeks) will be admitted to the Honorary Fellowship of the College.

National Smoke Abatement Society.—Annual conference at Southport, October 3–5. Sir HUGH BEAVER will deliver the Des Vœux memorial lecture on "Clean Air: The Next Step." Details from the society, Palace Chambers, Bridge Street, London, S.W.1.

Mongolism.—A meeting to discuss current research on mongolism will be held at the Fountain Hospital, Tooting Grove, London, S.W.17, on October 3 at 5.30 p.m. The speakers will be Professor L. S. PENROSE, F.R.S., Dr. C. O. CARTER, and Dr. U. MTTWOCH. All interested are invited.

Association of Clinical Pathologists.—Fifty-seventh general meeting will be held at the Royal College of Surgeons, Lincoln's Inn Fields, London, W.C.2, October 4–6. On October 6 there will be a joint meeting with the Association of Clinical Biochemists. The dinner (25s.) will take place on October 5. Details from Dr. J. N. CUMINGS, National Hospital, Queen Square, London, W.C.1.

London County Medical Society.—A meeting of the Society will be held at 5.30 p.m. on October 4 at the County Hall, Westminster Bridge, London, S.E.1. The society will be addressed by Sir CLEMENT PRICE THOMAS, and his subject will be "Carcinoma of the Lung." Members of the Association of Industrial Medical Officers, the Middlesex County Medical Society, and members of the London Divisions of the B.M.A. are invited.

Institute of Diseases of the Chest.—Clinical demonstrations arranged will be held in the lecture room of the Insti-

tute, Brompton, London, S.W.3, on Fridays at 5 p.m., from October 5 to December 14. Open, without fee, to medical practitioners.

Yorkshire Association of Graduates of Glasgow University.—Annual dinner at the Great Northern Hotel, Leeds, October 6 at 7.30 p.m. Details from Mr. J. WISHART, F.R.C.S.Ed., 33, Manor Row, Bradford, 1.

NEW ISSUES

Archives of Disease in Childhood.—The new issue (Vol. 31, No. 158) is now available. The contents include:

FREE DIETS IN THE TREATMENT OF DIABETIC CHILDREN. Constance C. Forsyth and W. W. Payne.
A CLINICAL AND BIOCHEMICAL STUDY OF GALACTOSAEMIA. G. M. Komtrower, V. Schwarz, A. Holzel, and L. Goldberg.
ADDISON'S DISEASE IN INFANCY. Alan Williams and M. J. Robinson.
FIBROCYSTIC DISEASE OF THE PANCREAS IN AN ADOLESCENT WITH MINIMAL PULMONARY INVOLVEMENT. R. C. King.
ACUTE PANCREATITIS IN CHILDHOOD. Edwin Haigh.
SYMPTOMATIC PANCREATIC HETEROTOPIA OF THE PYLORUS ASSOCIATED WITH BILATERAL RENAL CORTICAL NECROSIS IN AN INFANT. R. J. Kernohan and J. Edgar Morison.
PATENT DUCTUS ARTERIOSUS. J. D. Hay and O. C. Ward.
HYDROCEPHALUS ASSOCIATED WITH OBLITERATION OF THE LONGITUDINAL SINUS. J. L. Emery and R. B. Zachary.
CONGENITAL FACTOR VII DEFICIENCY. H. B. W. Greig, H. C. Falcke, M. Simon, and H. Cohen.
HAEMOLYTIC DISEASE OF THE NEWBORN DUE TO ANTI-DUFFY (Fy^a). J. B. Baker, David Grewar, Marion Lewis, Hiroko Ayukawa, and Bruce Chown.
THE INTELLIGENCE OF CHILDREN WITH CLEFT PALATE. R. S. Illingworth and L. B. Birch.
A PATHOLOGICAL STUDY OF FIVE CASES OF PYELONEPHRITIS IN THE NEWBORN. K. A. Porter and M. McC. Giles.
THE MORBID ANATOMY OF INFANTILE MALNUTRITION IN CAPE TOWN. J. A. H. Campbell.
ACUTE NECROTISING RHEUMATIC ARTERITIS IN A CHILD. A. T. Sandison.
LEAD POISONING IN CHILDHOOD TREATED BY THE SUBCUTANEOUS ADMINISTRATION OF A CHELATING AGENT. N. V. O'Donoghue.
A CASE OF ATRESIA OF THE LARYNX. N. E. Rankin and I. R. Mendelson.
INTRATHECAL ISONIAZID IN TUBERCULOUS MENINGITIS. P. N. Swift.
BOOK REVIEWS.

Issued six times a year; annual subscription £3 3s.; single copy 12s. 6d.; obtainable from the Publishing Manager, B.M.A. House, Tavistock Square, London, W.C.1.

SOCIETIES AND LECTURES

A fee is charged or a ticket is required for attending lectures marked ●. Application should be made first to the institution concerned.

Monday, September 24

LONDON UNIVERSITY.—At Royal Free Hospital School of Medicine, 5.15 p.m., special university lecture in physiology by Professor J. H. Comroe (Pennsylvania): Pulmonary Function: Tests and Interpretation.

Tuesday, September 25

LONDON UNIVERSITY.—At Royal Free Hospital School of Medicine, 5.15 p.m., special university lecture in physiology by Professor J. H. Comroe (Pennsylvania): Pulmonary Function: Tests and Interpretation.

Wednesday, September 26

HARVEIAN SOCIETY OF LONDON.—At 11, Chandos Street, W., 8.15 p.m., Professor Hans Selye (Montreal): Recent Progress in the Study of Stress.

Thursday, September 27

ROYAL NORTHERN HOSPITAL.—2.45 p.m., Dr. E. C. O. Jewsbury: General Practitioner and Epilepsy.
SURREY INTER-HOSPITAL PSYCHIATRIC ASSOCIATION.—At Horton Hospital, Epsom, 8 p.m., Freud Centenary Meeting. Address by Dr. E. G. Glover.

BIRTHS, MARRIAGES, AND DEATHS

BIRTHS

Cantwell.—On September 7, 1956, at the Hammersmith Hospital, London, W., to Patricia, wife of Dr. R. J. Cantwell, a daughter—Shirley Margaret. Cleary.—On April 11, 1956, at the Mater Private Hospital, Sydney, Australia, to Thérèse (formerly Dunne), wife of Michael F. Cleary, M.B., B.Ch., B.A.O., a daughter—Pauline Mary Thérèse.
Price.—On September 7, 1956, at City Hospital, St. Albans, Herts, to Elizabeth (formerly Jones), wife of Dr. John Harding Price, a son.
Swan.—On September 11, 1956, at Jessop Hospital for Women, Sheffield, to Harold and Elisabeth Swan, a son.

DEATHS

Fitch.—On September 2, 1956, at Ambleside, Arthur Alfred Fitch, M.R.C.S., L.R.C.P., aged 69.
Leathes.—On September 14, at Montreux, Switzerland, John Beresford Leathes D.Sc., M.B., F.R.C.P., F.R.C.S., F.R.S., aged 91.
Sinnott.—On September 4, 1956, Malcolm Bernard Gathorne Sinnott, M.B., Ch.B., D.P.H., of Wayside, Barkerend Road, Bradford.
Waterhouse.—On September 1, 1956, at Oxford, Amyas Theodore Waterhouse, M.D., of Boar's Hill Hotel, Oxford, aged 83.
Welsh.—On September 6, 1956, at 20, Bellevue Road, Prestwick, Ayrshire, James Kennedy Welsh, M.B., Ch.B., late of 5, Mayfield Gardens, Edinburgh.

Any Questions?

We publish below a selection of those questions and answers which seem of general interest. It is regretted that it is not possible to supply answers to all questions submitted.

Threatened Abortion and the Foetus

Q.—Have any studies been carried out on the morbidity and mortality of infants surviving threatened abortion compared with those of infants whose intrauterine life has been uneventful? Do the former group show a higher incidence of congenital malformations, mental defects, or neonatal morbidity and mortality?

A.—There is a voluminous literature on this subject, but all the statistics are confused if only because different standards are taken for the diagnosis of threatened abortion. Thus, estimates of the frequency of this complication vary from 4% to 26% of all pregnancies, and figures can be selected to substantiate any thesis. A general conclusion, however, is that the chance of a deformed child is not increased in pregnancies which continue after abortion has threatened, and the treatment of threatened abortion has not raised the incidence of malformations—which again is variously estimated as occurring amongst 0.47% to 4.9% of babies born after 28 weeks, according to different classifications.

As regards other foetal risks, it might be expected that the incidence of placenta praevia, accidental antepartum haemorrhage, and premature labour would be increased in cases of threatened abortion. Here again there is no proof, and one study shows that the risk of premature labour is no higher than 2%—which is lower than the accepted overall incidence. By and large it may be concluded that when threatened abortion is a sign of foetal abnormality, and when the amount of placental separation is enough to damage the foetus, the pregnancy does not continue whatever treatment is applied. The very fact that the pregnancy survives the disturbance is a sign that all is well, and the chance of a normal healthy child resulting is said to be not less than 98.5%.

BIBLIOGRAPHY

Burge, E. S., *Amer. J. Obstet. Gynec.*, 1951, 61, 615.
Colin, E. D., Bartholomew, R. A., Grimes, W. H., and Fish, J. S., *ibid.*, 1950, 59, 1208.
King, A. G., *Obstet. and Gynec.*, 1953, 1, 104.

Immunization in Pregnancy

Q.—(1) What immunization is advised for a pregnant woman going to the Tropics (Sumatra)? (2) If she delays her journey until after her child is born, what immunization will the infant require? (3) Are there any strong reasons for advising the latter course, on the grounds that immunization might harm the foetus in utero?

A.—A pregnant woman proceeding to Sumatra would legally be required to be protected against smallpox and to have a valid certificate of vaccination issued within the preceding three years. Such protection is also required for persons of all ages, so that a newly born child would require vaccination before proceeding overseas. There are no strong reasons for advising postponement of the journey on the grounds that immunization against smallpox might harm the foetus in utero.

Though not legally enforced, persons proceeding overseas are advised in their own interest to be protected against enteric fever. There is no evidence that inoculation of a pregnant woman with T.A.B. is likely to harm the foetus, but if it is feared that this might happen no immunization difficulties would arise from postponing the inoculation. It is inadvisable to give enteric vaccination to those aged less than one year.

Protection against yellow fever is not required for those entering Sumatra, but, if any part of tropical Africa, or other

region in which yellow fever is endemic, is to be visited en route, yellow fever vaccination would be legally required. In that case infants and persons of all ages would have to be in possession of a valid certificate of yellow fever vaccination; again there is no available evidence that vaccination of a pregnant woman would harm the foetus in utero.

There is, however, always a slight risk that any illness or fever no matter how mild or transient might adversely affect pregnancy in the early months, and this risk, though minimal, would be more particularly expected in primary vaccination against smallpox. If the person concerned is unwilling to accept the risk it would be necessary to postpone the vaccinations and therefore the journey until after the first few months of pregnancy.

Crops of Styes

Q.—What treatment is advised for a child with recurrent styes who is sensitive to penicillin eye ointment? How can further attacks be prevented?

A.—Children who are otherwise in excellent health may suffer from a crop of styes without any evident provocation, just as they may from time to time break out into successive boils on other parts of the body. In most cases the crop will spontaneously come to an end, and all the sooner if over-treatment of a particular stye is avoided. Hot fomentations, incisions, and plucking of eyelashes are all to be deplored; nor are antibiotics and elaborate chemotherapy needed. When once a stye has begun, it will run its course in a few days, and seldom needs any treatment except gentle cleansing away of any discharge that may issue from it. If styes keep on recurring in spite of good general health, then a course of antistaphylococcal vaccine may be tried. It is useless to pretend that this remedy always succeeds, but results have been encouraging. Stock vaccine is generally considered to be as effective as an autogenous preparation.

Diet before Glucose Tolerance Test

Q.—When a patient is found to be suffering from glycosuria, it is nearly always necessary to ask for a glucose tolerance test. It is said to be important that the patient should not restrict his diet before the test. Why should this be so?

A.—It is not nearly always necessary to ask for a glucose tolerance test when a patient is found to be suffering from glycosuria. A glucose tolerance test is very rarely required for the diagnosis of diabetes.¹ It has been known for nearly a century that a reduced carbohydrate diet impairs carbohydrate tolerance in dogs. If a glucose tolerance test is performed while the patient is on a low carbohydrate diet the test will reveal impaired glucose tolerance whether diabetes is present or not. The precise mechanism of this is still a subject of research.

REFERENCE

¹ *Clinical Pathology in General Practice*, 1955. B.M.A., London.

Salt-water Swimming-pool

Q.—I prefer swimming in salt water, so I propose to add salt to a private swimming-pool to make the water as near sea-water as possible. What variety of salt and what concentration are advised? Will the salt prevent algae growing and mosquito larvae breeding?

A.—The simulation of sea-water is a most difficult task: this will be appreciated when it is realized that out of some eighty-odd elements known to man over thirty have been isolated from sea-water samples. The commoner salts found in water (in grammes per litre) are: sodium chloride (27), magnesium chloride (3.8), magnesium sulphate (1.6), calcium sulphate (1.25), potassium sulphate (0.8), calcium carbonate (0.12), and magnesium bromide (0.076). The salinity of average sea-water varies from about 4 to 6%. In Britain (for example, at Preston Pans, Scotland) sea-water is evaporated

for commercial purposes. If contact were made with a commercial chemical firm, no doubt crude sea-water salt could be obtained. The salt would, of course, be lost each time the pool was drained.

Green algae occur only in fresh water. These can be dealt with by copper sulphate. Sea-water is subject to infestation by blue-black algae, which will not respond to the application of copper sulphate. The blue-black variety are very tenacious and are difficult to remove even by physical means. The growth of such algae and the breeding of mosquito larvae could best be tackled by the fitting of a suitable circulating filtering and chlorinating plant, preferably one making use of break-point chlorination. Such a plant will almost certainly be necessary if the water is to remain sweet and usable, as, apart from the problems mentioned by the questioner, other difficulties will be met, such as the presence of spores which require free chlorine for their control.

Severe Reaction to Penicillin

Q.—Following an injection of 900,000 units of procaine penicillin an Indian child of 10 months with early bronchopneumonia developed urticaria of the legs the same evening. By the next day the legs were tensely oedematous and purpuric, and urticaria was still present. The condition deteriorated, and eventually both feet developed dry gangrene and fell off at the ankle-joints. Two other infants of about the same age received the same dose of procaine penicillin from the same vial without mishap. What is the explanation of this extreme reaction? Is there any treatment that might help in such a case? Have similar cases been recorded in the literature?

A.—I do not know of any such very severe reaction to procaine penicillin, but certainly similar reactions have been recorded in the literature. Harkavy¹ mentions necrotizing purpuric lesions as a sensitivity response to penicillin. Many others have recorded their belief that polyarteritis nodosa can occur as a sensitivity reaction, and Schmid² records gangrene which was apparently associated with neither purpura nor polyarteritis nodosa. It seems very probable that this was a sensitivity response, and it is just possible that treatment at the stage when urticaria only was seen might have averted the eventual gangrene.

REFERENCES

- ¹ Harkavy, J., *J. Allergy*, 1952, 23, 104.
- ² Schmid, M. A., *Brit. J. Clin. Chir.*, 1953, 186, 463.

Medical Treatment of Cholecystitis

Q.—What dietary and other treatment is recommended in elderly patients with cholecystitis for whom operation is contraindicated? Have there been any recent advances in the medical management of such cases?

A.—An acute cholecystitis may be treated initially medically, and, indeed, there is one school that believes this to be the method of choice. The patient is put to bed, pethidine and atropine are given for pain, constant gastric suction may be necessary for repeated vomiting, and hydration is maintained, if necessary, by intravenous fluids. Antibiotics may not be of much benefit in the early stages, for acute cholecystitis so often results from chemical irritation due to bile retained when the cystic duct is obstructed by a gallstone. Bacterial invasion, however, is apt to follow, and tetracyclines should be given in full doses. If symptoms fail to subside in 2 to 3 days, if the right upper quadrant mass increases, and if the white blood count exceeds 20,000 per c.mm. gangrene and perforation are imminent. In spite of age and poor general condition operation should then be seriously considered, as the mortality from these complications is about 50%.

There have been few advances in the medical management of chronic cholecystitis, and when symptoms are sufficiently severe and cholecystography confirms the condition the gall-bladder should be removed. Medical measures include correction of obesity and a bland diet avoiding heavy, greasy meals and cooked fats. The functional state of the

gall-bladder determines dietary fat intake; if it is non-functioning, a low-fat diet is advisable. If cholecystography, however, demonstrates atony, a normal-fat diet can be recommended and even reinforced by such cholagogues as olive oil, 1 fl. oz. (28 ml.) three times a day, or magnesium sulphate, 60 gr. (4 g.) each morning.

Septic Tanks

Q.—On what principles do septic tanks work? Have septic tanks been superseded in rural areas where there are no sewers?

A.—The purification of sewage in a septic tank is due to the action of anaerobic bacteria which attack the sewage and break down the proteins. The process is referred to as anaerobic liquefaction and is followed by aerobic nitrification, in which the nitrogen-containing by-products of the protein breakdown are converted into harmless nitrites and nitrates. This second process is carried out by passing the septic tank effluent over a filter consisting of broken stones. The method has not been superseded in rural areas.

Exclusion of Sugar from Diets for Obesity

Q.—Why is sugar excluded from diets for obesity? I was taught that it burned up the fat.

A.—Sugar as such is usually excluded from reducing diets because of its high calorie value in relation to its volume (stomach-filling quality). Other carbohydrate foods, such as vegetables, with relatively more bulk than calorie value are allowed, the carbohydrate in them being turned to sugar by the digestive processes. This amount of sugar is enough to play its metabolic part in the burning up of the surplus fat of obese persons.

NOTES AND COMMENTS

Diets for Coeliac Disease and Steatorrhoea.—Dr. L. H. LAMPITT, D.Sc. (Director and Chief Chemist, J. Lyons and Company Ltd.), writes: Our attention has been drawn to the statement in the *British Medical Journal* on diets for coeliac disease and steatorrhoea ("Any Questions?" April 21, p. 937), and in particular to the last paragraph of that statement, which reads: "Only some proprietary foods are suitable for inclusion in the diet. The following are among those known to be gluten-free: . . ." The list which follows concludes with a reference to two brands of ice-cream, from which we think the assumption may readily be that other ice-creams are not or might not be suitable for inclusion in a coeliac diet. We write to inform you that our own ice-cream is entirely free from gluten, and we therefore ask you to correct your statement by including also Lyons's ice-cream.

Corrections.—We regret that Dr. C. B. L. Hart's initials were wrongly printed in the list of references on p. 568 in the *Journal* of September 8.

In the Educational Number, under "Medical Service of the L.C.C." (September 1, p. 536), two erroneous figures appeared in the scales of salaries for medical officers. The maximum of the higher salary scale for divisional medical officers of the London County Council is £2,270 (not £2,370), and for principal medical officers and psychiatrist (whole-time) it is also £2,270 (not £2,570). It would also be more accurate to speak of a deputy divisional medical officer as "serving" in a division instead of "living" in it.

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BRITISH MEDICAL JOURNAL

LONDON SATURDAY SEPTEMBER 29 1956

AN ASSOCIATION BETWEEN BLOOD GROUP A AND PERNICIOUS ANAEMIA

A COLLECTIVE SERIES FROM A NUMBER OF CENTRES*

For several years studies on pernicious anaemia have been in progress at the centres contributing to this report. The nature and purposes of the studies vary, but in all of them the ABO blood groups of the patients have been determined. Realizing that with so rare a disease it would be unlikely that any single centre could obtain enough data within any reasonable time for testing the existence of blood-group associations, we decided to compare our data and pool the results. This was done nearly a year ago, when we discovered that the combined data pointed fairly strongly to a higher incidence of pernicious anaemia in persons of group A than in those of group O. Though we had hoped to build up a larger total, we think that a brief interim account should now be given, setting out the evidence for the association with blood group A and postponing a more detailed analysis till later. It is to be hoped that others will be able to supplement the data and either confirm or disprove a finding for which, however, the evidence is tolerably strong.

It is interesting that Buchanan and Higley (1921) gave results for no fewer than 457 cases of pernicious anaemia. In retrospect the percentage frequencies of O and A—41.4 and 44.2 respectively—do suggest an excess of group A. Their own statement covering all the diseases studied was, however: "There is no relationship between blood groups and any disease in which sufficient data are available to justify a conclusion."

Results

The basic data are given in Table I. In London and Glasgow there seemed to be large differences between different hospitals. This is very striking if the figures for the Southern General Hospital and the Royal Infirmary at Glasgow are compared. Lest real heterogeneity should be obscured, the data from hospitals in these areas have been

* This report is an analysis of studies made by the following workers: I. Aird, H. H. Bental, and J. Bingham (Department of Surgery, Postgraduate Medical School of London, Hammersmith Hospital); E. K. Blackburn, Mary S. Mackay, and H. T. Swan (Department of Haematology, Royal Infirmary, Sheffield); Sheila T. Callender and M. A. Denborough (Nuffield Department of Clinical Medicine, Radcliffe Infirmary, Oxford); E. H. Hemmsted (Royal Berkshire Hospital, Reading); D. P. Mollin, Barbara Anderson, John Selwyn (Department of Haematology, Postgraduate Medical School of London); D. N. Phear and G. A. Gresham (Department of Pathology, Addenbrooke's Hospital and University of Cambridge); Joan S. Sneath (Blood Group Research Unit, Lister Institute, London); C. C. Ungley (Royal Victoria Infirmary, Newcastle); John Wallace (Western Scotland Blood Transfusion Service, Glasgow); J. S. Adams (Department of Medicine, Royal Infirmary, Glasgow); and J. Buchanan and G. H. Shaw (Southern General Hospital, Glasgow). The data supplied have been analysed by J. A. Fraser Roberts (Burden Mental Research Department, Stoke Park Colony, Bristol, and London School of Hygiene and Tropical Medicine).

kept separate so far as possible. In London the fairly large series for Hammersmith and the Kingston General Hospital are both high in A, the remainder showing no excess. The remainder consist of several very small series, which have been added together. Seven results from Birmingham, which has very much the same ABO frequencies as London, have also been added.

Except for Sheffield the control series used have all been described in previous publications: those for London and Newcastle by Aird, Bental, Mehigan, and Roberts (1954); for Oxford by McConnell, Pyke, and Roberts (1956); for

TABLE I.—Basic Data

	Pernicious Anaemia				Controls			
	O	A	B	AB	O	A	B	AB
London:					4,578	4,219	890	313
Hammersmith . . .	48	75	7	4				
Kingston . . .	23	42	1	2				
Composite* . . .	19	18	4	1				
Oxford . . .	112	120	18	8	2,888	2,839	557	208
Cambridge . . .	51	49	8	2	1,571	1,501	255	111
Sheffield . . .	47	58	10	8	1,451	1,318	249	93
Newcastle . . .	55	45	7	2	6,598	5,261	1,321	392
Glasgow:					3,177	1,906	637	178
Southern General . . .	63	35	9	3				
Royal Infirmary . . .	72	61	22	5				
Total . . .	490	503	86	35				

* This composite number includes 7 patients obtained from the records of Birmingham United Hospitals in the course of the survey of another disease, and the remainder of the group comprise 35 patients suffering from pernicious anaemia who have presented, since the collection of data was begun, at Balham Hospital, the Central Middlesex Hospital, the North Middlesex Hospital and Whips Cross Hospital.

TABLE II.—Summary of Group Frequencies in Patients and Controls (including Copenhagen)

	Pernicious Anaemia		Corresponding Weighted Controls (%)
	No.	%	
O	534	43.6	47.2
A	550	44.9	40.3
B	100	8.2	9.3
AB	41	3.3	3.2
Total	1,225		

Cambridge by Bennett and Walker (1956); for Glasgow by Peebles Brown, Melrose, and Wallace (1956). The control series for Sheffield was kindly provided by the Nuffield Blood Group Centre of the Royal Anthropological Institute; it is based on a count of consecutively registered blood donors.

For the analysis we have added a series of 111 cases from Copenhagen, as recorded by Køster, Sindrup, and Seale (1955). It is useful to be able to include additional published series, but in this instance it is especially important that the Copenhagen figures should be added, because they lower the significance of our finding. The Copenhagen figures

for pernicious anaemia are: O, 44; A, 47; B, 14; AB, 6; and for the corresponding controls: O, 5,804; A, 6,299; B, 1,557; AB, 644.

A brief summary of the findings is given in Table II. The percentage group frequencies for the controls are based on figures weighted according to the numbers of patients drawn from each area. It will be seen that in the disease series as compared with the controls A is increased and O and B are both reduced, though, of course, the number with B is very small.

The method of analysis is that of Woolf (1955). It is rather similar to that used by Aird *et al.* (1954), but the work is carried out in terms of relative incidences instead of differences in proportions. It is natural to think of diseases in terms of incidence, and the results come out in a form which has a direct and simple meaning. For example, from Table I, the Sheffield results show 47 with O and 58 with A in the disease series, compared with 1,451 and 1,318 respectively in the controls. Thus the relative incidence of pernicious anaemia in persons of group A, as compared with persons of group O, is simply $(58 \times 1,451) \div (47 \times 1,318) = 1.3586$. Woolf's method also has the advantage that series drawn from populations with very different gene frequencies can readily be combined. When such differences are not very large, as in this country, the two methods give closely similar results, but this would not necessarily be so if data from different parts of the world were being compared. The method of combining areas in the analysis is the same.

Table III gives the relative incidence and χ^2 for groups A and O.

TABLE III.—Relative Incidence of Pernicious Anaemia in Persons of Group A Compared with its Incidence in Persons of Group O

	Relative Incidence	χ^2
London:		
Hammersmith	1.70	8.05
Kingston	1.98	6.90
Composite	1.03	0.01
Oxford	1.09	0.41
Cambridge	1.01	0.00
Sheffield	1.36	2.35
Newcastle	1.03	0.02
Glasgow:		
Southern General ..	0.93	0.13
Royal Infirmary ..	1.41	3.83
Copenhagen	0.98	0.01
		21.71

The combined weighted relative mean incidence of pernicious anaemia in persons of group A is 1.20 compared with 1 in group O. The total χ^2 of 21.71 is partitioned as follows:

	D. of F.	χ^2	P
Difference from unity	1	8.84	0.0029
Heterogeneity	9	12.87	0.17

Thus the probability of getting so great a departure from equality by chance is 1/340.

There is no evidence of any heterogeneity. Although the results look so different for the different series, ranging from an incidence in Group A at Kingston Hospital which is practically double that in group O to an actual slight excess in group O at the Southern General Hospital, Glasgow, and also at Copenhagen, such fluctuations are only to be expected with samples of this size.

Group A is also increased as against group B. If A is compared with O and B added together, the analysis shows:

	D. of F.	χ^2	P
Difference from unity	1	10.63	0.0011
Heterogeneity	9	15.28	0.087
Total	10	25.91	

The probability of getting so great a difference by chance is thus reduced to 1/900, and once again the 10 areas are not significantly heterogeneous at the 5% level.

Further analysis must await more detailed comparisons, we hope on larger numbers. For the moment we simply give

in Table IV a brief comparison by sexes, which shows that the excess of A appears in both. This refers to the British data only, as the Copenhagen figures were not broken down by sex. The differences in the control figures are due to the differing proportion of men and women at the various centres.

TABLE IV.—Comparison of Sexes. Totals for British Series

	Men			Women		
	Pernicious Anaemia		Corresponding Weighted Controls	Pernicious Anaemia		Corresponding Weighted Controls
	No.	%		No.	%	
O	167	42.7	47.4	323	44.7	48.0
A	180	46.0	40.4	323	44.7	39.7
B	34	8.7	9.0	52	7.2	9.2
AB	10	2.6	3.1	25	3.4	3.1
Total	391			723		

Summary

The combination of data from a number of centres shows with fairly high significance that pernicious anaemia is commoner in persons of Group A than in persons of Group O, and also perhaps, though the numbers are small, than in persons of group B. The greater incidence in group A appears in both sexes.

One of the authors (J. Bingham) has been in receipt of a personal grant and a grant for secretarial expenses from the British Empire Cancer Campaign. The Glasgow contributors wish to acknowledge the help they received from Professor L. J. Davis, Glasgow Royal Infirmary, and from Dr. E. G. Oastler and Dr. L. D. W. Scott, Southern General Hospital, Glasgow, and wish to thank them for access to patients in these two institutions. They also wish to acknowledge the assistance they received from Dr. I. A. Cook, Southern General Hospital, Glasgow.

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In the recently published Annual Report of the General Board of Control for Scotland for the year 1955 (H.M.S.O., price 1s. 6d.), it is stated that more people are seeking psychiatric help at an earlier stage of mental illness. During 1955 the total number of patients under treatment for mental illness in Scotland was 21,242, 80 fewer than at the end of 1954, but the number admitted to hospital was 9,168, 657 more than in 1954. Of that number 2,583 were certified patients and 6,585 were voluntary patients, the latter figure being an increase of 723 over the previous year. On the other hand, the number of discharges both of certified and of voluntary patients increased substantially, the figures being 1,481 and 5,718 respectively. 241 patients were allowed out on probation from mental hospitals during the year: of these, 123 were discharged at the end of their probation period, 95 were sent back to institutions, 22 were transferred to guardianship in private dwellings, and 3 died. Seven deaths occurred from suicide among hospital patients and 52 died as a result of accidents. The total number of certified mental defectives was 8,065, or 207 more than at the end of 1954. Of that number 5,513 were patients in institutions and 2,552 were under guardianship. The Board comments that all but one of the mental hospitals in Scotland were built more than 50 years ago, but much is being done to make these institutions more cheerful.

ABO BLOOD GROUPS AND SECRETOR CHARACTER IN DUODENAL ULCER

POPULATION AND SIBSHIP STUDIES

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PART I. ABO BLOOD GROUPS IN DUODENAL ULCER

In a previous paper (Clarke *et al.*, 1955) we showed in a survey of 1,665 peptic ulcer cases drawn from three Liverpool hospitals that there was a great increase in blood group O in patients with duodenal ulcer compared with controls; in gastric ulcer, on the other hand, the ABO distribution was normal. The investigations had been prompted by the earlier paper of Aird *et al.* (1954), which demonstrated, in three other English centres, a marked increase in blood group O in both duodenal and gastric ulcer compared with controls. The high frequency of group O in peptic ulcer has also been reported by workers in Portugal (Lessa and Alarcão, 1949), Scotland (Peebles Brown *et al.*, 1956), Denmark (Køster *et al.*, 1955), Norway (Westlund and Heistø, 1955), and the U.S.A. (Buckwalter *et al.*, 1956; Mayr and Diamond, 1956).

Our next interest in the matter was to consider whether this association between group O and duodenal ulcer was causal—that is, due to a direct or pleiotropic effect of the O gene—or, alternatively, coincidental. Penrose (1939) pointed out that because a blood group appeared to be associated with a disease a causal connection should not necessarily be assumed. He instanced the finding of Henwerden and Boele-Nijland (1930) in Holland, in which an apparent association between dark hair and blood group B was due simply to the presence of a racial group (in this case Dutch East Indian) in the general student population being investigated. Penrose therefore suggested that we should carry out a study of the blood groups of duodenal ulcer patients and their sibs, the main point being to obtain a control which could not be criticized on the ground that it was not from the same stratum of the population as the ulcer patients. In all previous surveys, our own included, the controls had either been blood donors or hospital patients with other diseases. In an analysis of sibships such as we have carried out the unaffected sibs act as controls and any question of racial stratification is avoided. Furthermore, Penrose suggested that, if possession of blood group O were indeed a cause of duodenal ulcer, the association should show up more clearly in sibships, where

variability due to differences in environment and genetic constitution is reduced compared with the general population.

Methods

Between 1954 and 1956 293 sibships have been collected. The propositi were either obtained from hospital records or referred to us by general practitioners at the request of the local Research Committee of the College of General Practitioners. In every case an accurate diagnosis had been made, the clinical findings being confirmed either radiologically or at operation.

The sibs were obtained through the propositi and were interviewed in order to assess their duodenal ulcer status and ABO blood group. Where there was doubt about the scoring an x-ray examination of the gastro-intestinal tract was carried out if possible, but there remain a few sibs in whom the diagnosis rests on the history only.

The sibs were scored as follows: 1=no dyspepsia; 2=atypical dyspepsia not suggestive of ulcer; 3=typical symptoms of ulcer; 4=a firm radiological diagnosis of ulcer; and 5=macroscopic evidence of ulcer. For the purpose of analysis 1 and 2 have been considered as "no ulcer," and 3, 4, and 5 as "ulcer." The ABO blood grouping was done by the macroscopic slide technique, using potent anti-A and anti-B sera.

The sibship data are too extensive to be given in full in this paper, but a selected sample is shown in Table I. The full data will be supplied on request to anyone wishing to use them, and a copy has been deposited in the archives of the Galton Laboratory, University College, London. It will be seen that secretor character is also given in Table I; this is dealt with in Part II.

TABLE I.—Selected Sample of Sib Data

Sibship No.	Sib	Sex	Born	Diagnosis	Blood Group	Saliva
3	a	F	1928	4	O	Non-secretor
	b	F	1934	1	O	Secretor
	c	M	1930	1	O	"
	d	F	1937	1	O	"
	e	F	1924	1	O	"
9	a	M	1891	5	O	Non-secretor
	b	F	1905*	1	O	Secretor
	c	F	1905*	1	O	"
	d	M	1898	4	O	Non-secretor
	e	F	1900	1	O	"
62	a	F	1888	4	O	"
	b	M	1897	2	O	Secretor
	c	M	1885	5	O	Non-secretor
	d	M	1927	4	O	Secretor
	e	M	1928	1	A	"
68	a	F	1919	1	O	Non-secretor
	b	F	1908	1	A	Secretor
	c	F	1876	4	A	"
	d	F	1883	1	O	Non-secretor
	e	F	1886	1	AB	"
69	a	F	1911	4	O	Secretor
	b	F	1904	1	AB	"
	c	F	1908	1	B	"
	d	F	1909	1	AB	"
	e	F	1892	5	AB	Non-secretor
85	a	M	1894	1	B	Secretor
	b	M	1889	1	AB	"
	c	F	1882	4	A	Non-secretor
	d	F	1884	1	A	"
	e	F	1880	4	O	Secretor
93	a	M	1901	4	O	Non-secretor
	b	M	1893	4	A	"
	c	M	1910	2	O	"
	d	M	1916	4	O	"
	e	F	1912	1	B	"
134	a	F	1903	2	O	Secretor
	b	F	1907	5	O	Non-secretor
	c	M	1901	5	O	"
	d	M	1897	1	B	Secretor
	e	M	1901	1	O	"
225	a	M	1923	5	A	Non-secretor
	b	F	1925	1	O	"
	c	F	1923	1	O	"
	d	F	1925	1	O	"
	e	F	1925	1	O	"

* Twins.

In this country about 78% of the population are secretors and 22% non-secretors, the percentages being the same in each of the ABO blood groups. Race and Sanger (1950) pointed out the marked biological difference between those people who do and those who do not secrete their antigens, and suggested that there might be selective differences between them. It occurred to one of us (Sheppard, 1953) that if this were so the differences might be particularly important in diseases of the gastro-intestinal tract, as the concentration of antigen is particularly high in saliva and gastric juice. We therefore decided to investigate the secretor character of duodenal ulcer patients, and the findings have been compared with two types of control. Firstly, we have obtained a series of unrelated duodenal ulcer cases and compared their secretor character with controls taken from the general population. Secondly, we have investigated the secretor character of the individuals in the sibships referred to in Part I.

Method of Collection of Material

All secretor tests were carried out by one of us (R. B. McC.) on saliva, specimens being obtained from 514 patients from four hospitals in the Liverpool region. The clinical diagnosis of duodenal ulcer was always confirmed, either by macroscopic or by definite radiological evidence. The control series consisted of students, soldiers, and nurses. In the sibships the method of collection of the individuals was as described in Part I. The two investigations are not completely independent, as 189 *propositi* of the sibships are also included in the series of 514 unrelated patients.

Technique of Secretor Tests

The tests were carried out on specimens of saliva which had been placed in a boiling-water bath for ten minutes within one hour of collection and then stored frozen solid. The technique used was of an agglutination-inhibition type in which dilutions of saliva were mixed with antiserum and then the appropriate red cells added. In non-secretors the antiserum is not affected and agglutination takes place.

In the early part of the investigation the specimens of saliva of individuals of groups A and B were tested with anti-A and anti-B sera respectively, and eel serum was used for testing the saliva of those of group O. It was found, however, that eel serum is an unsatisfactory anti-H, as the saliva of an appreciable number of secretors (at least 10%) contains so little of the H-substance which inhibits eel serum that it can be detected (Ceppellini, 1955a) only by using three volumes of neat saliva to one volume of eel serum. Some group O persons were therefore erroneously scored as non-secretors because equal volumes of saliva dilutions and eel serum were used in our technique (see Table VI).

A study was therefore made with an extract of the seeds of *Ulex europaeus* to assess its value as a source of anti-H. The investigations confirmed the opinion of Boyd and Shapleigh (1954) that a *Ulex* extract is suitable for testing the secretor character not only of group O persons but also those of groups A, B, and AB. Thus specimens of saliva from 205 people of groups A, B, and AB were tested with a *Ulex* extract as well as with anti-A and anti-B sera, and all those containing A- or B-substance were found also to contain a significant titre of the H-substance which inhibits *Ulex* extract. However, the saliva specimens from groups B and AB secretors usually inhibited *Ulex* extract to lower titres than did those of groups O and A secretors. All those scored as non-secretors with anti-A and anti-B sera were also non-secretors when tested with *Ulex* extract.

The separation of individuals into secretors and non-secretors by the use of calibrated *Ulex* extract was found to be so reliable that this technique has been used in the later stages of the investigation whatever the ABO group; however, where a person of group A, B, or AB has been scored a non-secretor with *Ulex* extract, the scoring has always been confirmed by testing also with anti-A and anti-B

TABLE VI.—Results of Secretor Tests in 514 Duodenal Ulcer Patients and in 491 Controls

Blood Group	Secretor Character	Males		Females	
		Controls	Duodenal Ulcers	Controls	Duodenal Ulcers
O (<i>Ulex</i> extract)	Sec.	91	135	43	31
	Non-sec.	25	77	17	22
A	Sec.	123	106	51	12
	Non-sec.	38	41	20	12
B	Sec.	37	28	14	9
	Non-sec.	12	17	4	3
AB	Sec.	9	12	4	1
	Non-sec.	0	7	3	1
Total		335	423	156	91
O (eel serum)	Sec.	102	113	45	14
	Non-sec.	48	87	30	23

serum. The use of *Ulex* extract in the testing of all salivas has the advantage that an error in ABO blood grouping cannot lead to mis-scoring as a non-secretor.

The series of 514 duodenal ulcer patients and 491 controls reported and analysed in this paper were tested with *Ulex* extract if of group O and with anti-A, anti-B, and/or *Ulex* extract if of groups A, B, or AB. In the sibship investigation all the group O individuals in sibships 120-293 were tested with *Ulex* extract, but those in sibships 1-119 with eel serum. The results of the tests in 237 group O patients and 225 group O controls when eel serum was used have been reported (McConnell, 1956). They are included in Table VI in order to show the degree of error with this technique, but they are not used in the analyses in this paper.

Secretor Character in Duodenal Ulcer Compared with General Population Controls

Table VI shows the results of the secretor tests in 514 duodenal ulcer patients and in 491 controls, and Table VII shows these results for group O and for groups A, B, and AB combined, expressed as percentages. It will be seen that there are higher proportions of non-secretors in the patients than in the controls. Statistical tests on these data are given in Table VIII. There is no heterogeneity among the male controls or among the female controls with respect to the frequency of non-secretors among those with different blood groups. In the tests, persons of group AB were combined with those of group B because of the small number, so that the χ^2 has two degrees of freedom. Because of the absence of heterogeneity, the ratio of secretor

TABLE VII.—Percentages of Non-secretors in 514 Duodenal Ulcer Patients and in 491 Controls

	Males		Females	
	Controls	Duodenal Ulcers	Controls	Duodenal Ulcers
Group O: Non-sec.	21.55%	36.32%	28.33%	41.51%
Groups A, B, and AB: Non-sec.	22.83%	30.81%	28.12%	42.11%
Non-sec. in all groups	22.39%	33.57%	28.21%	41.76%

TABLE VIII.—Analysis of Secretor Data in 514 Duodenal Ulcer Patients and in 491 Controls

Comparison of Non-secretor Frequency in	Degrees of Freedom	χ^2 for Heterogeneity	P
Groups O, A, and B + AB male controls	2	0.28	>0.80
O, A, and B + AB female controls	2	0.00	>0.99
Male controls—female controls	1	1.96	>0.10
Groups O, A, and B + AB ulcers (males)	2	3.29	>0.10
O, A, and B + AB ulcers (females)	2	1.67	>0.30
Males with ulcers—females with ulcers	1	2.21	>0.10
All ulcers—all controls	1	13.97	<0.001

to non-secretor among all male controls was compared with that among all females, and again there was no heterogeneity. The same procedure was followed for the duodenal ulcer cases, and again it was found that there was no heterogeneity and that consequently the male and female data from all blood groups could be combined. A test was then made between the frequency of the two classes among the controls and among people with duodenal ulcer. The resulting χ^2 was 13.971, giving a significance level of less than 0.001.

We also investigated the question of heterogeneity within the data with respect to diagnosis and source of the samples of saliva. Table IX shows a breakdown of the duodenal

TABLE IX.—Duodenal Ulcer Data Subdivided with Respect to Diagnosis and Source of Saliva Samples

Group	Macroscopically Diagnosed		Total	Saliva from D.L.N.H.	Saliva from Other Hospitals
	Yes	No			
O { Sec.	62	104	166	75	91
{ Non-sec.	31	68	99	45	54
A { Sec.	35	83	118	59	59
{ Non-sec.	21	32	53	28	25
B { Sec.	14	23	37	20	17
{ Non-sec.	8	12	20	15	5
AB { Sec.	6	7	13	5	8
{ Non-sec.	6	2	8	5	3
Total	183	331	514	252	262
Percentage non-sec.	36.07	34.44	35.02	36.90	33.21

ulcer data into those diagnosed macroscopically and those in which the diagnosis was based on radiological evidence. Table IX also shows the secretor character of the cases in which the samples were obtained at the David Lewis Northern Hospital, compared with those collected elsewhere, and brought to the David Lewis Northern Hospital for storage and testing. The reason for this subdivision is that there might be a deterioration in the antigen content in those samples of saliva collected from outlying hospitals, for there would then be a greater time interval between collection and storage at -20°C , thus giving an apparently high frequency of non-secretors. Analysis shows that there is no heterogeneity for either of these factors.

In these data there is therefore a very marked association between non-secretion and the presence of duodenal ulcer when the general population is used as a control.

Secretor Character within Sibships

In 262 of the duodenal ulcer sibships the secretor character of the individuals has been tested, and these data have been examined to see if the association of ulcer with non-secretion is also found within families. The results in the total of *propositi* and affected and unaffected sibs of the sibships 120 onwards (tested with *Ulex* extract, see below) are shown in Table X. It will be seen that the proportion of non-secretors in the unaffected sibs is less than that in the *propositi* and the affected sibs, but it is considerably higher than that found in the general population. For the same reasons as those given in Part I an analysis has been made of the 89 sibships which segregate for ulcer and for non-secretors, taking each family separately as described in the Appendix to Part I. The result, given in Table XI, shows that there is a significant association between duodenal

TABLE X.—Secretor Character of *Propositi* and Affected and Unaffected Sibs in Sibships from No. 120 (Group O Individuals Tested with *Ulex* Extract)

	No. Sec.	No. Non-sec.
<i>Propositi</i>	113	61 (35.1%)
Affected sibs	24	20 (45.5%)
Unaffected sibs	144	68 (32.1%)
General population control ..	372	119 (24.2%)

TABLE XI.—Analysis of the Chance of the *Propositi* being Non-secretor in the Sibships Segregating for Secretion

Sibship No.	Sibs		Non-sec. Proposit		Variance
	Non-sec.	Sec.	Observed	Expected	
A. In the examples in Table I					
3	1	4	1	0.2	0.16
9	5	2	1	0.7143	0.2041
62	1	3	0	0.25	0.1875
68	2	1	0	0.66	0.22
69	1	3	1	0.25	0.1875
85	3	3	1	0.5	0.25
134	3	1	1	0.75	0.1875
225	1	1	1	0.5	0.25
B. In the whole series of 89 segregating sibships			52	42.4643	20.0727

The difference divided by its standard error = $\frac{9.5357}{\sqrt{20.0727}} = 2.128$. $P < 0.04$.
(The identical twins in family 9 are treated as one individual.)

ulceration and non-secretion ($P < 0.04$) within these sibships. This analysis, though not independent of the one for random sample, since 76 *propositi* are included in both, is independent with respect to the controls. The test for the 14 families remaining with an affected sib and segregation for non-secretion after the *propositi* have been excluded is, however, entirely independent of the other two analyses. It will be seen (Table XII) that the observed total of non-

TABLE XII.—Analysis of the Chance of an Affected Sib being Non-secretor in Sibships Segregating for Secretion and Duodenal Ulcer after the *Propositi* have been Excluded

Sibship No.	Total Sibs	Sibs		Sibs		Non-sec. Ulcer		Variance
		Non-sec.	Sec.	With Ulcer	Without Ulcer	Observed	Expected	
9	6	4	2	3	3	3	2.0	0.4
18	2	1	1	1	1	0	0.5	0.25
22	5	1	4	2	3	0	0.4	0.24
70	2	1	1	1	1	1	0.5	0.25
77	2	1	1	1	1	0	0.5	0.25
85	5	2	3	2	3	1	0.8	0.36
106	3	2	1	2	1	2	1.33	0.22
115	2	1	1	1	1	1	0.5	0.25
134	3	2	1	1	2	1	0.66	0.22
232	3	2	1	2	1	2	1.33	0.22
243	2	1	1	1	1	1	0.5	0.25
271	2	1	1	1	1	1	0.5	0.25
279	2	1	1	1	1	0	0.5	0.25
291	2	1	1	1	1	0	0.5	0.25
Total for the 14 segregating sibships							13	10.533
							3.66	

The difference divided by its standard error = $\frac{2.466}{\sqrt{3.66}} = 1.288$. $P < 0.2 > 0.1$.
(The identical twins in family 9 are treated as one individual.)

secretors is again greater than the expected, though on the small numbers involved the difference does not reach the significance level of 0.05. However, it supports the conclusion of an association between ulcer and non-secretion based on the *propositi* analysis (Table XI).

These sibship results cannot be accepted as they stand without consideration of the fact that there has been mis-scoring of both ulcer patients and unaffected sibs of group O in sibships 1-119, due to the use of eel serum. It is, in fact, in these early sibships that the association appears to be most pronounced, but this is not confined to sibships with members who are group O. Three considerations militate against the suggestion that mis-scoring of group O secretors as non-secretors is responsible for the association found between duodenal ulcer and non-secretion in the sibships.

1. There is no apparent association between duodenal ulcer and blood group O in the sib data, the *propositi* and unaffected sibs having about the same group O frequency; therefore the error in technique should apply equally to the *propositi* and to the unaffected sibs and there should be no bias in favour of the *propositi* being non-secretors.

2. A comparison between group O sibs in which secretor character was scored using *Ulex* extract and those where

eel serum was used shows that both methods give an excess of non-secretors among the people with duodenal ulcer, as compared with their unaffected sib controls.

3. If all families segregating for group O are excluded—because it is only in such families that a bias is likely to occur—the association between duodenal ulcer and non-secretion is still found. Thus in families in which all members are group O and in which eel serum was used one gets an expected number of non-secretor propositi of 7.50 and an observed value of 10. A similar difference is found in all other families non-segregating for group O, including group O families scored with *Ulex* extract, but excluding all scored with eel serum. Here the expected value is 20.30 and the observed 29, the difference being $+8.7 \pm 3.174$ ($P < 0.01$). The data therefore do not support the view that the association found between non-secretion and duodenal ulcer is due to the faulty technique, for a significant result is obtained after excluding the families tested with eel serum and those segregating for group O.

Discussion

The observed association between non-secretion and duodenal ulcer might be accounted for in at least three ways.

1. *Racial Stratification*.—The arguments are similar to those in Part I concerning the association of group O with duodenal ulcer. It is possible that there is a strain high in duodenal ulcer and high in non-secretion imperfectly mixed with the general population, and that this accounts for the association; the secretor sibship data, however, contradict this view. Moreover, an ethnological explanation seems even more unlikely here than in the case of group O, because the non-secretor frequency in different European populations has been found to vary much less than do the ABO blood-group frequencies.

2. *An Effect of the Disease*.—It is possible that the disease itself affects the amount of blood-group substance secreted, so that the phenotype is changed to non-secretor in some ulcer patients who had been weak secretors. This hypothesis is testable by investigating the patients' Lewis blood groups, as these are very unlikely to be affected by the disease. Non-secretors of ABH are usually $Le(a+)$, and mis-scoring would be suspected if a higher proportion of the ulcer non-secretors are found to be $Le(a-)$ than that found in non-secretors of the general population. The proportion of non-secretors who are $Le(a-)$ found in previous population surveys has varied from 1 in 48 (Race and Sanger, 1954), to 2 in 59 (Grubb and Morgan, 1949), to 11 in 94 (Ceppellini, 1955b), but in this country the expected frequency would be about 7% (Race, 1956). In 82 ulcer patients scored as non-secretor the red cells were tested for Le^a (Table XIII), and 8 (9.76%) of them were $Le(a-)$.

TABLE XIII.—Result of Tests with Anti- Le^a Serum in 82 Non-secretor Duodenal Ulcer Patients

ABO Group	Males		Females	
	$Le(a+)$	$Le(a-)$	$Le(a+)$	$Le(a-)$
O	33	3	10	4
A	18	0	4	1
B	7	0	2	0

The saliva of the 8 $Le(a-)$ patients did not inhibit anti- Le^a serum.

The proportion of $Le(a-)$ in the males (4.92%) is in good agreement with the expected, but in the females it is very much higher (23.81%). This difference, however, between the $Le(a-)$ rate in male and female non-secretor patients is not quite significant ($P=0.13$). It can be concluded from these data with some degree of confidence that the difference found between the non-secretor rate of male ulcer patients and the controls is not due to a change of phenotype, and probably this conclusion is also true in the females.

3. *A Causal Relationship*.—It is possible that the genes controlling secretion are affecting the susceptibility of the indi-

vidual to duodenal ulceration, making non-secretors more liable to the disease, and we feel that our data give some support to this view. The concentration of blood-group substances is higher in saliva and gastric juice than in most other body fluids, a circumstance which is not likely to be fortuitous; and it is perhaps not surprising, therefore, that a selective effect has been found with a condition of the upper gastrointestinal tract. It is of interest that Pasternak *et al.* (1955) have found easily detectable amounts of B-like substance in the gastric mucosa of guinea-pigs but not in the mucosa of other parts of their gastro-intestinal tract.

The mechanism responsible for a relationship between duodenal ulceration and non-secretion might depend on the mucopolysaccharide nature of the ABH substances secreted, causing them to have a protective action on the mucosa of the gastro-intestinal tract, as suggested by Aird *et al.* (1954). Aird (1955) also put forward the hypothesis that the relationship between blood group O and duodenal ulcer might be due to the A, B, and H substances conferring different degrees of protection against ulcerogenic agents, H-substance giving less protection than A and B substances. If this were so, one would expect to find a particularly high proportion of non-secretors in the ulcer patients of groups A, B, and AB. In our data, however, the percentage of non-secretors in the ulcer patients is rather higher, though not significantly so, in those of group O (total, 37.2%—males, 36.3%; females, 41.5%) than in those of the other ABO groups (total, 32.5%—males, 30.8%; females, 42.1%). This finding does not support Aird's attractive hypothesis, but rather suggests that group O non-secretors may be the individuals most liable to ulcer. The question of a possible protective action might be answered by more information than we have at present on the titre of antigens secreted, and it would also be valuable to know what proportion of the total gastric mucin is made up of blood-group antigens.

When considering the amount of protection which the secretion of blood-group antigens may confer on an individual, the Lewis system as well as the ABH substances must be taken into account. Le^a and Le^b substances are the only antigens, other than the ABH, which have been found on red cells and which are also known to be secreted in large amounts in body fluids, and Le^a substance, at least, has similar physical and chemical properties to the ABH substances (Annisson and Morgan, 1952). The method of their inheritance is of some importance; the ability or inability to produce and secrete them is apparently determined by alleles at a locus which is not linked with the locus for ABH secretions nor with the ABO blood group locus (Ceppellini, 1955b), and since the two secretion characters therefore segregate independently there is the same proportion of non-secretors of Le^a in ABH secretors as in ABH non-secretors.

The interrelationship of the ABH and Lewis systems is also of importance, and according to Ceppellini is as follows: Le^a substance is the primary product of a dominant gene Le , and in ABH non-secretors it is present as such both in secretions and on red cells. Le^b substance is probably derived from interaction between the gene Le and the gene for ABH secretion (Se). The Le^a activity which is found in the secretions (but not on the red cells) of the ABH secretors who show the phenotype ($Le(a-b+)$) on the red cells could be either an unmodified residue of the primary Lewis substance or a manifestation of cross-reactivity between anti- Le^a sera and Le^b substance. Individuals without the gene Le ($le le$) have neither Le^a nor Le^b specificity on the red cells; their saliva when tested with anti- Le^a and with "specific" anti- Le^b sera also appears to be devoid of any Lewis specificity; however, many anti- Le^b sera ("H-cross-reacting" variety, according to Ceppellini) are inhibited by the saliva of all ABH secretors and thus simulate the presence of Le^b specificity.

There are therefore four main secretor types (Ceppellini, 1955a), and they might have differential protection from duodenal ulcer (Table XIV). If it is assumed that the ABH

TABLE XIV

Genotype	Red Cells Phenotype	Antigens in Saliva			Approximate Percentage in Population	Possible Protection
		ABH	Le^a	Le^b		
ABH Secretor : Lewis Locus						
$sese$: Le	$Le(a+b-)$	—	++	—	20	++
Se : Le	$Le(a-b+)$	++	+	+	70	+++
Se : $lele$	$Le(a-b-)$	++	—	—	8	++
$sese$: $lele$	$Le(a-b-)$	—	—	—	2	0

and Lewis substances give about equal degrees of protection, and that the presence of the gene Le does not influence the amount of ABH substances secreted, it will be seen from the last column in Table XIV that there will be an excess of non-secretors of ABH among people with duodenal ulcer, as about 90% of the secretors of ABH will be twice as well protected as any other individuals in the population. Only the fourth type of person, being a non-secretor of both ABH and Lewis substances, is completely without the hypothetical protection, and this type might be expected to be particularly prone to duodenal ulcer and therefore found more commonly in patients than in normals.

Clearly the next step should be to investigate in detail the Lewis secretor character of duodenal ulcer patients and controls, using both anti- Le^a and anti- Le^b sera. The data which we have on this subject are inconclusive, and all that can be reported at present is that in 82 ABH non-secretor patients we find eight non-secretors of Le^a (Table XIII). The only available data on secretion of Le^a in normal people with which to compare this finding are those of Grubb (1951) and Ceppellini (1955b), who found respectively 9.8% and 11.78% of non-secretors of Le^a . Our result is therefore in good agreement with the expected, but it will be seen from Table XIII that in the males there are less than the expected (4.9%), whilst in the females there is a considerable excess (23.8%) of those people who are completely without a hypothetical protective action of the blood-group substance.

In conclusion we feel that an unequivocal answer to the nature of the association between non-secretion and duodenal ulcer which we have demonstrated must await further investigation. We are continuing the study, and with the method of analysis used sibship data from various regions can readily be incorporated with those reported here.

SUMMARY

Part I

Recent work has suggested an association between blood group O and duodenal ulcer in several areas of Europe and in the U.S.A. The finding has been obtained by comparing the blood groups of ulcer patients with a control series of unaffected people living in the same area. Such controls can be unsatisfactory in that a population of mixed origin may contain elements with a high frequency both of group O and of duodenal ulcer without the two being causally connected. Sibship studies where the unaffected sibs act as controls are not subject to this criticism.

Data are presented for 293 duodenal ulcer sibships. An analysis of these gives no evidence to support the hypothesis that a group O individual is more likely to have a duodenal ulcer than are his A, B, or AB sibs.

This result could be regarded as evidence in support of the suggestion that the previously found association was due to racial stratification within the populations concerned. There are, however, considerable objections to this explanation, and an alternative, that the findings are due to a maternal effect, is discussed.

Part II

The ability to secrete ABO blood group antigens in body fluids is an inherited character, and it seemed possible that secretors and non-secretors might have different susceptibilities to duodenal ulcer. We have therefore investigated the secretor character in the saliva of 514 unrelated duodenal ulcer patients and compared the results with those of 491 controls from the general population.

This analysis shows that there is a significantly higher proportion of non-secretors in the duodenal ulcer patients (35.0%) than in the controls (24.2%). This difference is found in both males and females of each of the ABO blood groups and in both macroscopically and radiologically diagnosed cases. These data suggest that non-secretor individuals may be about 45% more likely to develop duodenal ulcer than are secretors.

For the same reason as in the association between group O and duodenal ulcer, sibship studies have been carried out, and the results in 262 families suggest that the relationship between non-secretion and duodenal ulcer may hold within families.

The possibility that the ABO and Lewis antigens may confer some protection against duodenal ulceration by virtue of their mucoid character is discussed.

We are indebted to Professor L. S. Penrose for suggesting the sibship investigation and for his advice during the work. Our thanks are also due to Dr. R. Ceppellini, Lord Cohen of Birkenhead, Dr. E. B. Ford, Dr. J. A. Fraser Roberts, and Dr. C. A. B. Smith for advice on various aspects of the work and for their comments on this paper. Antisera were kindly given us by Dr. A. E. Mourant and Dr. J. Ruffié. The co-operation of the Merseyside Branch of the College of General Practitioners and its Research Committee, under the chairmanship of Dr. K. M. Cobban and Dr. W. P. O'Regan respectively, was of great assistance, and we are grateful to the many practitioners and house-physicians who helped in the collection of data.

The work has been carried out with the aid of a grant from the Medical Research Committee of the United Liverpool Hospitals. One of us (P.M.S.) is grateful to the Nuffield Foundation for their support, and during the latter part of the work one of us (R.B.McC.) has been in receipt of a personal grant from the Medical Research Council.

The work has been greatly expedited by the untiring efforts of our research assistant, Miss Sheila M. Manning, who collected much of the material both in hospitals and in the homes of relatives, and whose ability and tact in handling reluctant sibs were invaluable.

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OBSERVATIONS ON THE AETIOLOGY
OF CHOLELITHIASIS

BY

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It is generally taught that cholelithiasis occurs characteristically in females who are "fat, forty, and fertile." This description implies that obese multiparous women who are approaching the climacteric are especially prone to gall-stone formation; if valid, therefore, it may lead to a more precise definition of the aetiology of gall-stones—for example, in terms of endocrine disturbances affecting this group of the population.

There have been several investigations into the incidence of biliary calculi among post-mortem specimens (Gross, 1929; Cleland, 1953; Joske *et al.*, 1954), but the results have little significance to the clinician who is concerned with the occurrence of stones in living patients. Nor do such studies in themselves throw much light on the aetiology of gall-stones. Griffin and Smith (1954) carried out a limited survey of the age and sex distribution of patients with cholecystitis. Their conclusions, however, are not necessarily applicable to patients suffering from cholelithiasis.

The present investigation was undertaken as a preliminary attempt to test the validity of the above-mentioned aphorism by comparing the age, sex, fertility, height, and weight distributions of a number of patients presenting with symptoms of cholelithiasis (subsequently confirmed radiologically or at operation) with the supposed distributions in the population at risk. It was found possible to collect complete and accurate data on only a limited number (783) of patients, but it is evident that if the "fair, fat, and forty" epigram is valid, either as a diagnostic aid or for heuristic purposes, it should be suggestively demonstrated by such a sample of unselected cases. An analysis was also made of the incidence of gall-stones among a group of post-mortem cases.

Data were derived from the records of patients suffering from cholelithiasis who entered the Queen Elizabeth and General Hospitals, Birmingham, between August, 1950, and December, 1954. It was not possible to delineate the exact population at risk, since some patients entering the hospitals live outside Birmingham, and some Birmingham patients are treated in other hospitals. We have therefore defined the *related incidence* in each age and sex group as the ratio of the number of cases in

each group to the population of Great Britain in the corresponding group (Census 1951, 1% sample). Our related incidence is therefore expressed as the number of cases in each group per million of the population of Great Britain of corresponding age group and sex. The Census gives no information concerning the parity distribution of women beyond the age of 49. This information was extracted from the *Report on the Family Census of 1946* (1954); the related incidence of married women with gall-stones in each age and parity group is thus expressed per 100 of the estimated population of married women in Great Britain in the corresponding group.

Records of all post-mortem examinations conducted at the hospitals between 1946 and 1954, inclusive, were also scrutinized and all cases noted in which calculi were found in the biliary tract. These data were related to the age and sex distribution of the total population examined after death at the two hospitals during the same period.

Clinical Material

1. Influence of Age and Sex on Related Incidence of Cholelithiasis

A total of 822 patients (163 male, and 659 female) suffering from cholelithiasis were admitted during the period. Of these, 39 were not included in the analysis because the age was not known (6), the marital status was not known (14), or because they were divorced or living apart (19). This left 783 cases (150 male, 633 female).

It may be seen from Table I and Fig. 1 that the disease occurred earlier and had a higher frequency in females than in males for all age groups. The related incidence was highest among females in the age group 50-59 and in males of the 70-79 group. The interval between the date of onset of symptoms and the date at which medical aid is sought is not known, but may be appreciable. It is possible, therefore, that Fig. 1 will describe the age and sex distribution of a population older than they were at the time they first experienced symptoms.

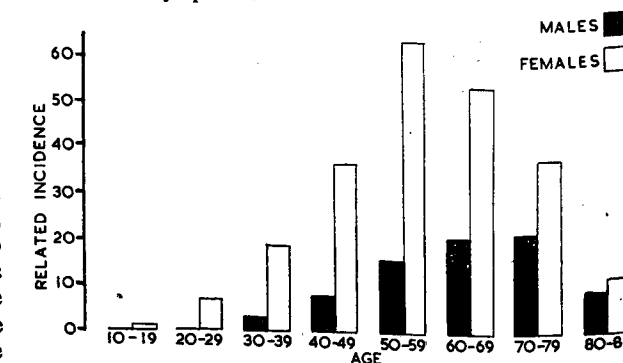


FIG. 1.—Related incidence of gall-stones by age and sex.

TABLE I.—Hospital Cases with Cholelithiasis

Age	Numbers								Related Incidence							
	Males				Females				Males				Females			
	Total	Single	Married	Widowed	Total	Single	Married	Widowed	Total	Single	Married	Widowed	Total	Single	Married	Widowed
0-19	—	—	—	—	2	2	—	—	—	—	—	—	0.6	0.7	—	—
20-29	1	—	1	—	26	3	23	—	0.3	—	—	—	7.4	2.3	—	—
30-39	12	1	11	—	69	4	62	3	3.4	1.8	0.7	—	19.0	7.8	20.6	44.6
40-49	29	—	29	—	138	9	126	3	8.1	—	9.3	—	37.3	16.1	43.1	16.9
50-59	42	2	39	1	201	20	156	25	15.7	8.5	16.8	9.3	63.6	40.7	70.0	59.0
60-69	41	4	35	2	135	13	78	44	21.4	24.1	23.1	8.9	54.4	32.2	60.5	56.4
70-79	23	1	15	7	57	6	22	29	21.6	10.4	22.4	23.7	37.4	23.9	44.9	37.1
80-89	2	—	2	—	5	—	1	—	8.6	—	21.5	—	12.0	—	18.5	13.7
All ages	150	8	132	10	633	57	468	108	7.7	1.2	10.9	1.2	29.3	8.5	38.2	42.2

Biliary calculi were found with consistently greater frequency in single females than males. These findings lend support to the view (Robertson and Dochat, 1944) that factors related to child-bearing are insufficient to account for the sex differences in the incidence of the disease.

2. Fertility

The fertility—that is, number of live-born children—of married women with cholelithiasis was calculated and related to a sample of the population of Great Britain described in the *Report on the Family Census of 1946*. Up to the age of 40 women with gall-stones had rather more children and beyond this age rather fewer children than in the sample (Fig. 2). The period 40-49 appears to be a time of transition. Cholelithiasis occurred more often in married women with children than in nulliparae up to the age of 50 (Fig. 3). After this age gall-stones occurred with greater frequency among the childless than among parous women. The fifth decade is the period during which most women experience the menopause, so that the years before 50 may be designated "pre-menopausal" and those beyond 50 "post-menopausal."

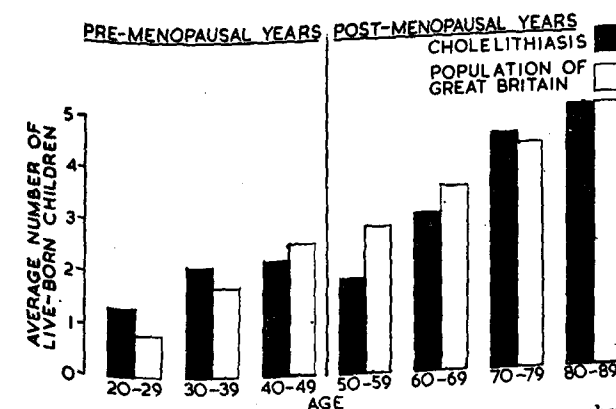


FIG. 2.—Married women according to age and average number of live-born children.

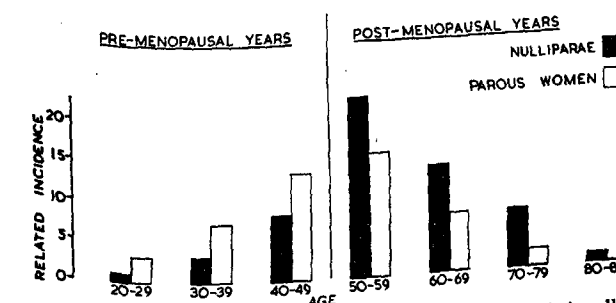


FIG. 3.—Related incidence of cholelithiasis among married nulliparae and married parous women according to age.

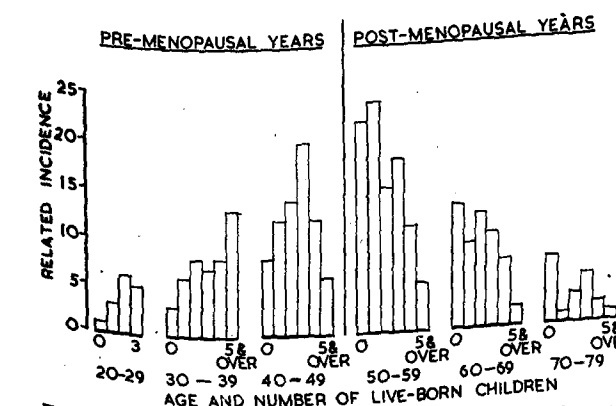


FIG. 4.—Related incidence of cholelithiasis among married women according to age and parity.

50, "post-menopausal." There is a marked difference in the distribution of gall-stones among married women of the post-menopausal years compared with married women of the pre-menopausal years. These differences are also shown in Fig. 4, where data for married women are broken down according to age and number of live-born children. Up to the age of 50 the frequency of gall-stones increases with parity. Among older age groups a reversal takes place, so that cholelithiasis decreases in frequency with parity. Once again the period of 40-49 (the menopausal years) appears to be a time of transition.

Gall-stones occurred with consistently greater frequency in married than in single women (Table I). The related incidence of the disease in widows, who for some part of their lives will have lived with their spouse, lies closer to that of married than to that of single women. The question arises whether the difference between married and single women is wholly accounted for by factors related to child-bearing, for among married women there is a definite relationship between parity and the incidence of biliary calculi. The related incidence of the disease among single women was thus compared with that for married nulliparae (Table II). Since the Family Census data did not include

TABLE II.—Related Incidence of Cholelithiasis in Single Women and in Married Nulliparae

Age	Numbers		Related Incidence	
	Single	Married Nulliparae	Single	Married Nulliparae
20-29	3	2	2.3	2.9
30-39	4	5	7.8	11.5
40-49	9	13	16.1	24.9
Ages 20-49	16	20	6.9	12.1

single women, numbers were related to the distribution by age and marital state of the female population of Great Britain according to the Census of 1951. Unfortunately, the Census gives data on married nulliparae to the age of 49 only. Up to this age, though numbers are small, the direction of trends is constant and shows that gall-stones occurred with greater frequency in married nulliparae than in single women.

The results enumerated above suggest that among women both the marital state alone and the factors related to or consequent upon child-bearing may be of aetiological significance in the development of gall-stones.

Data for males are very few and there is no unequivocal relationship between the incidence of gall-stones and the marital state (Table I).

3. Weight and Height

A two-months sample of women entering hospital with cholelithiasis was reviewed for height and weight measurements, since these data were not recorded in the main group of clinical material. Measurements taken from the 20 patients in the sample were compared with those of a sample of the general population measured by Kemsley (1950). Since the subjects of Kemsley's survey were measured fully dressed, 6 lb. (2.7 kg.) in weight and 1½ in. (3.8 cm.) in height were added, as suggested by Kemsley, to the clinical data, which had been recorded from women who wore no footwear and were clad only in night attire.

The linear regression of height on age was calculated by the method of least squares for our own sample and compared with Kemsley's data (Fig. 5). The curves run closely together. There is no reason to suppose, therefore, that the heights of the patients differ from those of the general population.

The curve of quadratic type fitted to the age/weight data by Kemsley is shown in Fig. 6. The scatter of weight against age was plotted for our data, and a curve of the same order was fitted. It is evident from Fig. 6: (a) that below the age of 50 the women in our sample were almost without exception

heavier, and an average of approximately 25 lb. (11.3 kg.) heavier, than the average for women of comparable age in Kemsley's population; (b) that over the age of 50 there was no preponderance of heavier-than-average women in our population. These findings are also expressed by the curve fitted to our data, which is widely separate from that for Kemsley's data for ages below 50 and close at ages above 50.

Since the distributions of heights of the two populations are closely similar, the generalization which follows is that it seems probable that, below the age of approximately 50,

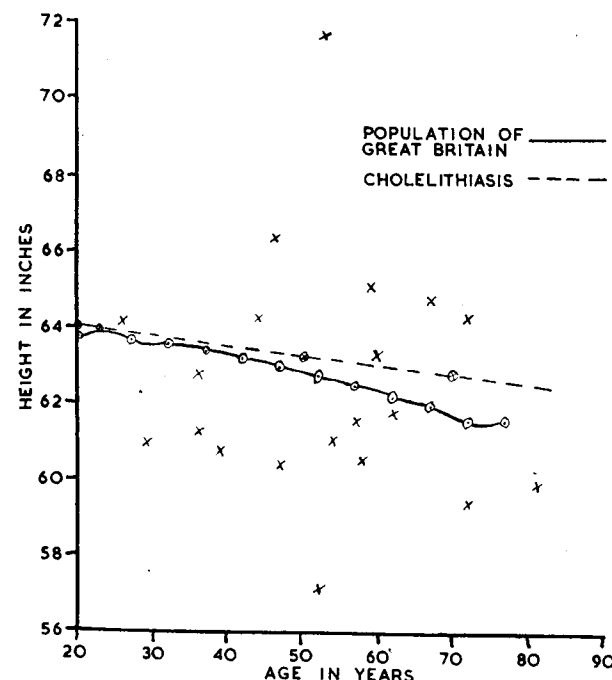


Fig. 5.—Cholelithiasis. Age/height curve of 20 female patients.

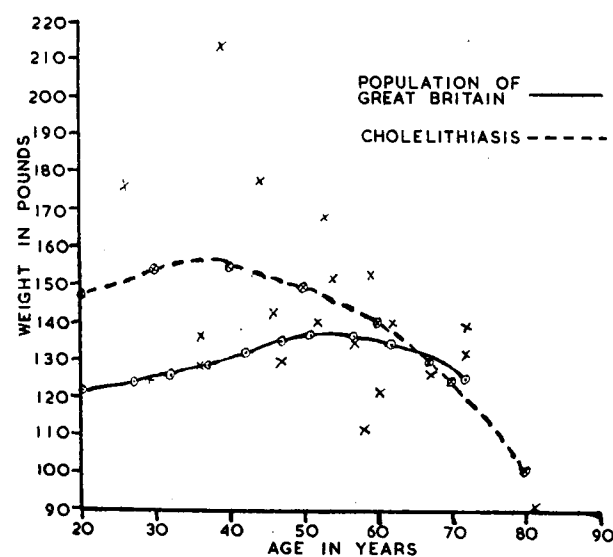


Fig. 6.—Cholelithiasis. Age/weight curve of 20 female patients.

women with biliary calculi are on the average more obese than women of comparable age in a sample of the general population. It would of course be desirable to verify this by examination of the weight/age distribution of a larger sample of cholelithiasis patients; but our results are particularly suggestive (a) in that they show a marked difference in the weight/age distribution before and after 50 years as compared with the estimated distribution for the

population; and (b) in the magnitude of the apparent difference for earlier age groups.

Lowe and Gibson (1955) have shown that at corresponding ages married women with children are heavier than those without. Before the sixth decade gall-stones were more frequent among married women with children than among married nulliparae (Fig. 3). After the menopause the reverse is true. The weight curves thus follow the direction which might have been anticipated on the basis of Lowe and Gibson's report.

Post-mortem Material

The records of all post-mortem examinations (3,523 males, 2,176 females) performed at the Queen Elizabeth and General Hospitals, Birmingham, during 1946-54, inclusive were examined. All specimens in which gall-stones were discovered (492) were recorded according to age and sex and related to the distribution by age and sex of all necropsy cases examined at the two hospitals during the same period (Table III). The bias introduced by the preponderance of

TABLE III.—Incidence of Gall-stones Among Necropsy Specimens

Age	Numbers		Incidence	
	Males	Females	Males	Females
20-29	—	4	—	31.0
30-39	7	10	23.7	50.0
40-49	15	23	26.8	67.9
50-59	46	77	50.9	153.1
60-69	56	83	56.6	143.6
70-79	66	75	116.4	206.0
80-89	15	15	217.4	238.1
All ages	205	287	58.2	131.9

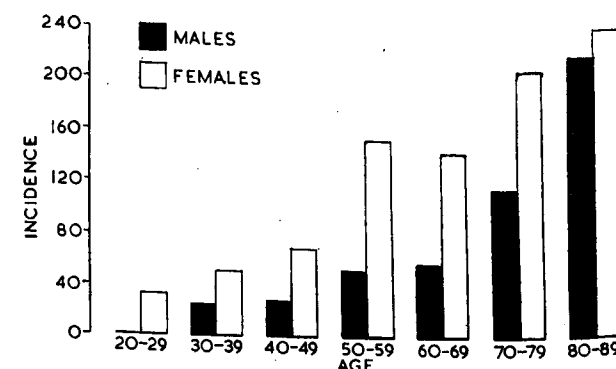


Fig. 7.—Post-mortem material. Incidence of gall-stones by age and sex.

necropsies on male subjects was therefore eliminated. No information was available concerning marital state or parity.

Gall-stones were divided into two groups. Those cases in which the stones were found impacted, or in which other pathological features were noted in the biliary tract, were referred to as "symptomatic" stones, since symptoms referable to the gall-bladder were likely to have been present during life (Table IV). The term "asymptomatic" was used to refer to those calculi found in biliary tracts in which no coexisting pathology was apparent and which were unlikely, therefore, to have given rise to symptoms during life (Table V).

It was found (Fig. 7) that in both sexes the incidence of biliary calculi increases with age and is highest in the oldest age group (80-89). In this group stones occur almost as frequently in men as in women, but below this age among women consistently more than men. Fig. 8 shows that in both sexes gall-stones of the asymptomatic variety are more frequent in each age group than those of the symptomatic variety.

If the information derived from post-mortem material be combined with that from the clinical material, a more

accurate description of the distribution of gall-stones among a living population may be obtained than from consideration of either set of data alone. Thus gall-stones which occur in hospital patients produce symptoms, and in this sense are symptomatic. They do not, however, contribute to the symptomatic post-mortem group, since symptom-producing cholelithiasis is usually treated by cholecystectomy. If such patients come to the post-mortem room at all they are without a gall-bladder. Thus a case that certainly had symptoms will not be included among the post-mortem symptomatic group. The latter will therefore be inordinately small, and would be an inaccurate index of the frequency of cholelithiasis among a living population. This is particularly true of the younger age groups, when

TABLE IV.—Incidence of Symptomatic Gall-stones Among Necropsy Specimens

Age	Numbers		Incidence	
	Males	Females	Males	Females
20-29	—	1	—	7.8
30-39	—	3	—	15.0
40-49	5	11	9.0	32.5
50-59	23	29	25.4	57.7
60-69	26	33	26.3	57.1
70-79	31	34	54.7	93.4
80-89	5	7	72.5	111.1
All ages	91	118	25.8	54.2

TABLE V.—Incidence of Asymptomatic Gall-stones Among Necropsy Specimens

Age	Numbers		Incidence	
	Males	Females	Males	Females
20-29	—	3	—	23.3
30-39	6	7	20.3	35.0
40-49	10	12	17.9	35.4
50-59	23	48	25.4	95.4
60-69	30	50	30.3	86.5
70-79	35	41	61.7	112.6
80-89	10	8	144.9	127.0
All ages	114	169	32.4	77.7

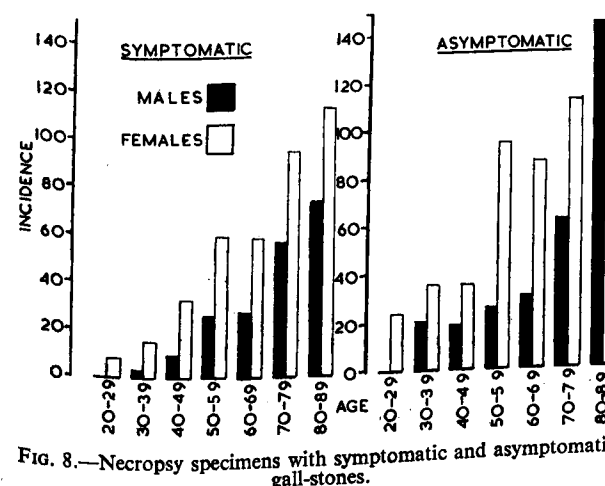


Fig. 8.—Necropsy specimens with symptomatic and asymptomatic gall-stones.

TABLE VI.—Variety of Stones found in Gall-bladders of Necropsy Specimens

Variety of Stone	All Cases				Symptomatic				Asymptomatic			
	Males		Females		Males		Females		Males		Females	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Mixed	71	45.2	122	53.8	32	48.5	53	65.4	39	42.8	69	47.3
Pigment	59	37.6	70	30.8	24	36.4	17	21.0	35	38.5	53	36.3
Cholesterol	27	17.2	35	15.4	10	15.1	11	13.6	17	18.7	24	16.4
Total	157	100.0	227	100.0	66	100.0	81	100.0	91	100.0	146	100.0
Other Not known	7		55		5		2		2		3	

On the other hand, excretion may not occur so effectively in men, as a consequence of which there is a low frequency of gall-stones and a high incidence of atherosclerosis. After the menopause sex differences in cholesterol metabolism may gradually diminish. At this time the frequency of gall-stones and that of atherosclerosis in the two sexes converge. Consistent with this view is the finding that in females the concentration of serum cholesterol increases slowly to equal that of the males by the seventh decade (Jones *et al.*, 1951).

The types of stones found in the biliary tract of post-mortem specimens are classified in Table VI into mixed,

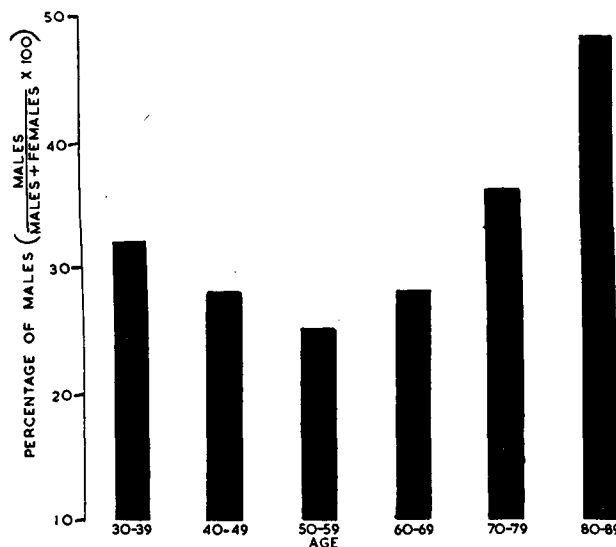


FIG. 9.—Post-mortem material. Percentage of males in each age group.

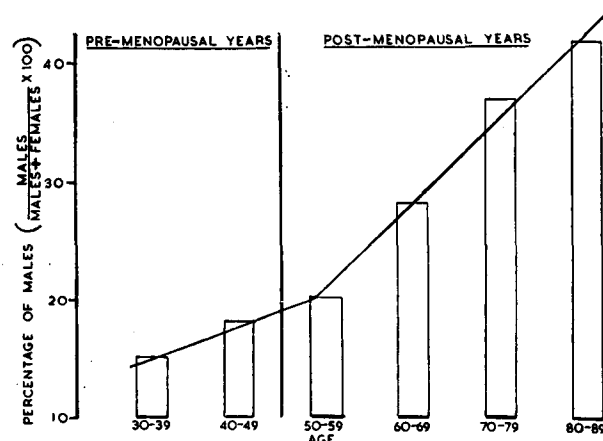


FIG. 10.—Hospital patients with cholelithiasis. Percentage of males in each age group.

pigment, and cholesterol. In each sex the mixed type of stone occurred with greatest frequency, the pigment type next, and the cholesterol stone least. The proportion of mixed stones in gall-bladders showing additional pathology ("symptomatic") was higher than in gall-bladders without additional pathology ("asymptomatic"). These findings suggest that an infected biliary tract is associated with an increased incidence of biliary calculi of the mixed variety. Furthermore, amongst the symptomatic group the proportion of mixed stones in females is substantially higher than in males. This state of affairs may be due to a higher frequency of gall-bladder infection in women than men.

Unfortunately no information is available concerning the frequency of the various types of stones present in diseased gall-bladders of living patients.

Discussion

The aphorism "fat, forty, fertile, and female" may describe a certain patient, but it does not describe the "typical" patient suffering from cholelithiasis. The use of the dictum is thus undesirable, since it tends to focus attention on a small group of those affected by the condition.

Some of the findings of the present study warrant further comment. First, however, it is necessary to remark briefly on two of the factors contributing to the formation of gall-stones, factors which appear to be of particular significance to the discussion which follows. It is generally accepted that biliary calculi may be produced (1) consequent on an increased excretion into the gall-bladder of cholesterol, and its subsequent precipitation out of solution; and (2) following infection of the gall-bladder (Cappell, 1951).

During the years of the menopause and immediately following it, great changes take place in the endocrine system. The ovaries gradually become atrophic (Engle, 1955), ovulation ceases, and the cyclic production of oestrogens and progesterone no longer takes place. These hormones appear to exert some influence on the blood cholesterol (Okey and Boyden, 1927); both are steroid compounds, the basic structure of which is the cholesterol molecule (Pincus *et al.*, 1955). Andrews *et al.* (1932) state that cholesterol-containing stones make up a large majority of all human gall-stones. It is not impossible, therefore, that the changing endocrine balance expresses a modification of cholesterol metabolism which is related in some way to the high incidence of biliary calculi in women during the immediately post-menopausal years. Furthermore, Pincus *et al.* have shown that the average androgen outputs of men and women converge in the later decades, when the output of oestrogens in women is actually lower than in men. Thus in the older age groups hormonal differences between the sexes become less clearly defined. These changes may be one of the factors responsible for the diminishing sex differences in the frequency of stones in the older age groups, and may also account for the relationship which has been suggested between gall-stone formation and atherosclerosis.

There are other factors, however, which must be considered in the possible relationship between endocrine metabolism and gall-stone formation. During pregnancy the ureters dilate. One of the causes of this dilatation is ascribed by Stuermer (1947) to the relaxing effect of the follicular and corpus luteum hormones on the smooth-muscle component of the wall of the ureters. The muscle of the bile ducts and gall-bladder are involuntary. Under the influence of the female sex hormones the muscle may relax, the biliary passages dilate, and the duodenal contents or pancreatic secretions regurgitate into the gall-bladder and there promote conditions favourable to the formation of calculi. In this connexion it may be significant that there is a higher proportion of mixed stones and hence, probably, a higher proportion of infection in the gall-bladders of women than of men.

It is difficult to account for the change in the incidence of gall-stones which occurs among married women after the menopausal years. The fact that the change occurs so abruptly is strongly suggestive of a relation with the climacteric, though the nature of this relation, if any, is by no means obvious.

It is concluded that the frequency of gall-stones increases with age in both sexes, but that among women these trends are modified by factors operating in and related to the child-bearing period.

Summary

An investigation was made into the incidence of gall-stones among hospital patients and post-mortem material.

Among hospital patients the related incidence was highest in females of the 50-59 age group and in males

AETIOLOGY OF GRAVES'S DISEASE IN RELATION TO RECENT EXPERIMENTAL FINDINGS

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Emotional Trauma and Graves's Disease

The occurrence of hyperthyroidism following a severe fright was first reported by Parry in 1825, when he described the condition that was later to be called Graves's disease. Ever since this first account innumerable papers describing the condition have confirmed the frequency with which emotional or psychological upsets precede the onset of thyrotoxicosis. The French school of Charcot (1859), Trousseau (1867), and others believed the disease to be nervous in origin, either a form of hysteria or associated with a definite but undetermined lesion. Such further publications as those of Crawford (1897), Marañón (1921), Deutsch (1923), Lewis (1925), Bram (1927), Moschowitz (1930), Goodall and Rogers (1933), and many others afford evidence of the relation between psychic trauma and the onset of the hyperthyroid state.

More recent work has been devoted to the type of individual and type of disturbance likely to be associated with thyrotoxicosis. Lidz and Whitehorn (1950) have described the type of patient in whom Graves's disease occurs as one highly dependent on interpersonal relationships for his security. This relationship is often familial, such as that of a daughter to mother or a mother to child. There is little latitude for adaptability, and the patient feels abject and helpless without such symbiotic relationship. These patients react in a highly emotional or exaggerated fashion to the disruption, or threat of disruption, of such a relationship. It is this type of emotional stress which threatens their security that is apt to precipitate Graves's disease.

It has been stated that the incidence of Graves's disease declines in times of economic depression, and it is possible that such social conditions bind families into closer-knit units. On the other hand, however, it is clear that emotional stress does not result in Graves's disease in a high proportion of the population. The aerial bombardment of large towns and cities during the last war did not appear to increase the incidence of thyrotoxicosis, though in some Scandinavian countries subject to occupation thyrotoxicosis is said to have reached epidemic proportions (see discussion following the paper of Lidz and Whitehorn, 1950). If emotional stress is an aetiological factor of importance, as seems likely, it is not the sole factor underlying the onset of the disease.

In view of the possible relationship between the central nervous system and thyroid activity, it became of interest to see the effect of prolonged (one to seven days) electrical stimulation of the hypothalamus on thyroid activity.

of the 70-79 age group. The frequency was higher in women than in men for all ages, though the differences were very small in the 80-89 group. At ages below 50 gall-stones were more frequent in married women without children than in single women, and more frequent in married women with children than in married nulliparae. Beyond the age of 49 the related incidence was higher in married nulliparae than in married women with children.

It was argued that by combining data from clinical and post-mortem material a more accurate description of the distribution of gall-stones in the living population could be obtained than from consideration of either set of data alone. It was found that gall-stones increase in frequency with age, but that in females after the sixth decade and males after the eighth there is a high proportion of "silent" stones.

It is concluded that, in women, age changes in the incidence of cholelithiasis are modified by factors operating in and related to the child-bearing period.

In the years following the female climacteric, sex differences in the incidence of cholelithiasis appear to diminish until there are virtually no differences in the oldest age group.

At ages under 50, women with gall-stones were heavier than normal women of a comparable age and height. After 50, differences in weight were no longer apparent.

Analysis of stones found at necropsy showed the mixed type to be most frequent, the pigment type next, and the cholesterol type least frequent in both sexes.

Comparisons were drawn between the incidence of gall-stones and of atherosclerosis. Prior to the menopause there is a sex difference in cholesterol metabolism. It is suggested that this difference is expressed in women by a high frequency of cholelithiasis and a low frequency of atherosclerosis, whilst the reverse occurs in men. After the menopause, when hormonal differences between the two sexes become less clearly defined, the pathways of cholesterol metabolism may converge and so account for the diminishing sex differences in the related incidence of gall-stones and atherosclerosis among the older age groups.

My thanks are due to Professor Lancelot Hogben, F.R.S., Dr. R. G. Record, and Dr. R. H. Cawley for their interest in this work; to Dr. Wallis Taylor for his assistance with the statistical analysis of the data; and to Professor J. W. Orr for allowing access to the post-mortem records.

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Electrical Stimulation of Hypothalamus, Thyrotrophic Secretion by Anterior Pituitary Gland, and Thyroid Activity in the Normal Animal

Few reports in the literature describe the effects of electrical stimulation of the hypothalamus on the thyroid gland. Green and Harris (unpublished, quoted by Harris, 1955) saw no increase in the oxygen consumption of rabbits following prolonged stimulation of the hypothalamus, but drew no conclusions from these data owing to the limitations of the method for measuring metabolic rate in rabbits. Colfer (1949) observed histological signs of increased thyroid activity in rats and rabbits after four one-hour periods of hypothalamic stimulation on each of two days.

In a recent study Harris and Woods (unpublished) have employed the method of remote control (de Groot and Harris, 1950) of electrical stimulation as applied to various regions of the hypothalamus and pituitary gland, and the ^{131}I output method (Brown-Grant, von Euler, Harris, and Reichlin, 1954) for indicating changes in thyroid function. These techniques permit (a) electrical stimulation to be applied to the unanaesthetized and unrestrained animal for long periods (usually 48 hours), and (b) continuous observation of thyroid activity to be made over an interval of 10 to 14 days. Out of 35 experiments on 22 rabbits in which the electrode was situated in some part of the hypothalamus or pituitary gland, stimulation resulted in thyroid inhibition in 20, no change in thyroid activity in 14, and a questionable result in one case. In one further animal a definite increase in thyroid activity occurred on two occasions. Since thyroid acceleration was observed in only 2 out of 37 experiments it was felt possible that some other factor was inhibiting or masking the effects of an increased secretion of thyrotrophic hormone in these experiments. One possibility appeared to be that the secretion of the adrenocorticotrophic hormone and excitation of the adrenal cortex known to follow such hypothalamic stimulation prevented in some way the pituitary secretion of T.S.H.

Effect of Adrenal Steroids on Thyroid Activity

It is now well established that electrical stimulation of the tuber cinereum elicits increased discharge of corticotrophin from the anterior pituitary gland and a rise in the concentration of the adrenal cortical steroids in the blood (de Groot and Harris, 1950; Hume and Wittenstein, 1950; Porter, 1953, 1954). The effect of the injection of corticotrophin or adrenal steroids on thyroid activity has been studied by many workers using different criteria for assessing such activity. A depression of ^{131}I uptake by the thyroid gland has been found to follow administration of corticotrophin or cortisone to man (see Hill, Reiss, Forsham, and Thorn, 1950; Berson and Yalow, 1952; Kuhl and Ziff, 1952), rabbit (Myant, 1953), and rat (Money, Krantz, Fager, Kirschner, and Rawson, 1951; Perry, 1951; Albert, Tenney, and Ford, 1952; Verzar and Vidovic, 1952; Migeon, Gardner, Crigler, and Wilkins, 1952). A similar depression of thyroid activity following the administration of corticotrophin and cortisone has been shown in the rat (Brown-Grant, 1955, 1956) and rabbit (Myant, 1953; Brown-Grant, Harris, and Reichlin, 1954; Brown-Grant, 1956) using the ^{131}I output method.

That the inhibition of the thyroid following the injection of corticotrophin is due to adrenal activation is shown by the fact that corticotrophin injection in cases of Addison's disease (Hill *et al.*, 1950) or into adrenalectomized rats (Brown-Grant, 1956) is without effect on thyroid function. It is also of interest that injection of both corticosterone and hydrocortisone (which are known to be secreted by the rabbit adrenal cortex) inhibit the release of radioactive hormone from the rabbit thyroid (Brown-Grant, 1956).

It is probable that the adrenal steroids affect thyroid activity by suppressing the secretion of thyrotrophic hormone from the anterior pituitary, since cortisone was found not to influence the response of the thyroid gland of the hypophysectomized rabbit to injection of T.S.H. (Brown-Grant, Harris, and Reichlin, 1954).

Electrical Stimulation of the Hypothalamus and Thyroid Activity in the Adrenalectomized Animal

In view of the above data the effect of electrical stimulation of the tuber cinereum on thyroid activity was investigated in adrenalectomized rabbits maintained on constant daily doses of cortisone. Fourteen such rabbits have been studied (Harris and Woods, unpublished), using the techniques mentioned above. Electrical stimulation evoked a marked and consistent increase in thyroid activity in 20 experiments on 10 animals (though previous to adrenalectomy these animals had shown thyroid inhibition in 10 experiments and no change in thyroid activity in five experiments). Ten experiments in the other four animals showed no observable change in thyroid function on eight occasions, an inhibition on one occasion, and a questionable result on one occasion. The precise location of the region stimulated in the various animals has not yet been determined by histological study, but the radiographic evidence suggests that it is stimulation of the median eminence of the tuber cinereum which results in increased thyroid activity.

During five experiments on four rabbits in which increased thyroid activity was observed from measurements of the thyroidal radio-iodine, estimations of the plasma radio-activity revealed a marked increase (up to $\times 3\frac{1}{2}$) during the period of stimulation. It is significant that hypothalamic stimulation could maintain an increased level of thyroid activity even in the presence of a high concentration of thyroid hormone in the blood. Five out of the 10 rabbits that showed a marked acceleration of thyroid activity during stimulation eventually died, suddenly and unexpectedly, while being stimulated.

In view of the striking difference in the results obtained in normal and adrenalectomized animals, it is of interest to consider the data regarding adrenal cortical function in Graves's disease.

Adrenal Cortical Function in Graves's Disease

An important relationship between the adrenal cortex and Graves's disease has been suspected for many years. Boyd (1944) states: "The more carefully the matter is studied the more clearly does an underlying relationship become evident between three such apparently different conditions as exophthalmic goitre, status lymphaticus, and Addison's disease." In 1921 Marine and Baumann reported increased heat production, increased respiratory exchange, and a symptom-complex resembling exophthalmic goitre following removal or damage to the adrenal glands in rabbits. Marine (1930) pointed out that thyrotoxicosis in the human is often associated with signs of adrenal cortical underactivity (lymphoid hyperplasia and a large thymus) and a small adrenal cortex. LeCompte (1949) measured the width of the adrenal cortex in cases of Graves's disease and found a significant narrowing of the cortex in such cases. The onset of Graves's disease has been noted to follow x-ray damage to the adrenal cortex in the human (Oppenheimer, 1937), and the incidence of thyrotoxicosis has been reported to be ten times greater in patients suffering from Addison's disease than in normals (Frederickson, 1951).

The techniques developed for estimating adrenal cortical activity during life have shown that in hyperthyroidism the urinary excretion of 17-ketosteroids may be low (Fraser, Forbes, Albright, Sulkowitch, and Reifenstein, 1941; Shadaksharappa, Calloway, Kyle, and Keeton, 1951; Corvilain, 1953), the excretion of reducing steroids may be normal or slightly increased (Shadaksharappa *et al.*, 1951; Talbot, Wood, Worcester, Christo, Campbell, and Zygmontowicz, 1951), and the urinary formaldehydogenic steroids are decreased (Daughaday, Jaffe, and Williams, 1948). In the study of Daughaday *et al.* (1948) serial studies of a patient showed that a severe exacerbation of the thyrotoxic state was accompanied by a fall in the excretion of formaldehydogenic steroids.

In a more recent study (Levin and Daughaday, 1955) the excretion of urinary 17-ketosteroids and 17-hydroxysteroids

was found to be within the normal range in hyperthyroidism. The surprising feature of these data is that urinary excretion of adrenal steroids is not greatly increased in Graves's disease, for the administration of exogenous thyroxine is known to result in adrenal hypertrophy (Wallach and Reineke, 1949; and others), an increased excretion of 17-ketosteroids in the guinea-pig (Levin and Daughaday, 1955), and an increased excretion of 17-ketosteroids in man (Corvilain, 1953). Also the emotional and physical state of a patient with thyrotoxicosis would appear to afford a strong stimulus for adrenal cortical hyperactivity. It is probable, then, that there is a relative, if not an absolute, degree of adrenal cortical hypoactivity in this condition.

General Conclusions

A comparison may be drawn between (1) the findings of Harris and Woods (unpublished) that electrical stimulation of the tuber cinereum of the hypothalamus in the normal rabbit results in inhibition of, or no change in, thyroid activity (rarely thyroid acceleration), whereas the identical procedure in the same animals after adrenalectomy results in a consistent and marked increase in thyroid function; and (2) the clinical observations relating emotional stress and relative adrenal insufficiency with the state of thyrotoxicosis.

In a patient with Graves's disease it is possible that some stressful stimulus has resulted in decreased adrenocortical activity and increased thyroid activity. Such a response would seem to be the reverse of that which occurs in the normal individual. In support of this view is the clinical evidence of Hill *et al.* (1950) that corticotrophin administration may induce remission in early cases of thyrotoxicosis.

Summary

It has been found that electrical stimulation of the hypothalamus rarely elicits increased secretion of thyrotrophic hormone in rabbits with intact adrenal glands. Prior to adrenalectomy increased thyroid activity was observed in only one rabbit out of 22 during electrical stimulation of the hypothalamus. In 35 experiments on 21 such rabbits thyroid activity was either unchanged or actually decreased.

After bilateral adrenalectomy, performed on 14 of the 22 rabbits, hypothalamic stimulation consistently elicited a marked increase in thyroid activity in 20 experiments on 10 rabbits.

Thyroid activity was estimated by measuring the rate of release of ^{131}I from the thyroid and the blood concentration of P.B. ^{131}I . Electrical stimulation of the brain was carried out in unanaesthetized and unrestrained rabbits by the remote control method.

These results seem to be of interest with respect to the aetiology of Graves's disease, since: (1) there is a probable relationship between psychological trauma and the onset or exacerbation of the state of hyperthyroidism; and (2) numerous clinical reports suggest that either a relative or an absolute adrenal insufficiency is a concomitant of Graves's disease.

It is felt that investigation of the effects of corticotrophin administration in early, previously untreated cases of Graves's disease would be of interest.

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PREFRONTAL LEUCOTOMY

VIEWS OF PATIENTS AND THEIR RELATIVES

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Recent correspondence in the *Lancet* and the *British Medical Journal* has shown that there are still widely diverging views on the value of leucotomy in the treatment of mental disorders. Critics object either that the deleterious effects of the operation are insufficiently appreciated and outweigh trivial symptomatic improvements if such occur, or that if beneficial results are obtained then they are in some ill-specified way not ethically justifiable. Thus it has been stated that all the surveys which show favourable results have been published by those who are emotionally prejudiced in favour of this treatment (Allen, 1955); and that the majority of surgeons do not know how badly their operations turn out (Standley, 1955; Atkinson, 1956). Winnicott (1956) has said that even if he were convinced that a leucotomy could be good he would still believe it was bad; and he has observed that many of his patients have a deep fear of leucotomy. Hardenberg (1956) confirms this finding, adding that the fear may be so deep that it can be unearthed only with difficulty. Tow (1956) attributes much of this fear to scare articles in the lay press.

Published reports of results, for reasons of space, commonly confine themselves to overall assessments made by the authors and such objective observations as rates of discharge from hospital and proportions of patients at work. However, these are not always found convincing, and it can be and is argued that leucotomy represents some form of degradation. Better for the

patient, it is claimed, that he should continue indefinitely an incapacitating battle with pathological ideas and emotions than that he should resign himself to becoming a diminished personality, the struggle abandoned, in a socially tolerated role. Overall assessments have a subjective aspect. Subjectivity in the judgment of results obtained is not to be excluded altogether, and there is some advantage in seeing what emerges if we change the judge. In the material which follows we have excluded all consideration of our own views of what has happened to our patients, and report solely what the patients themselves and their relatives think.

Material and Method

The subjects of the present analysis are all the patients from the public wards of the National Hospital who were leucotomized there before June, 1954, together with those patients from the private wards with whom one of us (E.S.) was clinically concerned. Two patients transferred to the Radcliffe Infirmary for cingulectomy by the late Sir Hugh Cairns have also been included. The great majority of these patients have attended, with their relatives, at regular intervals at a follow-up clinic, where consistent efforts at the greatest attainable degree of rehabilitation have been made. In addition, home visits have been made by the psychiatric social worker in nearly all cases, and contacts have been established with the disablement rehabilitation officers and employers. The assessments which are the basis of this paper have been obtained at the follow-up clinic or in the patients' homes. The diagnoses have been intractable pain (22 cases), excessive emotional reactions to physical symptoms such as tinnitus or involuntary movements (19 cases), chronic anxiety or tension states (36 cases), endogenous depression (21 cases), and schizophrenia (5 cases). There was a total of 46 standard and 57 modified operations. The average lapse of time between the operation and the taking of the assessments was 31 months, the shortest time being six months and the longest 104 months.

In making these formal assessments a modified "open-ended" interview technique was used. Each patient was asked the same six questions: (1) Whether the operation had helped him and, if so, how? (2) Which symptoms had improved (or) had any symptoms improved? (3) Which symptoms had not improved? (4) Had he noticed any bad effects? (5) Had he noticed any change in personality? (6) Was he glad that he had had the operation, did he regret it, or was he undecided? (This last question was arranged as a five-point scale: see Table I.) Free spontaneous elaboration of answers under all these heads was invited.

The relative was asked whether the operation had relieved the patient, which symptoms were relieved, and which had not, whether any bad effects could be reported; and he was asked to assess the value of the operation to the patient on a five-point scale from much improved to much worse (see Table I). He was further asked whether, with his present knowledge, he would in similar circumstances again give consent. And, finally, he was asked about the social consequences of the operation, how it had affected his own life and his relationship with the patient. After these questions both patient and relative were taken through the complete range of pre-operative symptoms and disabilities to ascertain their present standing.

Results

Of the original 118 patients who fall into this series, five died as a direct consequence of the operation; one other patient failed to survive six months, dying of an intercurrent cerebral accident; four others died of natural causes before the assessment was made, and one committed suicide. Of the remaining 107 cases, the assessment has been mislaid in two cases, was made to a questionnaire since abandoned in one, and was blocked by a relative in a fourth, the husband maintaining that post-operative improvement had been brought about by spiritual means. The data provided by the residual 103 patients (96% of the survivors) are presented in

Relatives' Opinion	Patients' Opinion					Totals
	Very Glad	Definitely Glad	Indeterminate	Regrets	Great Mistake	
Great improvement	23	14	4	—	—	41
Some ..	6	10	10	5	—	31
Little change ..	1	3	4	2	—	10
Slightly worse ..	—	1	2	1	1	5
Much ..	—	1	2	1	2	6
None available ..	3	4	1	2	—	10
Total ..	33	33	23	11	3	103

Table I. The views of a close relative or friend, obtained at a formal assessment interview, are available for 93, or 90%. In the 10 remaining cases no relative with adequate knowledge was available in four, the assessment has either not yet been made or has been mislaid in four, and in two cases the patient has requested us not to contact relatives.

Table I shows a marked but not complete agreement between patient and relative on the value of the operation. Rather surprisingly, considering that leucotomy is supposed to produce personality changes of an antisocial type, the relatives were more favourably impressed than the patients. Of the patients, 65% were glad they had had the operation, 32% very glad; of the relatives, 78% thought there had been improvement, 45% that there had been great improvement. Disagreement between patient and relative is clearly, in part at least, due to the fact that they were required to answer rather different questions. However, in the 72 cases where the relatives thought there was improvement the patient regretted the operation in only five, and in the 66 cases where the patient was glad to have had it relatives thought they were worse in only two.

At the time when these interviews were being conducted our predilections were more for modified operations than for standard ones. If the interview had any suggestive effect in eliciting favourable reports (which we do not believe), then this effect should be greater in the reports of patients who had had modified operations than in those who had had standard ones. Actually, the latter group of patients gave the more favourable answers (39 "glad," 3 "indeterminate," 4 "regret," as against 27, 20, 10). The reports of relatives also tended to favour standard rather than modified operations.

Personality Changes, Bad Effects, and Social Adjustment

Of our 103 patients, 46 denied both that there had been any bad effect and that there had been any personality change of any kind; 14 denied any bad effects but claimed that there had been personality changes which were regarded as beneficial; 11 others, also denying bad effects, said that there had been personality changes which they felt were unfortunate. The remaining 32 patients all reported bad effects—15 with unwelcome changes of personality, 16 with no such change, 1 with a favourable change. In all, 43 patients reported either bad effects or an unwelcome change of personality, or both.

Bad effects, apart from personality change, are not of a very impressive kind: eight patients reported an increase in one or more of their symptoms, six complained of pains or unpleasant sensations in eyes or head which they attributed to the operation, one patient complained of fits, one of frequency of micturition, one of depersonalization and difficulty in making decisions, one that the certification which had followed operation meant that he would not be able to emigrate.

Among personality changes the most common complaints, with numbers reporting them, were: increased irritability (12), emotional flatness (11), lack of energy or laziness (7), intellectual impairment (6), tactlessness (5), loss of self-assertiveness (3), decreased ability to mix socially (3), lack of personal tidiness (2), lack of self-confidence (1). One woman claimed she was now able to assert her ideas more than before. Unfortunately these were Christian principles

relating to the status of coloured people, and she asserted them at bridge parties in South Africa. Since this embarrassed her husband, and she herself regretted it, the tendency has been recorded as a personality deficit under the heading of tactlessness. Another woman, after the operation less preoccupied with her own symptoms, now complained of greater sensitivity to those of others, her husband's uncouth eating habits particularly distressing her. A handful of other patients had complaints which they had difficulty in characterizing, or which do not fall under any of the main headings.

Fifteen patients, when asked about personality changes, said that there had been such changes, but of a beneficial kind; only one of these patients thought that there had also been some bad effect. These favourable changes are mostly classifiable as increased stability of affect and a reduced liability to unpleasant emotional reactions. Increased self-confidence, increased confidence in others, increase of energy, initiative, and of interests are also mentioned. A patient who had had several years of orthodox psycho-analysis claimed that the operation had made him more adult and less narcissistic.

As might be expected, bad effects following the operation were more readily and more often recognized by the relatives than by the patients; nevertheless there was fairly good agreement. There was also close agreement in the kinds of bad effect reported, and the list quoted above provided by the patients is duplicated by the relatives, with somewhat increased numbers (see Table II). Irritability,

TABLE II.—Incidence of Certain Defects in 93 Cases

Nature of Defect	Report by Either Relative or Patient	Report by Relative	Report by Patient
Irritability	30	25	12
Lack of energy, laziness	15	12	6
Emotional flatness	23	15*	11
Intellectual or memory defect	12	7	8†
Tactlessness	13	11	5

* Includes two cases where the reduction in emotional responsiveness was regarded by the patient as an asset.
† Includes one case in which the patient did not regard this impairment of his powers of memory as a deficit, since they were reduced from phenomenal to normal.

lack of energy or laziness, and tactlessness were reported by the relatives twice as often as they were mentioned by the patients; though sometimes they were reported by the patients and not by the relatives. Although emotional flatness was reported more frequently by the relatives, they were patients were in general aware of this defect, and they were actually more sensitive to defects of memory and intellect than the relatives.

In addition to the above, relatives also reported, in individual cases, fits, frequency of micturition, difficulty in finding words, selfishness, restlessness, excitability, and an increasing interest in sex. The relatives reported some bad effects in 59% of the cases in which a standard leucotomy had been performed, and in 53% of those in which the operation was a modified one.

When asked about the effects of the operation on the personal relationship between informant and patient, 45 relatives replied that this had improved, 28 that there was no significant change, and 20 that there had been a deterioration. In these 20 cases irritability was reported in 15, lack of energy in 7, tactlessness in 4, emotional flatness in 4, and memory or intellectual impairment in 3. Irritability was by far the most ominous change and the one most likely to be associated with social deterioration.

Discussion

The aim of this paper is to present the solicited but unselected testimony of patients and their relatives about leucotomy. Of the 103 patients available at the time of the inquiry only three regarded their operation as a great mistake. Eleven others regretted having had it, but in

five of these cases the relative reported definite improvement, and in two more they said that the patient was no worse.

It is not appropriate here to raise the question of how far these results may justify the operation on certified patients without their consent. In the present series the operation was carried out only on the request of the patients themselves. It is clear from their replies to the questionnaire that they would, in the majority of cases, now regard any psychiatrist who had previously advised them against the operation as having been mistaken. On the other hand, they would regard with scepticism Pippard's (1955) statement that "positively undesirable changes" occurred in only 2 of a series of 114 cases treated by modified leucotomy.

There is an unfortunate tendency in the literature either to disregard favourable personality changes or to confuse personality changes of any kind with bad effects. Changes of personality that are regarded as favourable by patients and relatives are not uncommon, and may be independent of symptomatic changes. They may well be brought about by more than one mechanism. Thus Pippard (1955), in his series, reports a favourable change in energy output in seven patients, and attributes it to the removal of hampering symptoms. It might as easily be the case that an increase in energy, perhaps analogous to the increase in appetite often noticed after operation, has, through the activation of basic emotional drives and the arousal of normal interests, provided a primary contribution to the alleviation of symptoms. We argue all too easily that damage to tissues which appear normal under the microscope can produce nothing but defects, and that then, if symptomatic improvements occur, some defect must be called on to account for them. Surely the fact that leucotomy is a crude therapeutic weapon, and that unnecessary and unwanted changes are often produced by it, should not blind us to the observation that occasionally it may produce effects which are wholly beneficial.

Few will doubt that the incidence of personality defects is larger with more extensive operations than it is with modified ones (Meyer and Beck, 1954; Pippard, 1955). In the present series patients and relatives detected bad effects with approximately the same frequency in the standard and the modified series. Since those who had a full leucotomy made better symptomatic improvements than those who had only a partial operation, it would seem that, if the result obtained is generally good, side-effects may not only appear less important or less bad but also may actually be less readily detected. Any particular change of personality cannot be regarded as good or bad in itself, though there are some changes, such as irritability, whose effects are nearly always bad. With most changes of personality there are both good and bad sides to its effects; all that is observationally possible is to say whether the patient as a whole has benefited or has suffered. Even this is a question which can only be answered in a defined context. There are patients who consider themselves better and are considered worse by their relatives, and a more numerous group to which the opposite applies. By what standards are we to say that one opinion is right and the other wrong?

Summary

A series of 103 patients have been asked for their views about the value to them of a leucotomy-type operation: 66 were glad to have had the operation, 11 regretted it, and 3 thought it had been a great mistake; 23 were neither glad nor sorry that they had had the operation.

The views of 93 relatives were also obtained: 72 thought the patient was better off, 11 thought the patient was worse, 10 thought it had made little difference.

Unwelcome changes were reported by the patients in 43 cases and by the relatives in 51 cases.

In the present series a good result was reported much more often with a standard operation than with a

In seven cases the disease was so advanced that even laparotomy could not be advised; if these are excluded the operability rate rises to over 70%. Eight cases might be open to question: those where inoperability was judged on the fixity of the growth and the presence of enlarged glands, both of which conditions may be inflammatory and not due to growth. When these are the only contraindications to resection it is well worth removing the growth if at all possible.

Elective Surgery: Resection

Colon.—In this series 178 resections were performed for carcinoma of the colon; the operative measures used are shown in Table VI. The use of a Paul-Mikulicz operation

TABLE VI.—*Resection for Carcinoma of Colon*

		1945-50	1950-5
Right colon (71)	End-to-end	20	50
	Paul-Mikulicz	1	0
Left colon (50)	End-to-end	6	23
	Associated bowel drainage	(3)	(11)
Sigmoid colon (57)	Paul-Mikulicz	12	9
	Hartman's operation	8	35
	Associated bowel drainage	(4)	(15)
	Paul-Mikulicz	8	3
	Hartman's operation	1	2

on the right colon has never been popular in this country because of the small-intestinal fistula. The figures suggest that it is now less frequently used in the remainder of the colon. Excluding the right colon, end-to-end resection without bowel drainage was used in only 39 cases (36.4%). This figure seems low, but it was associated with a group in which 20.2% of all patients with colonic growths were admitted in acute obstruction.

Rectum and Recto-Sigmoid (Table VII).—The standard radical operation for these cases was some form of combined excision. Anterior resection was used for certain growths in the upper rectum and recto-sigmoid, while perineal resection and Hartman's operation were occasionally used for frail patients.

TABLE VII.—*Resection for Rectal and Recto-sigmoid Carcinoma (417)*

No.	1945-50	1950-5
Operable (palliative operations included)	178	239
Perineal resection	128 (71.9%)	186 (77.8%)
Hartman's operation	5 (2.8%)	5 (2.1%)
Anterior resection	33	52
Abdomino-perineal	64 (4.4%)	88 (36.8%)
Synchronous combined	14 (4.4%)	33 (13.8%)
Perineo-abdominal	7	2
Pelvic exenteration	—	4 (1.7%)
Operative mortality	7.8%	7.5%

The frequency with which *anterior resection* has been used—85 out of 314 resections (27%)—is rather higher than it would normally be for purely rectal growths and is due to the inclusion of recto-sigmoid growths in this group. Those selected for anterior resection should be early growths, not of high malignancy, at least 10 cm. from the anal verge, 5 cm. above the reflection of the peritoneum in the pouch of Douglas, and ensuring that a clear margin of bowel 5 cm. in length can be removed below the growth. There were no deaths among these 85 operations, and this has reduced the overall mortality rate: if these cases are excluded the mortality rises by 3%. The figures in this series suggest that while the abdomino-perineal operation is still in common use the *synchronous combined operation* is gaining in favour. The overall mortality of the abdomino-perineal operation was 7.9% and that of the synchronous combined operation 14.9%, but in the last five-year period both operations had the same operative mortality—9%. *Pelvic exenteration* was used on four patients with one death.

Operative Mortality

Colon.—Resection was performed on 178 patients with 18 deaths (Table VIII), a mortality of 10.1%.

Rectum and Recto-Sigmoid.—Resection was performed on 314 patients with 24 deaths (7.6%).

TABLE VIII.—*Causes of Post-operative Deaths*

Colon	Rectum
Peritonitis	4
Pulmonary embolus	4
Shock	2
Cardiac failure	2
Uraemia	2
Sepsis	1
Cerebral thrombosis	1
Coronary	1
Small-bowel obstruction	1
	3
	3
	4
	4
	3
	2
	2
	2
	1

In the three hospitals concerned in this series, pre- and post-operative exercises were routine throughout the greater part of this ten-year period, yet it is interesting to note that fatal pulmonary embolus equalled peritonitis as the most common cause of death.

Recurrence

Among patients dying from recurrence after resection there were 145 in whom necropsy or other evidence was sufficient to indicate the main metastases at death. Only a limited number were submitted to necropsy, and while the recurrence rate for the liver may be overestimated it will certainly be underestimated for the lungs, adrenals, skeleton, and lymph nodes. Brown and Warren (1938), in a series of necropsies on cases of rectal cancer, found hepatic metastases in 34%, pulmonary in 22%, adrenal in 11%, and occasional metastases in sacrum, spine, thyroid, and brain. In the present series the percentage of those dying from recurrence with liver metastases was 50.5% for the rectum and 48% for the colon, with pulmonary metastases 13.2% for the rectum and 6% for the colon, and with skeletal metastases 17.6% for the rectum and 2% for the colon; metastases also occurred in the brain and spinal cord, adrenals, lymph nodes, and kidneys. There were two cases of "A" rectal growths (Dukes's (1944) classification) treated by combined excision where metastases occurred in the brain and spinal cord at intervals of five and eight years after operation. Skeletal metastases and those in the brain and spinal cord were more frequent with rectal than colonic growths, and it is reasonable to explain this on the more likely involvement of the paravertebral venous plexus by rectal growths. Many writers have stressed the frequency with which excised growths show venous invasion and the influence which this has on prognosis. The frequency with which blood-borne metastases contribute to the patient's death is undoubted.

Evidence, at death, of peritoneal recurrence was present in 33% of rectal cases and in 39.6% of colonic cases, and these figures were not materially altered by the exclusion of "C" cases (Dukes's classification).

Recurrence at the anastomotic site occurred in 6 out of 85 cases of rectal cancer treated by anterior resection (7%) and is believed to have occurred in 15 out of 178 cases of colonic resection (8.4%). It is believed that the figures for the rectal cases are accurate and that all such recurrences are included, but for the colonic cases the evidence is less certain and the local recurrence rate may be higher. The importance of post-operative supervision after anterior resection is shown by the fact that five recurrences were treated by combined excision and that two of these patients were alive and free from recurrence six and six and a half years after the second operation. The remaining anastomotic recurrence had followed a palliative operation.

Survival After Colonic Resection

Although there are 297 colonic growths in the series, only 77 remain to be considered when from the total are deducted those inoperable cases, operative deaths, and (the largest deduction) those cases operated upon less than five years ago. The figures, which include palliative resection, show an overall five-year survival rate of 57.1%, with a high level of 68.6% for B cases and 34.6% for C cases (Table IX). If the figures are broken down into groups it is found that growths in the sigmoid colon have the lowest survival rate. This is in keeping with other findings, for of the 114 cases of sigmoid carcinoma in this series 28.9% were admitted with acute obstruction, 10.4% with general or local peritonitis, and 6.1% with a vesico-colic fistula, and the operability

TABLE IX.—*Colonic Resection. Five-year Survival Rate (five years elapsed since operation). Palliative Resections Included; Three Untraced Cases not Included*

Group	Operation Survivors	Died in Less Than 5 Years	Survived 5 Years
A	—	—	—
B	51	16	35 (68.6%)
C	26	17	9 (34.6%)
Total	77	33	44 (57.1%)

Two patients died of recurrence after five years.

rate was only 50%, the lowest of any group. One could sum up the outlook for carcinoma of the colon in this series, which I believe to be fairly representative, as follows: of every 100 patients admitted to hospital, including all cases, the 60 will have a resection, 6 will die from operation, and of the remaining 54, 31 will survive five years. A few of those (two cases in this series) surviving five years will subsequently die of recurrence. In a series reported by Colcock (1947) 13.6% of the five-year survivors died of recurrence in the next five years.

It is interesting to compare these results with those of Grinnell (1953) in a larger series from the Presbyterian Hospital, New York, consisting of 890 colon and 777 rectal growths over the years 1916 to 1945 inclusive. In the colon the five-year survival rate of all cases admitted rose from 5.9% for the period 1916-20 to 32% for 1936-40, but in 1941-5 it dropped to 30.8%. Unlike my own series, Grinnell found the worst prognosis to be in growths of the hepatic flexure, which he attributed to early invasion of the liver and duodenum. As regards lymphatic involvement, he found a 67.9% five-year survival rate for curative colon resection when no glands were involved and 36.7% of those with metastases. In the present series the figures are 68.6% and 34.6%, but all operations, including palliative resections, are included. Broder's grading on growth histology has not been applied to these figures, but it has always been shown that the degree of differentiation influences prognosis.

Survival After Rectal and Recto-Sigmoid Resection

Out of 314 cases, 162 survivors of this operation had been operated upon more than five years ago. The proportion of C cases is less than is usual in a series of rectal growths, and it is likely that fuller dissection might have placed some of the B cases in the C group. The figures, which include all palliative resections, show an overall five-year survival rate of 47.5%, with a high level of 78.2% for A cases and 28.8% for C cases (Table X). Taken with the operability rate

TABLE X.—*Rectal and Recto-sigmoid Resections. Five-year Survival Rate (five years elapsed since operation). All Operations, Palliative Resections Included. Four Untraced Cases not Included*

Group	Operation Survivors	Died in Less Than 5 Years	Survived 5 Years
A	23	5	18 (78.2%)
B	87	43	44 (50.5%)
C	52	37	15 (28.8%)
Total	162	85	77 (47.5%)

Three patients died of recurrence after five years.

and mortality rate they suggest that of every 100 patients admitted to hospital with carcinoma of the rectum, 75 will have a resection, 6 will die from operation, and of the remaining 69, 33 will survive five years. This figure is slightly better than that for carcinoma of the colon. Dukes (1944) quotes a figure of approximately 40% of the total entry at St. Mark's Hospital surviving five years after operation, but it is probable that general hospital beds are more likely to receive the frankly inoperable case. In Grinnell's series the five-year survival rate for all cases of carcinoma of the rectum admitted to hospital rose from 17.5% for the period 1916-20 to 32.7% for 1936-40, but in 1941-5 it dropped to 28.6%. These comparisons suggest that though the numbers in this series are small the picture they present of the disease is

probably a fair one. Private patients comprised over 40% of all cases in Grinnell's series and under 10% in the present series.

Survival After Combined Excision and After Anterior Resection

The after-results of cases treated by combined excision and by anterior resection are compared in Table XI, which shows that in this series the results of anterior resection were better than those of combined excision in all groups. Because of the small numbers, C cases show better results than B. Waugh, Block, and Gage (1955), from the Mayo Clinic, have

TABLE XI.—*Five-year Survival Rate after Combined Excision and After Anterior Resection (five years elapsed since operation)*

Group	Operation Survivors	Died in Less Than 5 Years	Survived 5 Years
<i>Combined Excision</i>			
A	12	4	8 (66.6%)
B	56	28	28 (50.0%)
C	36	28	8 (22.2%)
Total	104	60	44 (42.3%)
<i>Anterior Resection</i>			
A	10	1	9 (90%)
B	27	12	15 (55.5%)
C	9	3	6 (66.6%)
Total	46	16	30 (65.2%)

reviewed a series of 625 cases of rectal cancer treated by three procedures: combined resection, combined resection with sphincter preservation (an operation in which continuity is restored by perineal anastomosis), and anterior resection. They quote a five-year survival rate of 65.6% for anterior resection, 53% for the combined resection with sphincter preservation, and 51.6% for combined resection. While the five-year survival rate for anterior resection is the same, that for combined operations compares favourably with the figures in the present series.

The figures for anterior resection should not occasion any surprise: they are only to be expected. If radical restorative operations such as anterior resection are practised only on properly selected cases their results should be better than those of combined excision. Anterior resection should be chosen for a high rectal growth, and we know that, however treated, this type of growth has a better prognosis; it should be chosen for an early growth—and this has a better prognosis; and it should be chosen for a growth of low malignancy, again a factor for better prognosis. While I remain an advocate of the operation of anterior resection I do not think we should be unduly influenced by figures. However well selected, a patient treated by anterior resection will retain a slight risk of recurrence which would not be present had the whole rectum been removed. As against this must be set the advantage of retaining an anal orifice, and an operative mortality rate which is lower than that of combined excision.

Conclusions

In this series 20.2% of cases of carcinoma of the colon were not admitted to hospital until suffering from acute obstruction.

The mortality of the patient admitted in obstruction was approximately twice that of an elective resection when unobstructed.

Simple decompressive measures appeared to carry the lowest mortality in obstruction.

If all cases of the disease are included it is difficult to achieve a high operability rate in carcinoma of the colon or of the rectum.

End-to-end resection with associated bowel drainage was favoured for the colon; some form of combined resection for the rectum.

re used when complete skin cover is required for the orsum or for the palm. The skin of the abdomen is often used in young children for cover of the fingers: because of the extreme difficulty of effecting immobilization it is divisible to raise a much larger flap than is necessary and partially tube it. This will allow of movement of the hand in the abdomen and reduce the risk of traction on the recipient area.

Thumb.—Skin cover for the thumb can be obtained by any of the methods previously described, with the exception of the thenar flap. Local flaps can be used to cover the terminal phalanx, a similar method to that used in cross-finger flaps, described below. In the same way a skin flap from the dorsum of the hand can be used to cover the flexor aspect of the proximal phalanx. When possible, it is preferable to use local skin flaps, as the skin is of good quality for weight-bearing surface on the hand, and it develops a higher degree of sensation than skin transported from a distance. An example of this is a patient who lost the skin from the flexor aspect of his thumb, exposing tendon and necessitating full-thickness skin cover. The defect was closed by a flap elevated from the dorsum of the hand, turned through 90 degrees, and inset into the flexor aspect of the thumb. The flap was detached after 14 days.

Middle and Proximal Phalanges of the Fingers.—Skin loss over the flexor aspects of the middle and proximal phalanges of the fingers may be repaired by flaps from the abdomen, chest, or arm; but, ideally, cover is provided from the dorsum of the contiguous finger by the cross-finger flap method. Fig. 6 shows the stages of the operation. An example is the case of a patient who burned her right middle finger. The area of skin loss exposing the long flexor tendon and the digital nerve was covered with a flap raised from the dorsum of the ring finger and turned through 180 degrees. The donor area on the ring finger was covered with a Wolfe graft from the left breast. It is possible to inset this flap only when the fingers are flexed owing to the disparity in length of any two fingers.

Degloving Injury of the Palm and Dorsum

This type of injury, which is not uncommon in industrial accidents, is a shearing effect often caused by catching the hand in rollers or in a press. The entire dorsum, palm, or both surfaces may be turned back on a distally based flap. Should this flap carry with it the venous plexus, as it often does, then it will become cyanosed within a few hours and the arterial blood supply will inevitably fail. At the time of injury the flap may appear viable, as in fact it is, with a good colour and a freely bleeding edge. An immediate decision to excise the flap and cover the raw area with a graft or a flap, according to whether the tendons are exposed or not, is not an easy one to make. Most surgeons will stitch the flap back and review in 24 hours, and exposed tendons will not suffer from this delay should the flap fail to survive. It should be emphasized, however,

that undue delay is unwarrantable, as infection is common under necrotic skin, and this not only jeopardizes the survival of deep structures but adds greatly to the post-traumatic fibrosis.

The next case is an example of the degloving type of injury involving the palm of the hand. This patient caught his hand in rollers, and the whole palm from the wrist crease to the base of the fingers had been turned back on a distally based flap. This flap was of good colour and had a freely bleeding edge. It was stitched back. Twenty-four hours later the flap was cyanosed, and it was therefore removed, the defect being covered by an abdominal flap. Where whole-thickness skin cover by a viable flap method is required, whether for the dorsum or the palm, the donor site of choice is the abdomen. An alternative procedure rarely used for the dorsum of the hand is the tunnel flap (see Fig. 7). This method is mentioned merely to discard it. It has no advantages over the single-based flap and has many disadvantages. With the patient fully anaesthetized the flap will appear to accommodate itself to the defect by compression of the abdominal wall. When tone recovers, however, the flap becomes taut over the hand and the tension is taken on the suture lines with subsequent necrosis, spreading towards the centre of the flap.

Degloving Injuries of the Hand and Fingers

In degloving injuries of the fingers complete replacement with abdominal flaps or tubes cannot be expected to give the patient a normal digit. There is, inevitably, some loss in joint mobility, and the skin covering is a poor substitute for normal hand skin. It does, however, provide the patient with a means to grip and even pick up small objects, and is therefore superior to any other reconstruction. The patient presented under this heading caught his hand in rollers. The dorsum of the hand was degloved and all the fingers stripped of skin cover. The middle and ring fingers were fractured and fit only for amputation. Two flaps were elevated from the abdomen, tubed, and slid over the index and little fingers. The dorsum of the hand was covered with a free graft. The end-result is shown (Fig. 8). After replacement of the pulp with a free graft the thumb was functionally normal. This patient can now grip and pick up small objects.

Reconstruction of the Thumb

The position the thumb holds in the function of the hand is unique. Not only is it the key opposition element, but its weight-bearing surface is requisite in all composite movements. Loss of any part of the thumb constitutes a serious disability, and the methods used for its repair and reconstruction are dependent upon the amount of tissue loss. The provision of skin cover for the terminal phalanx has been discussed, and loss of less than half of this phalanx does not justify more radical procedures. Loss of

the terminal phalanx can, to some extent, be compensated for by apparent lengthening, a procedure known as phalangization, whereby the thumb web is deepened and the defect so created lined by a free graft. When the terminal loss of the thumb is of such an extent that it no longer reaches the level of the second cleft, then additional length should be provided to attain this level.

There are three commonly used methods for adding length to the thumb, each dependent on the degree of tissue loss:



FIG. 8



FIG. 9

(1) the chapeau flap of Gillies, (2) the tube pedicle and bone graft, and (3) pollicization. The preservation of normal skin with normal sensation in the thumb adds greatly to its functional place in the hand, and for this reason the chapeau flap is the method of choice where the additional length required does not exceed $\frac{1}{2}$ in. (2 cm.). It is essential, however, that minimal terminal scar should be present; otherwise necrosis will supervene and lead to loss of the bone graft. The following is an example of the chapeau flap. This patient, operated upon by Mr. Rainsford Mowlem, lost the terminal phalanx of his thumb while working a circular saw. A curved incision was made around the base of the thumb and the skin dissected off, superficial to the venous plexus, until it could be slid over the end of the bone, attached only to the first cleft. An autogenous bone graft of the desired length was fixed to the end of the bone and the skin replaced. A skin defect created at the base of the thumb was made good by a free graft. Fig. 9 shows the hand before and after operation.

In cases where the loss in length exceeds that of the terminal phalanx, a simple opposition post constructed by a tube pedicle and bone graft adds considerably to the function of the hand. The patient should be warned that for the first six months after reconstruction the skin is anaesthetic and should be protected against excessive heat and cold. Thereafter, a degree of sensation is present which is sufficient to protect the area from injury. Fig. 10 shows the hand of a patient who lost his thumb and three fingers. A tube pedicle from the right side of the abdomen was grafted on to the hand. After the pedicle had been detached

from the abdomen it was opened and an iliac bone graft inserted into the stump of his metacarpal. With his little finger and reconstructed thumb he was able to grip and resume his pre-accident occupation of gardening. The end-result is shown.

Pollicization

Where the thumb has been amputated down to near the base of the metacarpal, pollicization of the index finger must be given serious consideration. The hand with four fingers but without a thumb is a poor functional unit compared with a thumb and three fingers. This procedure has been fully dealt with by Cuthbert (1949). In those cases where the trauma to the hand has at the same time damaged the index finger, pollicization is the method of choice.

An example of this is the case of a boy who caught his hand in a lathe. The thumb had been amputated through the base of the metacarpal. The proximal phalanx of the index was left; but the skin was beyond repair. An immediate abdominal flap was utilized to repair the defect in the first instance (see Fig. 11). Later the index was pollicized. A flap from the dorsum of the hand was elevated and the interosseous muscle between the index and middle metacarpals was split. The second metacarpal was sectioned near its base. An incision was then made in the palm and the artery to the middle finger isolated and divided; the digital nerve was then split proximally. The deep transverse ligament and the adductor pollicis were divided; the index was then rendered freely mobile. The second metacarpal was wired to the base of the first. The extensor tendon to the index was sutured

to the extensor pollicis, and the dorsal flap was wrapped around the pollicized digit so as to give good local skin cover on the flexor aspect. The defect on the dorsum of the hand was covered by a free graft. Fig. 12 shows the end-result.



FIG. 10

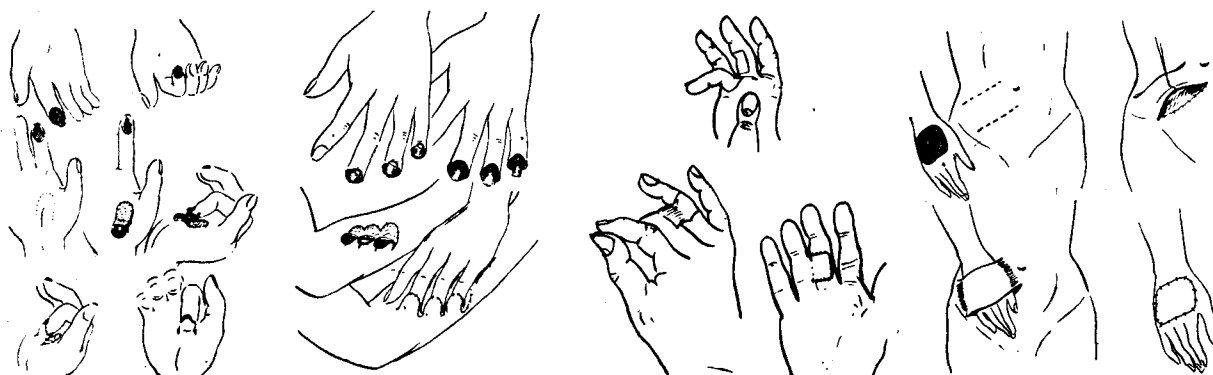


FIG. 4

FIG. 5

FIG. 6

FIG. 7

At a later date the pollicized digit should be provided with an opponens tendon transplant, as there is a marked tendency for the digit to take up a position of adduction deformity. This deformity has been corrected and both opposition and abduction have been much improved in the case described. This addition to the method of pollicization has proved to be an advance on the earlier technique used.

Major Hand Reconstruction

In injuries of the hand where all the digits have been lost, the objective is the provision of a forceps type of hand by lengthening one or two metacarpals with bone

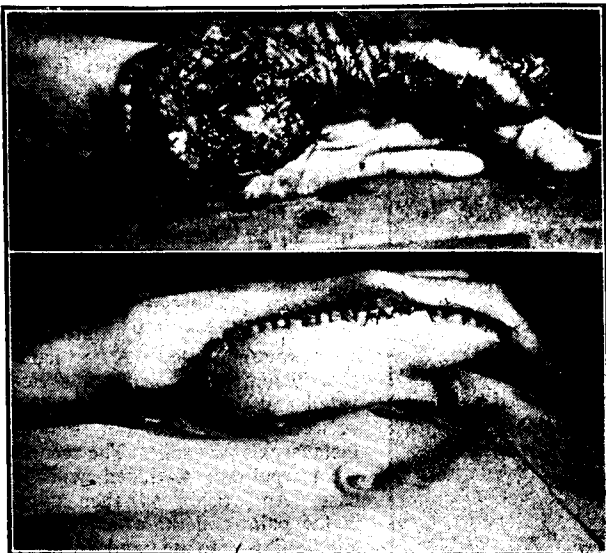


FIG. 11



FIG. 12

grafts covered by flaps or tubes of skin, and the reduction of the intervening metacarpal remnants. These two rays can be motivated by tendon transplantation to provide a simple means of opening and closing the forceps to enable the patient to grip. The provision of a mobile wrist-joint is of first importance in the functional end-result of this type of hand, and every effort should be made to achieve this by early active movements. It is interesting to observe how children with congenital absence of the fingers and a normal wrist-joint can adapt the palm and the dorsum of the hand to a surprising degree of usefulness.

Multiple Injuries

Damage to the hand, particularly in industrial accidents, may be associated with injuries to bone and soft tissues proximal to the wrist, whose immediate treatment and functional recovery are problems inseparable from those of the hand. Two cases are presented to illustrate these points.

One patient caught his arm in a cement mixer. In addition to a severe hand injury he had, in the same arm, a fracture of the lower end of the radius and a dislocation of the elbow. The dislocation was reduced, the fracture of the forearm plated, one finger amputated, and the other repaired. He recovered full function and returned to his pre-accident occupation.

In this type of case it is not only desirable to effect a one-stage repair, it is equally desirable to initiate composite movements of the entire limb in its rehabilitation.

The other patient caught his hand in an automatic die-casting machine with spikes. There was skin loss on the dorsum and palmar aspects of the hand associated with comminuted fracture of the lower end of the radius. There was a large area of skin loss on the dorsum of the wrist, exposing the fracture. The hand was repaired by free grafting, the radius was plated, and an abdominal flap was elevated and inset into the forearm to cover the plated bone. All areas healed without complication.

Summary and Conclusions

An attempt has here been made to illustrate accepted methods of using skin cover to repair injuries of the hand, the aim being to limit the loss of tissues that may affect the functional end-result. Primary skin cover reduces the incidence of infection and preserves deeper structures which would not normally remain viable if exposed. At the same time as the skin cover is provided, the underlying structures are rearranged so as to place them in the optimal position for the reconstructive phase. The stages of hand repair present a composite picture, each one being related to and dependent upon the other. Each stage must be consolidated by maximal functional recovery before proceeding to the next.

Transported skin must be toughened up and rendered freely mobile, tendons and nerves allowed to unite and function, joints activated, and the hand integrated into the synergic mechanism of the whole upper limb.

Throughout treatment, rehabilitation by those experienced in the care of damaged hands can do much to establish new cerebral patterns to compensate for loss or limitation of movement. Undesirable defence mechanisms and trick movements can be corrected and avoided by careful re-education as the stages of reconstruction proceed. In the end the patient should be left, not with a useless monument to the technical skill of the surgeon, but with a functional unit patterned on a conception of his primary requirements—earning a living and the performance of his usual daily tasks.

I wish to thank Mr. Rainsford Mowlem for his help and encouragement in this field of surgery, and in the preparation of this paper. I also thank Miss Farmer, of Rookdown House, Basingstoke, and Miss Walker, of the Photographic Department, Mount Vernon Hospital.

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The British Pharmaceutical Conference, which has just concluded its 93rd meeting in Dublin, has accepted an invitation from the Bristol and district branch of the Pharmaceutical Society of Great Britain to meet in Bristol from September 2 to 6 next year.

RENAL VEIN THROMBOSIS WITH NEPHROTIC SYNDROME AND RENAL FAILURE

BY

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Acute thrombosis of renal veins with renal infarction was first described by Rayer (1837-41). It may be either "primary" or, more commonly, a complication of dehydration, and is seen in infants. It presents as acute renal failure with anuria or oliguria, haematuria, and renal enlargement; it is usually rapidly fatal (Barenberg *et al.*, 1941).

A subacute or chronic thrombosis of the renal veins resulting clinically in nephrotic syndrome is a less common condition. Shattock (1913) described a case in which oedema of the legs and abdomen occurred in a 24-year-old medical student after he had run in a 120-yards race, during the whole of which he held his breath. Albuminuria persisted until death 25 years later. At necropsy the inferior vena cava was found to be converted into a flat impervious ribbon extending from the point of entry of the hepatic veins to below the renal veins. Both renal veins were occluded at their point of entry into the inferior vena cava. Derow *et al.* (1939) described a case of inferior vena caval, portal, and renal thrombosis in a 15-year-old boy who had the features of a nephrotic syndrome without renal failure and who died after six months' observation following an attack of acute gastro-enteritis. Fishberg (1939) described the case of a patient with migrating phlebitis who subsequently developed a nephrotic syndrome. At post-mortem examination canalization of thrombi of the inferior vena cava and renal veins was found. More recently Blainey *et al.* (1954) described three cases, in one of which thrombosis of the inferior vena cava and renal veins had resulted in typical nephrotic syndrome. This patient had a raised blood urea and died from pneumonia after one year's observation. Milne (1954) reports a case of intrarenal vein thrombosis in a patient with nephrotic syndrome who died following pneumococcal peritonitis.

A case is described below in which the nephrotic syndrome, with later progressive renal failure, was apparently due to a primary thrombosis of renal branch veins within the substance of the kidneys unaccompanied by thrombosis or occlusion of the main renal veins or the inferior vena cava.

Case History

The patient, a retired Army officer aged 57, leading an extremely active life, consulted his doctor on June 12, 1954, as he had noticed a sudden swelling of his legs and face. He had been playing tennis frequently, and the last game he had been on the day before symptoms appeared. He had had no previous illnesses of note, but had had a bullet wound of his left loin in 1917. He was admitted to the Cambridge Military Hospital on June 20, and was found to have severe pitting oedema of the legs and oedema of the face, whilst his urine was loaded with protein. The blood pressure was 150/90 mm. Hg and there were no other abnormal signs.

Investigations.—Urine: protein, 20 g. per litre (albumin 62%, globulin 38%); the deposit showed a moderate num-

ber of granular casts and red cells with a few epithelial cells. Serum proteins: total 4.1 g. per 100 ml. (albumin 30.2%, globulin 69.8%—alpha one 3.1%, alpha two 31.2%, beta 11.3%, gamma 24.2%). Apart from a somewhat higher gamma globulin the electrophoretic pattern was similar to that quoted by Squire (1953) as being associated with nephrosis. Oedema fluid protein, total 0.6 g. per 100 ml. (albumin 33.6%, globulin 66.4%). Blood urea, 30 mg. per 100 ml. Blood cholesterol, 400 mg. per 100 ml. X-ray film of chest and E.C.G.: N.A.D.

For the first few days after admission he was given a low-protein diet with 30 oz. (852 ml.) of fluid intake daily. On this regime his urine output fell rapidly from over 50 oz. (1,420 ml.) to 10 oz. (284 ml.) a day, and his plasma albumin dropped to 0.7 g. per 100 ml. He was then given a high-protein diet with restriction of sodium to less than 0.5 g. daily, his fluid intake being maintained at 30 oz. (852 ml.) daily. This was followed by a continued diuresis reaching 90 oz. (2,556 ml.) a day one month later. It was necessary to raise the fluid intake to 40 oz. (1,136 ml.) and then to 50 oz. (1,420 ml.) daily, as he suffered from thirst. The plasma albumin climbed gradually to 1.8 g. per 100 ml. and he lost a considerable amount of his oedema. From July 29 his high urinary output began to drop slowly. On August 5 his output was 60 oz. (1,704 ml.) a day and his intake 50 oz. (1,420 ml.), but his blood urea, which had previously shown only a slight elevation, rose to 120 mg. per 100 ml. His blood cholesterol at this time was 550 mg. per 100 ml.; serum sodium, 140 mEq/l., and serum chloride 90 mEq/l. From then onwards his urinary output fell slowly but steadily and the blood urea rose progressively. Towards the end of August he became drowsy and developed intractable hiccup. He sank gradually into a uraemic state and died on September 5.

During all this time he had continued to pass large quantities of protein in his urine (20-45 g. per litre). Red cells and granular casts were continually present. Towards the end of his illness pus cells appeared in the urine in increasing numbers. No organisms were seen in the Gram films, and urine culture was sterile. Blood urea readings were: June 25, 30 mg. per 100 ml.; July 1, 46 mg.; July 11, 50 mg.; July 24, 59 mg.; August 7, 120 mg.; August 12, 160 mg.; August 19, 186 mg.; August 26, 200 mg.; August 31, 215 mg.

The blood pressure remained approximately the same throughout the illness.

Necropsy Findings.—The kidneys were pale and much enlarged (right 250 g., left 235 g.) (Fig. 1). Numerous stellate veins could be seen through the capsule. The capsules stripped with ease, leaving a smooth, pale surface with reddish mottling. The pelves, ureters, and bladder showed no lesions. The renal veins and inferior vena cava contained no thrombus and were of normal appearance. However, there was thrombosis of several of the major renal branch veins and multiple thromboses of the arcuate veins. Apart from the latter findings the macroscopical appearance of the kidney suggested subacute glomerulonephritis (Ellis Type II).

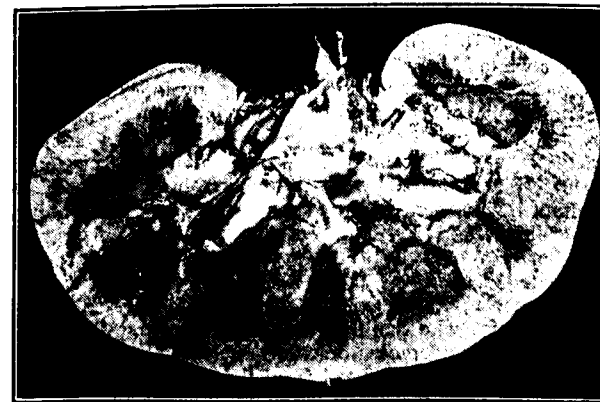


FIG. 1.—Hemisection of the right kidney.

Microscopical Examination of Kidneys.—The glomeruli were normal and the basement membrane showed no thickening or other lesions. Many of the convoluted tubules were dilated and the lumina contained large numbers of polymorphs, debris, and eosinophilic fluid. Gram's stain failed to demonstrate the presence of organisms. The dilated tubules were lined with atrophic epithelium. No regeneration of epithelium was present, and the appearances suggested a chronic tubular atrophy (Fig. 2). The collecting tubules were normal. The interstitial tissue was fibrotic and oedematous, there being a patchy infiltration by lymphocytes and polymorphs. Examination of the pelvis of the kidney revealed the presence of multiple intrarenal branch vein thrombi. Many of the thrombi showed organization and recanalization (Fig. 3).

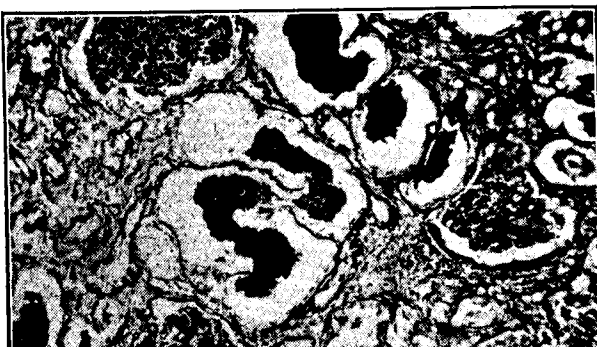


FIG. 2.—Dilated convoluted tubules containing either large quantities of pus or eosinophilic fluid. Note increase of interstitial tissue. (Periodic acid Schiff.)



FIG. 3.—Branch of the renal vein within pelvis of kidney to show thrombus undergoing organization and recanalization. (H. and E.)

Discussion

This case differs from previously reported cases in that the nephrotic syndrome occurred in an adult, associated with renal vein thrombosis and occlusion which was wholly within the substance of the kidney. Furthermore, there is discrepancy between the findings of apparently typical "large white kidney" and the histological features. Chronic glomerulonephritis, amyloid disease, pyelonephritis, and eclampsia have been reported as having been complicated by multiple thrombi in the main and medium-sized branches of the renal veins resulting in acute terminal uraemia (Vilk, 1940). Bilateral renal vein thrombosis in a youth of 18 without involvement of the inferior vena cava was reported by Miller *et al.* (1954) and was associated with polyarteritis nodosa. However, in the case which we have described no associated disease was found. The case of thrombosis of main renal vein tributaries reported by Milne (1954) was in a boy of 7 who had a typical nephrotic syndrome. The thrombi were undergoing organization, and it was concluded that these could have dated from the onset of the disease. The histology of the kidney was not discussed.

In children renal vein thrombosis may be secondary to dehydration or it may be "primary" (Barenberg *et al.*, 1941; Sandblom, 1948; Zuelzer *et al.*, 1951). Thrombosis usually begins in the arcuate and interlobular veins, although even smaller veins may be involved (Morison, 1945). Moreover, in children, when the inferior vena cava is thrombosed there is evidence that the thrombus starts in the small veins of the kidney and extends from there into the renal vein and inferior vena cava (Kobernick *et al.*, 1951). It is common in these cases to find associated thrombosis in other vessels, suggesting that the thrombosis may be the expression of a systemic factor whether it be haemoconcentration, blood slowing, damage to the endothelial wall, or other cause (Zuelzer *et al.*, 1951; Becker, 1954). In our case thrombosis involving other organs was not found. In view of the organization and recanalization of many of the thrombi and the rapid course of illness it is likely that multiple renal branch vein thrombosis was present at the onset of the illness and did not constitute a terminal event. It is suggested that the high pressure in the tributaries of the renal vein produced by the presence of thrombi resulted in a heavy proteinuria and thus, ultimately, to a fully developed nephrotic syndrome. It has been shown experimentally in dogs that gradual progressive obstruction of the renal vein after unilateral nephrectomy results in persistent albuminuria with apparently normal renal function (Rowntree *et al.*, 1913).

Histological examination did not reveal glomerular lesions, and it must be assumed that protein escaped from the glomeruli in the absence of obvious structural changes. Corcoran (1952) draws attention to the fact that in a normal kidney up to 10 mg. of protein a minute may escape from the glomeruli: under normal circumstances this is all absorbed by the proximal tubules. In this case the presence of gross proteinuria is explained by the increased escape of protein from the glomeruli accompanied by considerable failure of tubular reabsorption due to the presence of chronic tubular atrophy (Fig. 2).

It is interesting that Shattock's case followed a period of acute exertion, as did this case. It is known that such exercise may cause proteinuria or even haematuria, and that the mechanism appears to be decreased renal blood flow accompanied by slowing of the renal circulation (Covian and Rehberg, 1937; Barclay *et al.*, 1947). It would seem possible that in the present case the thrombus occurred or extended during a period of severe exercise (not necessarily the last game of tennis), and that this was the precipitating cause.

Summary

A case of intrarenal branch vein thrombosis associated with nephrotic syndrome is described. The possibility that the nephrotic syndrome was secondary to the multiple thrombosis is discussed.

We are grateful to Captain T. Freeman, R.A.M.C., for carrying out the electrophoretic studies, and to Colonel R. Spicer for permission to publish the case.

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SMOKE IN A LONDON DIESEL BUS GARAGE

AN INTERIM REPORT

BY

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Exhaust products from motor vehicles are known to be potentially harmful to man in that they contain substances which, if inhaled in sufficiently high concentrations, are noxious. Much is known of the composition of vehicle exhausts, but such analytical data, though essential, are of limited toxicological value unless the degree of dilution in the ambient air is known. No practical assessment of the potential danger is possible without knowing what man is likely to breathe. The highest concentrations of exhaust products to which men are regularly exposed probably occur in garages, and we are at present studying air pollution in one of London Transport Executive's garages for diesel buses. This study is being supplemented by extensive analyses of exhaust products of various diesel vehicles under different running conditions on the L.T.E. test track at Chiswick. Our work is being done in the closest co-operation with London Transport Executive, which has offered us every facility for the investigations.

Our efforts have been directed initially to the study of diesel exhausts as a matter of urgency in view of recent suggestions that, because 3:4-benzpyrene has been found in soot from diesel engines, they might be at least partly responsible for the rise in the incidence of lung cancer. It is with this urgency in mind that we have prepared an interim report of our findings with respect to smoke and benzpyrene; a detailed account of our findings with respect to all suspect pollutants will be published later.

Site of the Investigation

In consultation with the London Transport Executive, the garage at Merton, S.W.19, was selected for a pilot study. It is one of the executive's older garages, situated about seven miles S.W. of Charing Cross in a fairly densely populated area with some factories near by. Nearly 200 buses are parked there every night, and most of them have the same type of 6-cylinder 9.6-litre diesel engine. Ventilation of the garage is by natural draught (through the length of the garage) and at present no extractor fan is in use. Most buses leave the garage in the early morning, and at this time a lacrimatory mist is produced for short periods as groups of buses are started up. The effect is most marked on cold mornings and is worst in the "annex," a poorly ventilated section adjoining the main garage. Some buses return for periods during the day, and all finally come back during the evening. At this time buses are left by their drivers in the mouth of the garage and are moved on, generally within a few minutes, for re-fuelling, washing, and ally parking. These manoeuvres involve several short bursts of acceleration with periods of idling in between, and, when a number of buses are running at once, smoke haze is visible.

Methods

The main object of this pilot survey was to determine the concentration and composition of smoke inside the garage. It was desirable to sample the air at sites where pollution was highest, and it was essential to take simultaneous samples of the air outside the garage, as there was likely

to be an appreciable amount of smoke from general urban sources. That the sampling sites we selected were indeed those with the highest concentration of smoke was later confirmed by direct experiment. The first survey was made on the night of April 18/19. It was cold and misty, and there was much town smoke in the air. It was later felt that the high levels of ordinary urban pollution on this occasion might have obscured any contribution made by the buses to the benzpyrene content of the garage air, and a second survey was therefore made on the night of June 21/22, when there was very little town smoke. This night was mild and there was some light rain. Exactly the same procedure was followed each time.

The nights were divided into four periods, during which the air inside and outside the garage was sampled continuously. The first two simultaneous samples were taken between 6 p.m. and 11 p.m., during which period buses were coming in a few at a time to be re-fuelled and washed at intervals. The second period was from 11 p.m. to 1 a.m., when there was maximum activity and greater pollution; buses were coming in almost continuously, and fuelling and washing were in progress most of the time. During the third period, from 1 a.m. to 5 a.m., there was no vehicular activity. In the fourth period, from 5 a.m. to 7 a.m., buses were being started up, and on the first occasion some were run for a few minutes before leaving the garage. The first three indoor samples were taken at one of the fuelling points, and the fourth in the annex. All four outdoor samples were taken on a flat roof adjacent to the garage.

Samples were obtained by drawing air at a rate of about 40 cu. ft. (1.13 cu.m.)/min. through weighed sheets of glass-fibre filter-paper. Between 20 and 430 mg. of smoke was collected on each filter, and in Table I these amounts are expressed as milligrams per cubic metre of air sampled. Each filter was extracted for several hours with cyclohexane, and the yellowish solution obtained analysed for polycyclic hydrocarbons by a modification of the method described by Cooper (1954).

Results

Determinations were made of the amounts of anthracene, pyrene, fluoranthene, 1:2-benzanthracene, 1:2-benzpyrene, 3:4-benzpyrene, and 1:12-benzperylene in each extract, and in some cases there was enough material to allow two determinations to be made on aliquot parts. In Table I, the amounts of 3:4-benzpyrene are expressed as micrograms per cubic metre of air sampled. Results are arranged in pairs, so that comparison can be made between the concentrations inside and outside the garage at any given time.

Concentration of Smoke and 3:4-Benzpyrene at Merton Garage

Period	Site	April 18-19		June 21-22	
		Smoke mg./m. ³	3:4-benzpyrene* µg./m. ³	Smoke mg./m. ³	3:4-benzpyrene µg./m. ³
(1) 6-11 p.m.	Garage	1.81	0.28	0.81	0.027
	Outside	0.92	0.34	0.24	0.015
(2) 11 p.m.-1 a.m.	Garage	3.04	0.46	1.44	0.026
	Outside	1.46	0.47	0.23	0.014
(3) 1-5 a.m.	Garage	0.77	0.21	0.21	0.011
	Outside	0.66	0.24	0.18	0.018
(4) 5-7 "	Annex	1.72	0.27	0.48	0.005
	Outside	0.55	0.20	0.14	0.006

* Mean of two estimations.

Discussion

To interpret the results it is necessary to assume that in the absence of pollution by buses the concentration of smoke inside the garage would be the same as that outside, and that it would contain similar amounts of 3:4-benzpyrene. That this is approximately so is borne out by the similar smoke concentrations found between 1 and 5 a.m., when all buses were parked. The slight differences in the concentration of 3:4-benzpyrene at that time could be due to chance. At all other times the concentration of smoke was much higher in the garage than outside, and it seems

reasonable to attribute the excess to exhaust smoke. The greatest difference noted between the concentrations of smoke inside and outside was about 1.6 mg./cubic metre, and this represents a 100% increase over the outside level. However, despite these considerable differences in the total amount of smoke, the amount of 3:4-benzpyrene in the garage remained virtually the same as outside. The estimations are not accurate enough for the detection of small differences in benzpyrene content, and the results from the first night are consistent with a hypothesis of no difference between the benzpyrene concentration of the air inside and outside the garage at any time. The results from the second night, when there was very much less smoke outside the garage, suggest that the buses might have added a small amount of benzpyrene to the garage air, an amount of perhaps the same order as that existing outside. As each figure is based on a single estimation only, these small differences cannot be established with any degree of certainty, but it is certain that the concentration of 3:4-benzpyrene does not rise in proportion with the concentration of smoke. It is also clear, by comparing results on the two nights, that any contribution of 3:4-benzpyrene by the buses is negligible in comparison with the fluctuations which may arise from the varying levels of smoke outside. The smoke from the buses must then contain little, if any, 3:4-benzpyrene, and certainly less than coal smoke.

These findings have been supported by the results of experiments carried out on individual buses running round a test track at London Transport's Chiswick works. No 3:4-benzpyrene has been detected in the exhaust smoke from several buses in average condition, but in samples from others small amounts have been found. In all cases the proportion of 3:4-benzpyrene in the smoke has been smaller than that found in coal smoke, and experiments are continuing in order to determine the conditions under which it is emitted. Kotin, Falk, and Thomas (1955) found no 3:4-benzpyrene in the exhaust smoke from a diesel engine operating efficiently, but they found considerable quantities under conditions of inefficient operation. It is important to note that London Transport derate all their engines by 10% in order to reduce the possibility of heavy smoke emission, and they also ensure, by a carefully arranged maintenance routine, that they are kept in excellent mechanical order.

Summary

Measurements have been made of the concentration of smoke and its associated 3:4-benzpyrene in the air inside and outside a London bus garage. Whilst the concentration of smoke is greatly increased when the buses are running in the garage, there is little difference in the concentration of 3:4-benzpyrene. It is concluded that the exhaust smoke from these buses contains little, if any, 3:4-benzpyrene, and this conclusion is supported by the results of experiments carried out on individual buses. Small quantities of 3:4-benzpyrene have been found in the exhaust smoke from certain buses, and experiments are continuing in order to determine the conditions under which it is emitted.

ADDENDUM.—Since this report was written, analyses of further samples of smoke, including quadruplicate determinations of 3:4-benzpyrene, have been completed. These results, together with the determinations of other polycyclic hydrocarbons, confirm the conclusions reached in this interim report and will be published later in full. The experiments reported here are to be repeated in the near future at another garage housing buses powered by engines of a different make.

Miss P. M. Harrison, B.Sc., of this group, carried out most of the analyses reported here. We are indebted to the London Transport Executive for providing facilities for this investigation.

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Medical Memoranda

Intra-arterial Thiopentone Injection in a Patient with Anomalous Forearm Vessels

The dangers of intra-arterial injection of thiopentone have been amply recorded in medical journals and textbooks of anaesthesia, yet cases still occur in which the drug is given into an artery, not because of ignorance on the part of the operator but often because what is believed to be a vein happens, in fact, to be an anomalous artery. The following case illustrates this point.

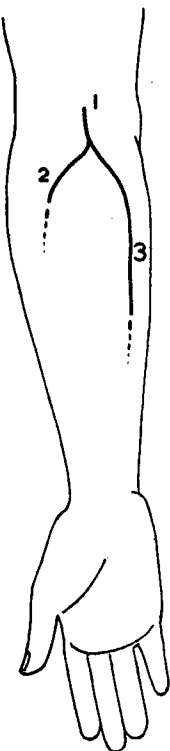
CASE HISTORY

A fit young man aged 24 was admitted to hospital for removal of a ganglion on his left wrist. To induce anaesthesia, a light rubber tourniquet was placed around the right arm proximal to the cubital fossa and a prominent subcutaneous vessel in the fossa was entered with the needle. Blood spurted into the syringe, the tourniquet was released, and a test injection of 2 ml. of 5% solution of thiopentone was made. Immediately the patient complained of pain at the injection site and tried to withdraw his arm, and the distal half of his forearm and hand noticeably blanched. The radial pulse disappeared. The needle was withdrawn, and during the next two to three minutes the colour of the skin and the radial pulse returned to normal.

Similar procedures were carried out on a vessel on the radial side of the cubital fossa and then on one on the ulnar side, at the junction of upper and middle thirds of the forearm. In these, only 0.5 ml. of solution was injected, and the reaction, although similar to the first, was less severe.

The patient was anaesthetized with ethyl chloride and ether, and suffered no ill effects from his experience.

At first it was thought that he was in some way abnormally sensitive to the drug, but careful examination of his right arm showed that the distal 3 in. (7.5 cm.) of the brachial artery, the proximal 3 in. (7.5 cm.) of the radial, and the proximal two-thirds of the ulnar artery were all superficial, as shown in the diagram. The numbers indicate the three injection sites.



COMMENT

There is little doubt that superficial arteries in the upper limb are relatively common. Cohen (1948) emphasizes their frequency and the dangers inherent in their non-recognition. Dubreuil-Chambardel (1926) found 90 in 500 subjects, about 50% bilateral; and he cites Testut, who found an incidence of 12.5%, and Ancel, who had an incidence of 15.9%.

Out of 481 limbs, Quain (1894) found 64 high divisions of the brachial artery at various levels upwards to the lower border of the axilla; the radial artery was the branch prematurely separated in 75%, but sometimes the ulnar artery, and more rarely a vas aberrans which joins one of the forearm arteries.

McCormack, Cauldwell, and Anson (1953) found 18.5% of 750 limbs with major variations in brachial or ante-brachial patterns, the commonest (15.45%) being a high origin of the radial artery. A high radial origin associated with an unusual course of the ulnar artery occurred in 1.9%, and a superficial brachial artery forming a common trunk for radial and ulnar arteries in 1.27%.

This patient had the common radio-ulnar trunk. Characteristically there is a high or low origin of a common trunk

from the axillary or brachial artery respectively; this is superficial in the cubital fossa, where it divides into radial and ulnar branches which remain superficial, the former in the proximal third and the latter in the proximal two-thirds of the forearm.

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Ileo-colic Intussusception after Appendicectomy

Ileo-colic intussusception following appendicectomy is a rare condition. Cleland (1953) reviewed the five recorded cases, and added a sixth. In a further case, here reported, the intussusception occurred within two weeks of operation for acute appendicitis.

CASE REPORT

A lance-corporal aged 19 was admitted to hospital on January 26, 1954, with a typical history of acute appendicitis. Appendicectomy was performed through a gridiron incision; the appendix, lying in the pelvic position, was incised; the appendix, lying in the pelvic position, was incised; the appendix, lying in the pelvic position, was incised. The acutely inflamed throughout the whole of its extent. The stump was invaginated with a purse-string suture, and the caecum and proximal part of the ascending colon were noticed to be abnormally mobile.

Post-operative progress was satisfactory until the evening of the fourth day, when he complained of a vague central abdominal pain, which recurred several times throughout the day. On the fifth day the pains became increasingly severe, were colicky in nature, and were localized to the left iliac fossa. He had developed anorexia and had not vomited. His bowels were opened normally twice early in the day; no mucus or blood was seen, but after the second bowel action he passed no flatus up to the time of his second operation. His general condition was good, pulse 80, and temperature 99° F. (37.2° C.). He had tenderness, with guarding, over the right half of the abdomen and normal gut sounds were heard. Rectal examination showed no mass high up in the pelvis. Urine examination showed no abnormality; his total white-cell count was 12,000 per c.cm., with 82% polymorphonuclear leucocytes; and a straight x-ray examination of the abdomen in the standing position revealed no conclusive abnormality.

During the evening of the fifth day after operation his condition deteriorated. He began to vomit, and his pulse rate rose to 120 and his temperature to 100.2° F. (37.9° C.). The pains became less severe and less frequent. The tenderness and guarding had spread to the epigastrium and the left hypochondrium. No mass was palpable. Intestinal obstruction due to an intussusception was tentatively diagnosed and operation advised. Under anaesthesia an elongated mass lying transversely in the epigastrium could be felt.

Laparotomy was performed through a right lower paramedian incision. There was an intussusception of the terminal 9 in. (23 cm.) of the ileum and the caecum into the ascending colon and transverse colon, almost to the splenic flexure. This was fairly easily reduced except for the caecum, which had formed the apex of the intussusception. The caecum was finally reduced manually, accompanied by a few small spurts of pus from the oedematous and inflamed site of the invaginated appendix stump. The caecum and the proximal part of the ascending colon were quite mobile and had a short mesentery. The site of the appendix stump was infected, with flakes of pus covering the serosa, but the wall of the caecum appeared quite viable. The capillary oozing was controlled with hot packs; the caecum was dusted with penicillin powder and replaced in the abdomen. The wound was closed in layers and the peritoneum drained.

The patient was placed on a five-day course of intramuscular crystalline penicillin, 200,000 units six-hourly, and streptomycin, 0.5 g. twice a day. Intravenous infusion and

gastric aspiration were continued for three days. On the third day after his second operation he was well enough to take fluids by mouth and to get up. He continued to make satisfactory progress, and by the tenth day was quite fit and awaiting his sick leave.

DISCUSSION

The cases reported by Rouquette (1914), Brodersen (1930), Schaaff (1933), Roesgen (1943), Ingelrans *et al.* (1947), and Cleland (1953) were of intussusception occurring in the immediate post-operative period following appendicectomy for acute appendicitis. In all of these the site of the invaginated stump of the appendix had formed the apex of the intussusception. The reports recorded either state definitely or infer that the stump had been invaginated, and the case described here is no exception. The advisability of invaginating the stump is questionable. Since invagination is such a frequent procedure, the rarity of the intussusception seems unusual if this is the cause.

Mayo (1934) quotes his pathologist, who had found a pocket of pus at the site of the invaginated appendix stump in cases in which appendicectomy had been performed in combination with another surgical procedure and death had occurred within 21 days. It seems likely that it is the oedematous inflamed wall of the caecum, sometimes with small abscess formation, which may act as the apex of the intussusception, not the invaginated stump of the appendix.

There is, however, another factor—that of failure of the third stage of rotation of the mid-gut, with the resulting mobile caecum and ascending colon. Forshall (1953) states that a fixed caecum is unlikely to intussuscept. Aird (1949) is more definite in claiming that ileo-caecal intussusception cannot occur unless the caecum and ascending colon are mobile and provided with a mesentery. Intussusception of the vermiform appendix with subsequent ileo-colic intussusception is a much more common occurrence than ileo-colic intussusception following appendicectomy, and McSwain (1941) collected 81 published cases. He added a personal case in which the patient had an ileo-colic intussusception originating from partial intussusception of the appendix. At operation the intussusception was reduced and the appendix removed. This appendicectomy was followed by a recurrence of the ileo-colic intussusception three months after operation. The caecum and ascending colon were extremely mobile and possessed a long mesentery.

In the case presented the patient exhibited two important aetiological factors—namely, an inflamed oedematous wall of the caecum, forming a mass at the site of the invaginated appendix stump, and a mobile caecum and ascending colon with a mesentery.

It seems reasonable, therefore, to suppose that the intussusception would not have occurred unless the congenital abnormality were present together with the inflammatory mass in the caecal wall. If this were not so, ileo-colic intussusception following appendicectomy would occur much more often than it does.

It is usually considered unnecessary to perform any fixation of the intestines after reduction of an intussusception in a child. If, however, a mobile caecum with a mesentery is found at appendicectomy, ileo-colic intussusception may be prevented by attaching the caecum to the lateral abdominal wall by means of sutures.

I wish to thank Colonel A. G. D. Whyte, consultant surgeon, B.A.O.R., for his assistance and encouragement in preparing this report.

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Reviews

DRIED B.C.G. VACCINE

Dried B.C.G. Vaccine. By Yoji Obayashi, M.D. (Pp. 220; illustrated. 25s., \$5.00, or Sw. Fr. 15.) Geneva: World Health Organization. 1955.

The World Health Organization is engaged in tuberculosis control campaigns all over the world, in which B.C.G. vaccines play a leading part. One of the most important problems met with is that of the transport of liquid B.C.G. vaccine over long distances, for the vaccine is very labile and rapidly loses potency, particularly in hot climates. Of great importance is the fact that because of its instability the vaccine has to be used before many of the tests can be performed which should be included if the absolute safety of the vaccine is to be ensured. Much work has been done in many countries in an effort to produce a more stable vaccine; the most hopeful project at the moment would seem to be the freeze-dried vaccine on which the Japanese have been concentrating for some years. As much of the information they have gathered is not readily obtainable by workers in the West, W.H.O. has published this monograph in the hope that the findings reported will be of general interest to all concerned with the problems of B.C.G. vaccinations. Only those who have actually worked on the problem will appreciate the enormous amount of work which is recorded in the 212 pages of this monograph, reporting as it does the results of numerous viability counts, animal experiments, and human inoculations.

As a result of their experiments the Japanese favour a vaccine prepared as follows. The bacilli are grown on Sauton's medium and harvested in the late logarithmic phase of growth. They are then suspended in 1.25% saccharose. Freeze drying is carried out in a chamber in which the ampoules of vaccine are prefrozen to between -15° and -20° C. During drying the water vapour is sublimed on to a condenser refrigerated to -40° C. The drying time is approximately seven hours, when the residual moisture content should be between 1 and 3%. The vaccine is finally sealed *in vacuo*, neither nitrogen nor dry air proving satisfactory for final packing. By this procedure a vaccine possessing about 40% of its original viability and having a stability vastly superior to that of the liquid vaccine is obtained, though, as the author states, "it has not yet been developed to the point where it can be safely preserved at room temperature in summer."

This book should certainly be in the hands of all those working on this problem. There are a number of points on which they would like further information; many of the tables are somewhat obscure, and the book suffers from the common disadvantage of those concerned with rapidly expanding subjects by being already out-of-date at the time of publication. In a personal communication Dr. Obayashi has informed me that they have now greatly improved on the 40% survival reported in this book.

R. I. N. GREAVES.

THERAPEUTIC HYPNOTISM

Hypnosis and its Therapeutic Applications. Edited by Roy M. Dorcus, Ph.D. (Twelve sections plus a 14-page index. 56s. 6d.) London, New York, and Toronto: Blakiston Division, McGraw-Hill Book Company Inc. 1956.

This is in many respects an outstanding contribution to the literature of hypnosis. Based on a series of postgraduate lectures delivered at the University of California in 1952, it covers the theoretical, experimental, and therapeutic aspects of the subject. A temperate discussion of theories regarding the nature of hypnotic phenomena is followed by a description of various methods of induction, a study of the control of sensory and perceptive functions by hypnosis, an account of its physiological effects and influence on learning and habit-formation, and some notes on the genuineness of hypnotic phenomena. The clinical sections are rather meagre in content, but include chapters on the uses of hypnosis in differential diagnosis; on symptom-formation

control and the control of pain; on the applications of hypnosis in general hospital practice, dentistry, and "supportive therapy"; and on methods of "hypno-analysis."

Psychiatrists will note, with, it is to be hoped, some chagrin, that the volume is the work of seven Ph.D.s and a dental surgeon. And although it might well have been enriched with contributions from medical hypnotists and possibly illumined by commentaries and paraphrases from a psychoanalyst versed in the techniques of hypnosis, it is a good example of team-work on a subject that calls for the attention of both clinical and laboratory psychologists. The most ambitious, though the most obscurely written, chapter is by a laboratory psychologist, Sarbin, on the physiological effects of hypnotic stimulation. Produced by an eclectic team, the book states the therapeutic claims of hypnosis with a becoming modesty which might well be copied by other sorts of psychotherapist. Incidentally, the theory of hypnosis most generally favoured by the writers is that of "role-taking," a psychological concept which would be more illuminating if the unconscious origins of identification and dramatization were more fully explored. (Compare, for example, the factor of "suitability for plastic representation" noted by Freud in his *Interpretation of Dreams*.) Fortunately the authors are not dogmatic even on this point, and the reader is left to form his own impressions, which doubtless will be determined by his own theoretical predilections.

EDWARD GLOVER.

A.M.A. SCIENTIFIC EXHIBITS

A.M.A. Scientific Exhibits, 1955. Sponsored by the Council on Scientific Assembly, American Medical Association. (Pp. 784+xiv; illustrated. \$20.00.) New York: Grune and Stratton. 1955.

At each Annual Meeting the American Medical Association stages a gigantic scientific exhibition which is the envy of all other associations. The five days of the meeting are all too short to examine the 300 or so exhibits and to attend the many other events. In 1955, for the first time, the A.M.A. has attempted to record in book form some of the exhibits, so that the many who are unable to be present may study them carefully at leisure. In the preface Dr. Thomas G. Hull, the organizing genius of the scientific meeting, claims with justification that this exhibition offers the finest medical postgraduate course in the world. These 800 pages give a complete photographic record of about one-third of the exhibits, from which one cannot fail to learn much of current medical research and practice in the U.S.A. This volume, however, serves another and possibly more important purpose, as a record of methods of medical illustration. In fact it could almost be a textbook on the subject, showing the varying techniques of display. It is of interest to note how use has been made of the best in the methods of artists in many different media. Apart from the orthodox artist, architect, sculptor, or photographer, there are examples of the methods of the window-dressers of Fifth Avenue, the strip cartoonist of the "comic," the arresting work of the commercial poster artist and the slogan writer, to mention but a few.

As a reference volume this is a "must" for any hospital or medical school department of medical illustration. Those preparing material for scientific exhibitions will be inspired by its pages, and saved a great deal of time in deciding on the methods to adopt. Two constructive suggestions are offered for subsequent volumes. As some of the best exhibits depend on colour for their effect, in future there should be a few colour plates, even at the cost of cutting down the number of exhibits recorded. In addition, as the whole exhibition is an attraction in itself as much as the individual items, it is submitted that there is a place for a few pictures of the whole exhibition in action, showing the bustling, viewing crowds, the discussions between the viewers and exhibitors, and, for those who have a special interest in such matters, plans of the general layout and details of grouping, lighting technique, and construction of booths.

The A.M.A. is to be congratulated on producing this magnificent volume, and it is to be hoped that it heralds a long series.

WALTER HEDGCOCK.

BRITISH MEDICAL JOURNAL

LONDON

SATURDAY SEPTEMBER 29 1956

BLOOD GROUPS AND DISEASES

The suggestion that particular blood groups, especially those of the ABO system, may be associated with particular diseases has recurred in the literature since about 1920. Apart from the investigations into haemolytic disease of the newborn, which is in a separate class and does not concern us here, most of the earlier studies failed to yield conclusive positive results, some because the diseases chosen for investigation had little or no connexion with blood groups, but others because they were planned on too small a scale or because of diagnostic or classificatory defects. It is now known, however, that some of them, though they were ignored at the time, did lead to correct and important conclusions.

More recently, in 1951, D. Struthers¹ showed that among infants in Glasgow dying of bronchopneumonia the frequency of blood group A was higher than it was among the general population. Then in 1953 I. Aird, H. H. Bentall, and J. A. Fraser Roberts² demonstrated a highly significant excess of persons of group A among sufferers from carcinoma of the stomach, which means that among all persons of group A a higher proportion have the disease than among persons of other groups. Their paper is of outstanding importance, not only because of the conclusions themselves, but because, by showing that definite positive conclusions could be reached in such investigations, it encouraged many other workers to enter the field; it set, moreover, an admirable diagnostic and statistical standard which most of these workers have followed. Beyond the confirmation and consolidation of existing knowledge, work carried out since 1953 has been directed to two main objects—the discovery of other diseases associated with blood groups, and the elucidation of the nature of such associations. It was very soon shown³ that an excessive proportion of sufferers from peptic ulcer were of group O, and subsequently⁴ that such an excess, though present in gastric ulcer, was much more marked in duodenal ulcer. A significant excess of group A has now been established⁵ among sufferers

from diabetes mellitus. For some diseases, notably carcinoma of the lung,^{3,6} it has been shown that there is virtually no connexion with the ABO blood groups, while for others, such as carcinoma of the colon and rectum,³ suggestive results have been obtained but the numbers of patients investigated have been inadequate to establish a significant excess of one blood group. Most of the work hitherto published has been carried out in Great Britain and based on the British population. Workers in this country may therefore feel a legitimate satisfaction in having opened up this important new field of research and in their great achievements in it.

The virtual restriction of investigations to one relatively homogeneous population has, however, been in many ways a disadvantage and has made it unnecessarily difficult to elucidate the nature of the connexion between a given blood group and a particular disease. Whenever such a connexion has been established two principal hypotheses must be considered in order to account for it. One is that the presence of a particular blood-group gene or antigen somehow increases susceptibility to the disease or fails to give protection from it. The other is that there are present in the population separate strains, of different historical origin and intermarrying little if at all, one characterized by high frequencies both of the blood group and of the disease, and another by low frequencies of both. If it could be shown that the same connexion was present in a number of populations of varying origin and in different countries, it would be most unlikely that it resulted from the coexistence of the same two racial strains in each of the countries. Already the results which are beginning to be obtained in countries outside Britain for a number of diseases are confirming the relations found here and so tending to disprove the hypothesis of separate strains.

This week the *Journal* contains two important contributions to the subject. A co-operative study reported in our opening pages by many workers in a number of different centres in Britain shows pernicious anaemia to be 20% commoner in persons of group A than in those of other blood groups. The numbers of patients examined is still small, and it is to be hoped that further investigations will be carried out and published. This study is a model of co-operation; in the case of a relatively rare disease, or when the effect of the blood groups, though real, is slight, it is only by means of such co-operation that we can hope to reach satisfactory conclusions. In view of the known connexion between pernicious anaemia and carcinoma of the stomach, it is satisfactory to find that the associations with the blood groups are similar in the two diseases.

¹ Struthers, D., *Brit. J. soc. Med.*, 1951, 5, 223.

² Aird, I., Bentall, H. H., and Roberts, J. A. F., *British Medical Journal*, 1953, 1, 799.

³ Mehigan, J. A., and Roberts, J. A. F., *ibid.*, 1954, 2, 315.

⁴ Clarke, C. A., *et al.*, *ibid.*, 1955, 2, 643.

⁵ McConnell, R. B., Pyke, D. A., and Roberts, J. A. F., *ibid.*, 1956, 1, 772.

⁶ Clarke, C. A., and Downton, F., *ibid.*, 1954, 2, 323.

⁷ Sheppard, P. M., *ibid.*, 1953, 1, 1220.

⁸ Mourant, A. E., *The Distribution of the Human Blood Groups*, 1954, Oxford.

heaps that are poorly made and not mixed. There are no recorded cases of disease arising from the use of habitation waste in agriculture in Great Britain.³

Under anaerobic conditions less nitrogen is required for composting because less carbon is oxidized completely. The temperature does not rise so rapidly or to the same maxima in anaerobic heaps, and pathogens are destroyed under these conditions more slowly than in composts that are turned frequently. The methane produced under these conditions, which are similar to those obtaining in the digestion of sewage sludge, can be stored in small gas cylinders and used on farms or in villages. One metric ton of organic waste yields about 50-70 cubic metres of methane, and about two cubic metres are required per day for cooking for an average family.

The duration of composting in aerobic heaps depends on the moisture content, particle size of the material, and the efficiency of mixing and aeration, all of which can be controlled, and also on the composition of the materials used, which is variable. When the carbon-nitrogen ratio is initially less than about 20 to 1, composting for a few days gives a product which can be safely applied to crops. If the final carbon-nitrogen ratio is greater than about 15 to 1, however, there is a risk that nitrogen in the soil will be utilized to decompose carbon compounds in the compost, and this can result in a serious check to plant growth. In general, the longer composts are stored the greater the amount of nitrogen they release for crop growth; in commercial composting for horticulture, storage may be for 8-12 months, but this is seldom possible when habitation wastes are composted in municipal plants, when storage is usually limited to 2-3 months. The approximate composition of composts prepared from habitation wastes, and of farmyard manure, is as follows:

Materials Composted	Moisture Content	% Dry Matter			
		N	P ₂ O ₅	K ₂ O	Ash
Garbage and refuse (U.S.A.)	—	1.4	1.1	0.8	37
Sewage sludge and town refuse (U.K.)	40-50	1.0	0.9	—	70
Refuse (Holland)	20-35	0.4-0.5	0.4-0.5	0.4	75-80
Farmyard manure	74	2.2	1.6	2.0	36

Composts from town refuse have a lower nutrient content than farmyard manure, and have given lower yields in field trials, particularly under wartime conditions when efficient sorting removed much of the organic material for feeding pigs.³

The quantities of nutrients and organic matter in town refuse are small compared with the amounts of inorganic fertilizers or farmyard manure used in Great Britain. The Zuckerman Report⁴ concluded that town refuse collected annually in this country contains

about 25,000 tons each of nitrogen, P₂O₅, and K₂O, but that over three-quarters of these nutrients were present in fine dust which it would not be economical to compost. This report also showed that about 700,000 tons of compost could be made annually by composting household wastes with sewage sludge; the estimated nitrogen content was about 4,500 tons, which is, however, only about 2% of the total nitrogen used each year in inorganic fertilizers. Although composting household refuse and sewage sludge by local authorities appears uneconomical in Great Britain, and would not conserve significant amounts of plant nutrients, it has been suggested that agricultural wastes and sewage sludge could usefully be composted where local conditions are favourable, and this is done at several plants in Britain. The efficient conservation of the nutrients in sewage effluent, in which at present 60,000 tons of nitrogen and large but unknown quantities of potassium salts are discharged annually into the sea, appears to be more important economically in this country than the recovery of the nutrients in town wastes.

RESPONSE TO LEUCOTOMY

A preference for an empirical rather than a theoretical outlook is traditionally supposed to mark the British character, and there are those who would argue that in psychiatry it is a preference that bears fruit. In this country psychiatrists probably concern themselves with philosophical issues less than do their colleagues overseas. One result of this has been the greater development and application of physical therapies than elsewhere, and the most radical of these, leucotomy, must by now have been performed about 15,000 times in Britain. While for many years the correspondence columns of this and other journals have contained discussions on the ethical pros and cons of this operation, general practitioners and psychiatrists have gone on steadily recommending it for suitable patients simply because it so often helps them when all else has failed. In an article published at p. 739 of the *Journal* this week Drs. Alick Elithorn and Eliot Slater show what a high proportion of patients can be helped by this operation, especially when selection of cases is very carefully carried out, as it is at the National Hospital, Queen Square. But if too full a cut is made, or patients are badly selected, the results will not always be so pleasing. Moreover, this particular series included only five schizophrenic patients, and some of the deleterious effects attributed to leucotomy in the past arose from leaving a patient with a schizophrenic illness too long untreated, so that emotional dilapidation from the illness itself was added to any undesirable effects of the operation.

Before this irreversible measure is carried out every other means of treatment should of course have been tried. Some patients do well on the new chemical tranquillizers, and they should always be given a trial before operation

is finally considered, but there is not yet any convincing evidence for recent suggestions that these drugs have done away with the need for either full or modified leucotomies. Most schizophrenic patients should generally be left for at least two years and be given all other forms of treatment, alone or in combination, before the operation is seriously thought of; in cases of neurosis and depression an even longer period of illness should be allowed. Many neurotic illnesses turn out to be atypical depressions and the patient recovers spontaneously after a year or two of waiting; and most neurotic illnesses have high remission rates whatever the type of treatment given. Again, it should be borne in mind that the result is the personality before illness the better the result is likely to be from the operation. Only when chronicity really appears to be present in either a neurotic or psychotic illness, and when all other treatments have been tried and failed, and when the patient is suffering from severe anxiety or from much unrelieved agitation and tortured self-concern, should the issue come to decision; then Elithorn and Slater's article shows that many patients will be grateful rather than critical after the operation.

Though Elithorn and Slater's paper does not mention the particular types of modified leucotomy performed on the patients in their group, the operation varies considerably in the hands of different surgeons. Some now feel strongly that modified operations, when thoroughly severing the tracts in the lower medial quadrants of the frontal lobes, are to be preferred to the full operation even in some cases of schizophrenia, and practically always in the neuroses and depressions. This seems to be a sound view, even though the personality deficits of the full operation were not found to cause complaint by patients or relatives in Elithorn and Slater's group so much as is sometimes reported by other workers. If necessary a second and fuller operation can always be done, but nothing can undo the effects of too extensive a cut done in the first instance. Undoubtedly when the modified operations come into more general use many of the remaining objections to this means of relieving intolerable mental suffering will diminish. Elithorn and Slater do well to state: "Surely the fact that leucotomy is a crude therapeutic weapon, and that unnecessary and unwanted changes are often produced by it, should not blind us to the observation that occasionally it may produce effects which are wholly beneficial." It is to be hoped that such an opinion now coming from the National Hospital and the neurological research unit of the Medical Research Council will do much to stop scare stories about this operation, for these not only can cause much unnecessary distress to patients and relatives, but may even stop a patient from having the only treatment which offers any hope at present of ameliorating a chronic and intractable mental illness.

BALLISTOCARDIOGRAPHY

The first ballistocardiogram was recorded nearly eighty years ago by J. W. Gordon,¹ who used a light bed suspended by ropes from the ceiling to record the movement imparted to the body by the heart and circulation.

J. S. Haldane and his colleagues² used a form of ballistocardiograph in order to determine the effect of altitude on cardiac output on the Pike's Peak expedition, their apparatus consisting of a plank supported on cork piles. Later other workers³⁻⁵ became interested in this field of investigation, and finally I. Starr⁶ in 1939 described his high-frequency instrument and developed the theory, technique, and clinical application of ballistocardiography.

Three main types of ballistocardiograph are used today. These are the Starr table, with a natural frequency of 10 cycles per second or higher; the Nickerson⁷ table with a frequency of 1.5 cycles; and the simpler Dock⁸ type of ballistocardiograph, which records the motion of the subject as he moves back and forth on a rigid table. The deflections of the normal ballistocardiogram were named by Starr according to the letters of the alphabet, H, I, J, K, L, M, N. The genesis of these deflections is still debated, though the H wave is believed to be due at least in part to the forces of atrial contraction and the J wave to forces resulting from ejection of blood into the aorta and pulmonary artery. While ballistocardiography is usually confined to recording the longitudinal movements of the body, three-dimensional ballistocardiograms have also been recorded,^{9,10} the record being named the vectorballistocardiogram.

The main clinical problems to which ballistocardiography has been applied have been the estimation of the cardiac output and the diagnosis of ischaemic heart disease. Both Starr¹¹ and J. L. Nickerson¹² have devised formulae for calculating the cardiac output, but these have not so far proved sufficiently accurate under varying circumstances and in the presence of different heart diseases to be of practical value. B. M. Baker and colleagues¹³ in a study of 110 patients found that in the presence of ischaemic heart disease both the ballistocardiogram and the electrocardiogram were usually abnormal, but that in certain cases the ballistocardiogram alone was abnormal and hence might be a useful test. More recently L. Brotmacher,¹⁴ using a Dock type of ballistocardiogram, has reviewed the criteria for the normal ballistocardiogram, but his conclusions about its practical clinical value were guarded. Although ballistocardiography and electrocardiography were invented at about the same time toward the end of the last century, their development has been unequal; while electrocardiography has become an essential method of investigation, ballistocardiography remains at present primarily a research process.

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EXPERIMENTS ON CONVICT VOLUNTEERS

Two medical research projects this year in which convict volunteers have collaborated are of special interest: the first, at the Ohio State Penitentiary, because of the nature of the experiments—the grafting of live human cancer cells into the volunteers; and the second, which is being carried out under the aegis of the Union of South Africa's Department of Nutrition, because it is the first example in that country of this use of convicts. Moreover, the fact of using convicts at all in medical research is in itself a debated question. In America a code of ethical rules governing the conduct of such research is believed to be already in existence.

By courtesy of the bodies responsible for these two investigations we are able to give details of how the volunteers were obtained, the safeguards adopted, and the practice with regard to incentives, as well as some information about the experiments themselves.

Research at Ohio State Penitentiary

The Ohio State Penitentiary has a tradition for helping in medical research. Thus, when the Sloan-Kettering Institute for Cancer Research, New York, and the Department of Medical Research of the Ohio State University College of Medicine needed human volunteers to further their work on the immunology of cancer, they turned for help to the Warden of the Penitentiary, Warden RALPH W. ALVIS. Experiments at the Sloan-Kettering Institute had already shown that transplanted cancer cells would grow slowly, remaining localized, when injected subcutaneously into patients with cancer who had volunteered for this. With the approval of the Warden, and the director of the Ohio Department of Mental Hygiene, Dr. JOHN D. PORTERFIELD, the following notice, signed by the medical director of the prison hospital, Dr. RICHARD H. BROOKS, appeared in the May 19 issue of the *Ohio Penitentiary News*. The *News* is a weekly newspaper written and published by the prisoners which is offered for delivery anywhere in the United States at 50 cents per annum.

"CANCER RESEARCH VOLUNTEERS NEEDED"

"For many years there has existed, one of many puzzling phenomena in the growth of cancer cells that still needs an answer; is still unsolved. Live cancer cells can be transferred from one individual to another. In the person who has cancer, the cancer cells will live and grow. In the person who has no cancer in his body, all of the transferred cells will die, eventually, after a short period of growth. It is this part of the problem that requires some further observation and study. Just how the normal individual who does not have cancer can kill off the transplanted 'Foreign' cancer cells, is the present important problem. So far, in past experiments, all attempts at growing one person's cancer cells in another individual, who does not have cancer, have ultimately failed. This is so, definitely, as far as we know now, that if transplanted cells do not grow, when injected into another person, it follows, that the injected person does not have cancer. If the cells do grow, it would indicate that the person injected probably does have a hidden or lurking cancerous growth, somewhere in his body.

"With the approval of Doctor Porterfield, Warden Alvis, and myself, the Sloan-Kettering Research Institute of N.Y.C. and the Department of Medical Research of the O.S.U. College of Medicine, are prepared to further study this problem, on volunteer inmates of the Ohio Penitentiary. The study will be directly supervised by Dr. Charles A. Doan, Director of Medical Research, College of Medicine, Ohio State University.

"The study would consist of the injection of live cancer cells (taken from some person who has a cancer) that have been kept alive in test-tubes, into both forearms of the volunteer—by direct needle injection under the skin. At the end of a two-week period, one of the injection sites would be entirely removed by a surgical excision of the injected area. The injection site in the other forearm would be observed for an—as yet—undetermined period of time, and then later be surgically removed. The

study of these skin biopsies—it is hoped—would bring forth some information on how the normal or non-cancerous individual's body-reaction goes about its normal process of 'killing-off' these foreign cancer cells that have been transplanted into it.

"The only hospitalization required would be for overnight stays, following the biopsies (surgical excision of the injected areas).

"Inmates with any type of known illness (diabetes, quiescent T.B., syphilis, osteomyelitis, peptic ulcer, heart trouble, high blood-pressure, etc.) would be acceptable as volunteers for cancer research.

"Men eligible for transfer to one of the Branch Camps, or assignment to another institution such as LPF, MCI, would also be acceptable.

"Approximately twenty (25) five volunteers will be utilized in this project.

"Any one interested in volunteering for research on our yet most baffling problem of our age, are requested to send a 'kite' to Warden Alvis."

Volunteers were asked to sign, in the presence of two witnesses, an authority provided by the Ohio State University, at the foot of which it was stated: "The organizations involved in this study agree to pay for any and all medical care, special treatment, biopsies, etc., that may be necessary in connection with this study." The authority was in these words:

"I, of the Ohio Penitentiary, and being of the age of 21 years or more, hereby volunteer myself freely and of my own will as a subject of experimentation in connection with a study of cancer, to be carried out under the joint supervision of the Division of Medical Research, College of Medicine, the Ohio State University, and the Sloan-Kettering Institute for Cancer Research of New York City.

"This study, as it has been explained to me, is intended to determine whether or not presumed live cancer cells can be successfully transplanted, indirectly, from one individual to another. I have been told that the cancer cells will be transplanted to my body by means of direct needle injection under my skin. I further understand that if the cancer transplant is successful that its existence will be observed for an indefinite period (whether I am still an inmate of the Ohio Penitentiary or not or am transferred to one of its branches). Further, I will readily agree to submit to a surgical excision of the involved area at any time or to a biopsy of adjacent (nearby) areas of my body upon the request of the principal investigators, Doctors Charles A. Doan, Alice E. Moore, and Chester M. Southam, or their associates. It is expected that if the transplant survives that the entire growth will be entirely removed. From time to time a sample of my blood will be drawn for analysis during this study.

"I also hereby agree that I will not donate any of my blood to the American Red Cross for transfusion until a release for same is obtained."

As a result of this appeal, the Warden received applications from 130 of the 3,800 convicts in the penitentiary. They formed, apparently, a fair cross-section of the inmates, including "some lifers as well as long- and short-time prisoners." The Warden is quoted in the *News* (of June 6) as saying that about 40% of those who applied added reasons for their volunteering, a majority stating that members of their families had died or were suffering from cancer; a few saying they had been "blanks all their lives" and welcomed the opportunity to do something useful; and some that they were grateful for what the prison regime had done for them, one specifying the education he had received there. The authorities offered no incentives to the volunteers. Indeed, most of the convicts in their applications made it clear that they understood there were to be no special privileges or prerogatives granted as a result of their volunteering. Fourteen of the volunteers were chosen for inoculation.

The story is carried a stage further in the July 7 issue of the *News*, which prints an extract from a report in the *Columbus Citizen*. This records that the 14 volunteers were inoculated subcutaneously in each forearm with the cancer cells on June 14, and that two weeks later "a section surrounding the injection was removed from one forearm of

each man." The report ends: "The fourteen participants, who have been given daily physical checks since the injections, include four lifers, four statutory offenders, four serving time for burglary and larceny, and two forgers. They have been working at their regularly assigned prison jobs since the start of the cancer research project. Biopsies of the injections on their forearms will be taken at a later date yet to be determined."

South African Project

In South Africa a working group from the National Nutrition Research Institute of the Council for Scientific and Industrial Research, operating under the aegis of the Union Department of Nutrition, is investigating the effects of variations in dietary fat in two groups of volunteer prisoners, one consisting of 20 European males and the other of 20 Bantu males. All the volunteers are serving long sentences. The original sponsor of the investigation and leader of the research team is Dr. P. J. KLOPPERS. The research stems from the current interest in the part played by fat intake and racial factors in coronary disease.

Although this is the first occasion on which convict volunteers in South Africa have been used for medical research, no special legislation was necessary. Arrangements were made by mutual agreement between the State Departments of Prisons and Nutrition, with the Council for Scientific and Industrial Research undertaking the laboratory aspects of the investigation. The project is reported to have the sanction of Mr. C. R. SWART, the Minister of Justice. No restriction has so far been placed on the type of investigation the working group may carry out. The only condition is that both the nature and aim of the experiment should be fully explained to, understood by, and voluntarily agreed to by each prisoner taking part. No prisoner, it is stated, "will necessarily be pardoned of part of his sentence merely by taking part in the experiment, while on the other hand again no prisoner will be penalized should he at any stage of the investigation desire to withdraw, with or without satisfactory reasons." The working group is also sworn to secrecy regarding the use of "photographs, family and personal histories, experimental findings, etc.," in writing up the work. Code numbers are being used to prevent the volunteers' identification.

There are no direct incentives to volunteering, but certain indirect ones are noted by the working group: "They [the volunteers] can of course look forward to changes (mostly for the good) in a rather monotonous diet, like the incorporation at some stages of the work of more highly satisfying fats of animal origin (e.g., butter), also eggs and so forth; the getting together for group talks by members of the working team; and in the case especially of the Bantu volunteers some extra cigarettes or tobacco."

The aim of the research is to throw light on the role of the diet, and in particular its fat content, in the aetiology of coronary thrombosis. The investigators hope to evaluate the relative importance of such factors as race and family history, and whether the consumption of unsaturated fats instead of saturated fats, or the presence of some other feature in the unrefined Bantu diet, affects blood cholesterol levels or the liability to thrombosis. The present cholesterol levels of both the Bantus and the Europeans in the prison diets are known each to contain 18% of fat. After investigation are known each to contain 18% of fat. After stabilization at this level both diets will be altered so that the consumption of saturated fats is increased to 40%, the diets being kept isocaloric by the withdrawal of carbohydrates. Again after stabilization, the Bantus will then be placed on the European diet with 40% of saturated fats. (The Europeans' diet remains unchanged.) After further stabilization, diets of both groups will be changed only in so far as the saturated fats will be replaced by unsaturated fats. Next both groups return to their own basic diets, but now containing 40% of unsaturated fat. Finally, each group goes back to its own original diet. The groups are

matched for age, and each group has a control group of 10 prisoners of the same race whose prison diet will not be altered. During the whole period, full clinical and laboratory investigations are being undertaken, including a full personal and dietary history and an attempt to assess the degree of "maleness" of each subject. This research has now been in progress for several months, and the results are awaited with interest.

PROGRESS IN BLOOD TRANSFUSION
INTERNATIONAL CONGRESS IN BOSTON

[FROM A SPECIAL CORRESPONDENT]

Advances in the technique of platelet transfusion, briefly noted in our issue of September 15 (p. 656), formed the main talking point at the International Society of Blood Transfusion's sixth congress in Boston this month. The congress was held in conjunction with the annual meeting of the American Association of Blood Banks from September 1 to 5, immediately after the congress of the International Society of Haematology (see *Journal*, September 15, p. 655). Dr. I. S. RAVDIN and Dr. J. J. GRIFFITHS presided.

Plastic Equipment in Transfusion

The work on platelet transfusion was presented by Dr. J. L. TULLIS and his colleagues from Boston. It was only the use of plastic bags and tubing and siliconed needles that made it possible. Dr. Tullis uses the Cohn automatic blood-fractionator to separate blood into red cells, plasma, and platelets. He then washes the platelets and resuspends them in gelatin. After freezing, they can be preserved for months. Dr. M. STEFANINI and Dr. E. KLEIN (Brighton, Mass.), and others, use the new plastic apparatus described by Dr. C. W. WALTER and manufactured by Fenwal; with this it is possible for any laboratory to prepare, *ex tempore*, packed cells, plasma, and concentrated suspensions of platelets without exposing the blood to any risk of contamination and without any waste; it will now be possible, for the first time, for any large hospital to prepare fresh frozen plasma and platelet suspensions. On first inspection this seems to be one of the greatest technical advances in transfusion since the introduction of blood banks, and one must hope that before long the equipment will be available for trial in Britain. If the quality of the plastic can be maintained, it may even prove advantageous to replace our glass bottles entirely by this plastic equipment.

Blood Groups and Antibodies

At the joint meeting with the International Society of Haematology on the first day of the Congress, a series of new discoveries in blood groups was announced: new alleles at the Ss locus (S^u , previously labelled U) by Dr. T. J. GREENWALT (Milwaukee); at Kk (Kell) by Dr. F. H. ALLEN, Jr. (Boston); at ABO (B^w) by Dr. P. LEVINE and Dr. M. J. CELANO (Raritan, N.J.). Dr. RUTH SANGER (London) showed that P, p, and Jay form a system similar to A_1 , A_2 , and O, for anti-Jay agglutinates all bloods containing P or p. Dr. M. SHAPIRO (Johannesburg) reviewed the MNS system, which now includes M,N,Ss,U (now S^u), Henshaw, and Hunter. The Rhesus system has been further complicated: the anti-V serum related to Rh was further studied by Dr. E. R. GIBLET and Dr. A. J. MOTULSKY (Seattle); Dr. H. H. GUNSON and Dr. W. L. DONOHUE (Toronto) described the phenotype C^wD-/C^wD- ; while Dr. R. E. ROSENFELD (New York) described an anti-D antibody, found in the serum of an Rh-positive woman, which agglutinated all Rh-positive cells except her own; absorption studies indicated that this subject lacked some component of the D-antigen mosaic. Indeed, all the blood-group systems are becoming more complicated. In the Rhesus system the hypothesis of

a one-to-one correspondence between genes and antigens seems now to have become inadequate, however fruitful it may have been in the past. There is clear evidence that the D antigen at least is composed of a mosaic of receptors or groups with antigenic specificity, and the only way of retaining the original hypothesis would be further to subdivide the D locus into yet more closely linked or inseparable sub-genes. Fortunately, however, these complexities are not often clinically important, though they may be of the utmost genetic and serological significance. These new discoveries may eventually necessitate some revision of the nomenclature.

Dr. J. V. DACIE (London), Dr. M. CUTBUSH (London), and Dr. J. H. VAUGHAN and Dr. M. V. WALLER (Richmond, Virginia) have studied the antibodies which behave as if they were composed of alpha and beta globulins—i.e., the “non-gamma-globulin” antibodies. These are nearly all cold antibodies, and their reaction in the anti-globulin test is due to absorption of the C₁, C₂, and C₄ components of complement on the sensitized cells. Antibodies to Lewis, H, A and B, P, Tj^a, Fy^a, and some Kell, M, and N antibodies, are of this type, and will not be detected if stale or inactivated serum is used in the test unless fresh complement is added. Dr. F. STRATTON (Manchester) underlined the importance of this for the Le^a antibody which is often a factor in transfusion reactions.

SOCIETY OF MEDICAL OFFICERS OF HEALTH

In his presidential address to the Society of Medical Officers of Health on September 20, Dr. J. D. KERSHAW, M.O.H. of Colchester, took a peep into the future. He was concerned not so much with the future shape of the public health service as with how its officers could make the most of their chances. Their Society, said Dr. Kershaw, was a community of true equality, which recognized that each member, whatever his status and seniority, could contribute something to the common pool. Apart from internal complacency and disunity, only three things could impede their progress: bureaucracy, hierarchy, and authority.

Bureaucracy, Hierarchy, and Authority

All these influences were at large. Perhaps at close quarters they were not very easily recognized. As an international Civil Servant with the United Nations, he had seen bureaucracy and hierarchy carried toward their awful conclusion. In a task with desperate urgency it had been distressing and infuriating to see how procedure caused delay and frustration, and rigidity robbed expert skills and knowledge of their effect. Back in England, his joy at the free air of public health was tempered by seeing the early symptoms of those diseases he had just encountered abroad at an advanced stage. “I urge,” said Dr. Kershaw, “that we examine our public health bureaucracy.” Public health was now and always would be a matter of helping people to live successfully. Flexibility and humanity were absolutely essential, whether for the helper or the helped.

It was the move towards bigger units which had also taken them toward a hierarchic administration, and close to hierarchy ran authority—“Father knows best” or, perhaps worse, “Father knew best.” It was well to remember that the newest recruit brought to his work a fresh viewpoint. He was every bit as likely to have something to contribute as an elder statesman.

Positive Health

In public health they were now moving out of an era centred on the development of the personal health service

into a search for positive health in its widest sense. A hundred years ago clinicians, by and large, had neither interest in nor time for preventive work. Public health workers had had to strike out into this field alone, and the evil effects of that cleavage between prevention and treatment were still only too apparent to-day. At all costs a similar schism in the field of mental health must now be avoided.

It was inevitable that psychiatric knowledge should have developed through the study of the diseased mind, but experience of mental illness did not inevitably lead to an understanding of mental health. It was unfortunate, too, that psychopathology exerted such a fascination on mankind as a whole. The human being who never in his life did or said anything that would not pass through the meshes of the psychiatrist's sieve was a rare creature and a poor one. Cranks and eccentrics were as important to the working of society as to that of the motor-car. A psychiatry that would stigmatize originality and individuality as signs of maladjustment could bring about as dangerous and deadening a uniformity as mass-advertising and political indoctrination. But there were welcome signs that, while one wing of psychiatry was moving rapidly in that direction, the other was seeing more than a glimpse of reality. It had been a psychiatrist who recently defined mental health as “a matter of getting on with people.” But, whatever the definition, the prevention of mental ill-health was largely a social matter. It was in the home, the school, or the place of work or recreation rather than by the couch-side that positive achievements would be made.

A second great problem of the times was the care of the ageing. There was no part of medicine where clinicians were becoming more social-minded or where there was greater scope for co-operation. “I want to see,” said Dr. Kershaw, “the people who care for the aged outside meeting and getting to know their charges while they are still in hospital.” The health visitor in particular should be a welcome guest and colleague in the wards. Another problem was the care of the handicapped. It was worth remembering in this connexion that whether a disability was or was not a handicap depended very largely on circumstances. And circumstances could be changed and modified. Help could be given in the planning of these people's lives, in reducing their risk of ill-luck and facilitating their opportunities. These three examples—the fields of mental health, geriatrics, and the handicapped—said Dr. Kershaw in conclusion, illustrated the new challenge: the future's outstanding needs were social rather than medical, and this applied to all the major problems they now faced.

OCCUPATIONAL HEALTH

MACKENZIE INDUSTRIAL HEALTH LECTURE

Dr. R. S. F. SCHILLING, reader in occupational health at the London School of Hygiene and Tropical Medicine and president of the Association of Industrial Medical Officers, gave the sixth Mackenzie Industrial Health Lecture at B.M.A. House on September 25. His subject was “Assessing the Health of the Industrial Worker.” The lecture, which is sponsored by the B.M.A. in conjunction with the Association of Industrial Medical Officers, was open to all interested in industrial medicine. The chair was taken by Dr. ALEXANDER HALL, President of the B.M.A.

Dr. Schilling reviewed the usefulness and reliability of such indices of industrial health as occupational mortality statistics, sickness-absence rates, records of treatment, and the results of field surveys, stressing some of the pitfalls. In the past, said the lecturer, industrial medicine was restricted to problems of industrial disease. “To-day the research

worker and the doctor in industry are expected to assess the extent to which many physical and psychological factors influence health.”

Mortality and Morbidity Rates

Occupational mortality rates were still of great value. Within the last ten years they had revealed or confirmed risks of lung cancer in arsenic, asbestos, and gas workers, and supported the hypothesis that the physically active in work get less coronary heart disease than the inactive. But they could mislead, indicating non-existent hazards or failing to show important ones. The Registrar-General's data were not sufficiently detailed to indicate certain hazards, such as the risk of those exposed to benzol and its compounds dying of aplastic anaemia, leukaemia, and liver necrosis, or dyestuff workers of bladder tumours.

Many occupational diseases might be revealed by sickness-absence rates, but such statistics were beset with difficulties. Recorded sickness in industry was dependent not only upon the pathological condition but upon many other factors—such as the nature of the employment, whether wages were paid during absence, and the method of recording. All these factors must be taken into account when comparing sickness statistics between one industry, factory, or occupation and another. Selective recruitment and discharge might also be important. But analyses in which these various factors were accounted for had been invaluable. Treatment records were also used to assess occupational health, but they might not be a reliable index of minor accidents and illnesses. Whether or not a worker reported for treatment depended on many things. Some made light of minor ailments. Others made the most of them. Distances from the ambulance room, the personality of the nurse, possible loss of wages, and so on might all influence the worker's decision to attend for treatment.

Field Surveys

Higher mortality and morbidity rates might only point to occupational hazards. Subsequently field surveys might be needed to show the extent and nature of the risk. In field surveys persons might be examined clinically, by set questionnaires, or by interview. In this type of work there were difficulties which did not arise in the statistical analysis of mortality and morbidity data. Little or nothing could be done without the co-operation of the population or a sample of it. If a minority refused to be seen or was not available, those who were seen might not be representative. A low lapse rate was usually achieved only by hard and painstaking preparation in gaining the support of the workers, their unions, and their employers. There were also important problems of error in observing clinical signs, in reading radiographs, in taking histories of symptoms, and so on. Much that was recorded might be unreliable, and the validity of the observations and answers given to questions had to be tested before the data could be used. If these difficulties were overcome, the field survey could be a valuable instrument of research. Although the field survey was useful in investigating diseases with a relatively high prevalence, it was of less value where the occupational risk was low, because so many workers had to be seen to get conclusive results.

Conclusion

But if one accepted the World Health Organization's definition of health as a state of physical, mental, and social well-being, and not merely the absence of disease, said Dr. Schilling in conclusion, then freedom from occupational disease could only be one component of occupational health. Conditions of lighting, atmospheric temperature, hours of work, the length of working spells, and so on clearly influenced well-being. In addition there were psychological factors: the worker should be suited to his job, both physically and mentally, and he should be able

to feel that he was making a useful contribution to the community. All these aspects had to be taken into account in the assessment of occupational health.

MEDICAL DEFENCE UNION

The annual meeting of the Medical Defence Union was held at the Birmingham Medical School on September 18. The president, Dr. S. COCHRANE SHANKS, gave an address on “Medical Litigation, Past and Present.” The situation could be summed up in a sentence, he said: “In the olden days there wasn't very much; now there is a great deal.” After a graceful reference to the presidency of Mr. Lawson Tait (1887-93), a leading Birmingham surgeon, and to the Union's early history, Dr. Shanks turned to the present. Of all the claims now made against members only a third were justified, he said, in that the Union either settled out of court or lost in court. In the other two-thirds the case was won in court or abandoned by the plaintiff. But, as in 80% of the court cases the plaintiff received legal aid, costs were usually not recovered even if the result was favourable. In two cases successfully defended recently the Union's costs had been more than £10,000, none of which had been recoverable. Defence societies, however, were not merely insurance companies. Their first object was to defend the character and interests of members. An insurance company took the cheapest way out. Time and again the Union had fought and won a case when it would have been cheaper to settle. Disputes between doctors were often referred to the Union and were usually settled informally and amicably. Sometimes they were settled by an arbitrator appointed by the council. It was the Union's rule not to support one member against another, though in one or two really difficult cases legal assistance had been provided to both parties.

Under the recent Medical Act, continued Dr. Shanks, divorce proceedings where a doctor was the co-respondent and the respondent his patient, if proved, were referred automatically to the G.M.C., which had to accept the verdict of the divorce court. To meet this situation, in selected cases the Union would undertake a member's defence in the actual divorce proceedings. This, however, was not automatic, and depended on the merits of the case in question. Dr. Shanks concluded his address by giving some examples of the types of case brought against doctors for negligence.

Annual Report

The annual report records that on July 17, 1956, membership of the M.D.U. stood at 43,219, of whom 7,698 were women. During 1955 the Union handled 2,348 cases, a similar volume of work to that in 1954. During the year Dr. PHILIP ADDISON was promoted to deputy secretary, under the secretary of the Union, Dr. ROBERT FORBES.

Under the heading “Practising illegally” the report draws attention to the large number of doctors whose names have been erased from the *Medical Register* because they have failed to answer inquiries as to their address from the G.M.C. Doctors are urged to check their position by inspecting the current *Register*. Other subjects discussed in the report include: the Coroners Rules, 1955; Witnesses Allowances Regulations, 1955; Dentists Act, 1956; medical reports to officials; blood transfusions; accidents in hospitals; “informing the patient”; professional secrecy; the Central Legal Office at St. Andrew's House, Edinburgh; disputed accounts; disclosure of information to the police; inquests; and the infringement of copyright—this last concerning an article in the *British Medical Journal* which, without permission, was reproduced in full in a popular magazine. The treasurer, Dr. HENRY ROBINSON, reports that, after deficits in current expenditure in the two preceding years, 1955 showed a surplus of £8,714, more than enough to cover the combined deficits. The total funds of the Union now amount to £171,522.

Correspondence

Breath-holding Test

SIR,—Tests for the quick assessment of cardiac and respiratory function are now being replaced by more elaborate investigations, such as the maximum breathing capacity and bronchspirometry. However, a test still used by many anaesthetists is the so-called Sebrasez breath-holding test, in which the time a person can hold his breath after a maximum inspiration is measured and anything over 25 seconds is regarded as normal. During the last four years I have been holding a pre-operative clinic at which I have seen patients for assessing their fitness for major surgery, and besides a full clinical examination of the heart and lungs I have carried out this breath-holding test. Having performed this test on just over 1,000 patients I am not satisfied that it gives any more information than the knowledge of a patient's everyday activities.

I thought it would be interesting to know how and why Sebrasez—whoever he might be—came to describe this test and what value he placed upon it. This led to the remarkable discovery that no such man as Sebrasez ever lived, and with the help of the Medical School librarian—Mrs. L. Sargeant—I finally traced the origin of this test.

In 1902 Dr. Jean Sabrazès, a Bordeaux physician who died in 1943, wrote in the *Gazette Hebdomadaire des Sciences Médicales de Bordeaux* a short note on "La durée maxima de la pause apnéique volontaire."¹ Here he describes his test in detail and emphasizes that the time measured is that during which a patient can hold his breath after a normal expiration *not* preceded by a forced inspiration; he states that the average figure for a normal person is 20–25 seconds. In other words, you ask the patient to see how long he can prolong the normal pause that follows expiration. This is, of course, quite different from holding the breath after a maximum inspiration. To illustrate this difference I carried out tests on a group of medical students and nurses and found the following:

	Average Age	Average Vital Capacity	S1	S2
Nurses	20 years	3,200 cu.cm.	42 sec.	19 sec.
Medical students	22 "	4,200 "	60 "	30 "

S1=Breath-holding after a maximum inspiration. S2=Breath-holding after a normal expiration.

It will be seen that a normal person can hold his breath for approximately twice as long after a maximum inspiration as after a normal expiration.

It seems hard that, only 54 years after a test is described, not only has the originator's name been mutilated but his test wrongly described and performed. I believe that the original test can be of value, and some interesting work was done by H. S. Ruth² in 1926, who showed that, in a series of 52 poor-risk patients, two-thirds of the deaths occurred in those cases with subnormal breath-holding ability—he, of course, was using the originally described test. Ruth also says that in cardiac cases if the breath-holding test is normal then circulatory depression is not likely to be encountered during anaesthesia. Woodbridge³ makes the same point when he states that a normal result in patients with heart disease is significant, but unfortunately he was not using the original test.

I have written this letter mainly to show how important it is to refer to original articles and not be satisfied with later references which may have become distorted. I hope also that this test of suspended respiration, as it was called by Gilbert Fitz-Patrick,⁴ will be reintroduced as a test of real value in assessing anaesthetic risk.

My thanks are due to Mrs. Sargeant, who finally found a copy of the Bordeaux gazette referred to at Bristol Medical School, and to the authorities at Bristol who allowed me to make a photostat copy of the original article by Dr. Jean Sabrazès.—I am, etc.,

King's College Hospital, S.E.1.

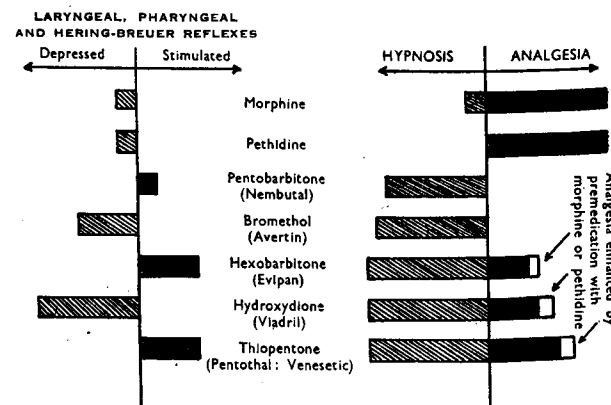
S. A. MASON.

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Steroid Anaesthetics

SIR,—As one of the experimenters mentioned in your excellent annotation on steroid anaesthesia (*Journal*, September 8, p. 594), I would like to comment on your statement that "hydroxydione is not an anaesthetic in the true sense of the word, but rather is a non-analgesic hypnotic." When a towel-clip is applied to the skin during the sleep produced by pentobarbitone (or other similar barbiturates) or bromethol in basal-anaesthetic doses the subject instantly rouses sufficiently to try and rid himself of the painful stimulus—he may even moan or cry out. With hexobarbitone or hydroxydione ("viadril") there would be slight movement at most, while with thiopentone there would be no movement if the dosage were adequate. To produce a lack of movement under such stimulation poisonous doses of pentobarbitone or bromethol would have to be used—i.e., sufficient to depress the respiration and circulation to dangerous levels. Thus it would appear that pentobarbitone and



bromethol are the true "non-analgesic hypnotics" when given in safe doses and that hexobarbitone, hydroxydione, and thiopentone come into another category—i.e., the analgesic-hypnotics, with thiopentone admittedly exhibiting a greater measure of analgesia than the other two. As hydroxydione depresses the throat and pulmonary reflexes instead of stimulating them, as do hexobarbitone and thiopentone, its slight deficiency in analgesic properties is amply compensated. The proof of the pudding is, of course, in the eating. Hydroxydione has been proved as an adequate alternative to thiopentone; a few anaesthetists still use hexobarbitone, but, so far as I know, no one uses pentobarbitone for this purpose. Thus, hydroxydione cannot be classed with the true "non-analgesic hypnotics." The accompanying block-diagram, which compares certain analgesics, hypnotics, and intravenous anaesthetics, is intended to illustrate my argument.—I am, etc.,

London, S.E.5.

A. H. GALLEY.

Asphyxia Due to Faulty Apparatus

SIR,—About three years ago I had a similar experience to that of Dr. W. N. Rollason (*Journal*, September 15, p. 658). I was giving an anaesthetic to a rather fat woman for a hysterectomy and passed a nasotracheal tube by blind intubation. The tube passed easily at the first attempt and expired air could be felt coming out of the Cobb's adapter. On connecting this to the gas machine, however, the lungs could not be inflated, although the patient's efforts to expire increased the size of the rebreathing bag. I was completely baffled and could only think that an acute bronchospasm had occurred. For this reason I was reluctant to remove the tube, but finally did so, with the gratifying result that the obstruction was immediately relieved. A second tube was passed and the narcosis proceeded without further incident.

On examination it was found that the Cobb's adapter contained a bakelite spigot used to close the inflating tube of the pneumatic cushion of a facepiece, and the shoulder

of this spigot acted as a perfect non-return valve. It transpired that some spare spigots had been stored in the box containing Cobb's adapters. Some of the flimsy chains securing the caps had broken so that several of the adapters had open ends into one of which a spigot had entered unnoticed. The moral is never to take anything for granted.—I am, etc.,

London, N.6.

C. LANGTON HEWER.

Respiratory Sign of First-plane Anaesthesia

SIR,—I am most grateful to Dr. V. T. Baxter (*Journal*, September 15, p. 658) for drawing my attention to the late Dr. J. U. Human's "sign of subcostal effort," in a textbook with which I regret I have previously been unfamiliar.¹ On the whole, I think that Human's title is a better one than mine ("modified cough"), since, as Dr. Baxter quite rightly points out, it can be and usually is apparent, even in the absence of a respiratory irritant—for example, thiopentone—prior to induction of anaesthesia by a sequence involving ether, or other stimulating agent. That this is a sign *per se* of ascending anaesthesia, however, I cannot agree, except in so far as any sign belonging to a certain level of anaesthesia will become apparent when that level is attained, either ascending or descending through the "planes."

Such a valuable respiratory sign in anaesthesia deserves better recognition, and Dr. Baxter will have done just service to the memory of a shrewd observer if Human's "sign of subcostal effort" finds its way into some of our standard textbooks for students of anaesthesia.—I am, etc.,

London, W.2.

HARRY L. THORNTON.

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Medical Education

SIR,—I was most interested in Dr. J. K. Paterson's scheme for the education of the complete doctor (*Journal*, September 1, p. 513), but, having followed its pattern up to the stage of clinical finals, I would like to suggest that there is an element of unrealism about it. *Tempus fugit*; and by my calculation the youngest doctor to step off the top rung of his ladder would be in his thirties. True, for the last two years he would have earned his living as a useful member of society, but could the State be expected to finance its future doctors to the age of 28? Furthermore, during the two "combative years" which Dr. Paterson advocates after leaving school these embryos will have lived alongside married men; can they all be expected to eschew marriage till 28? If not, who should pay? How can these objections be met? Is it not a poor outlook if two years of combative training are to be regarded as a *sine qua non* of manhood? There are ample opportunities to further this aspect of education in enterprising use of university vacations and in the three years of postgraduate training.

In your leading article (p. 519) you discuss the struggle for a synthesis in the university medical curriculum between fact accumulation and broader training of the mind. I suggest that Oxford has largely found that synthesis. Fact accumulation is essential as a foundation for clear thinking and sound medical judgment, and the preclinical student can satisfy this essential in eight hours of the day. For the remainder of the time he may enlarge his "manhood" by indulging in a variety of activities, mental and physical, in a non-medical environment, and one college at least insists admirably on its medical students writing periodical essays on cultural topics.—I am, etc.,

Oxford.

JOHN B. WILLIAMS.

Virilism with Mental Symptoms

SIR,—I should like to make a slight correction to my letter (*Journal*, September 8, p. 604) on the treatment of psychoses associated with virilism by adrenalectomy. I overlooked the fact that Dr. Raymond Greene and his asso-

ciates¹ published a successful case in 1945, and Soffer² reported the cure of a paranoid psychotic after her adrenal had been removed in 1948. Thus Dr. E. A. Bennet's case (*Journal*, August 25, p. 478) is the fifth in which cure of a psychosis has resulted after adrenalectomy.

Cases to be successful should be chosen for operation with considerable care. The criteria of suitability are that the patient should preferably be under 35 years of age; there should be definite adrenogenital virilism, which should have occurred synchronously with the psychosis. Signs of homosexuality such as a desire to wear male clothing, etc., are of good prognosis for the success of the operation.

It is interesting that cortisone has produced psychoses in some people,³ and the oxidation products of adrenaline—adrenochrome and adrenoxine—are believed by Heirman⁴ to act as hallucinogens. Obviously the adrenal gland is more important to psychiatrists than they have realized in the past.—I am, etc.,

London, W.1.

CLIFFORD ALLEN.

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Abuse of Antibiotics

SIR,—I was interested in Dr. A. Fry's outcry (*Journal*, September 1, p. 551) against the abuse of antibiotics, which I should like to second. But why look so far afield as the Continent for an example? The following is a quotation from a note I received recently with a baby sent up by a general practitioner to a London casualty department: "This baby has had a febrile illness lasting one week, in spite of sulphonamide therapy. Would you kindly see and advise?" If this were an isolated example of hit-and-miss medicine it would be laughable, but it is not. The only unusual feature of the case is that the doctor had prescribed the humble sulphonamide and not one of the more exotic—and more dangerous—antibiotics.—I am, etc.,

London, N.11.

JOAN M. CURTIS.

Drugs with Similar Names

SIR,—Can nothing be done to stem the spate of more and more drugs with similar-sounding names but widely different? Even if one can find the formula, that often conveys little to one's mind of what is what.

My post this morning contains literature about "penbenemid" and "pentoxylon," and not long ago a chemist gave one of my patients "thyroidex" instead of "theodrox" (luckily she had had them before and knew they were not the same). It seems to me that the situation is not only chaotic but dangerous. We doctors can so easily make a mistake, and it is becoming impossible for the chemist to be the extra check on the prescription.—I am, etc.,

Potters Bar, Middx.

A. MARY ALLAN.

Medical Evidence at Inquests

SIR,—Dr. F. M. Rose's letter (*Journal*, August 11, p. 356) on the question of the consultation of the family doctor by the coroner reminds me of three of my own cases.

In the first, my evidence almost certainly would have shown that the patient intended to commit suicide; so I was glad not to be called. In the second case, I arrived at the mortuary punctually but only just in time to persuade the pathologist to examine the neck; here he found a fracture-dislocation, which was the actual cause of death instead of the hypothetical one which he was going to present to the coroner. In the third, I learnt subsequently that the patient had died soon after his admission to hospital and that the staff had felt unable to give a certificate. The pathologist had been equally at a loss. I felt sure that it was a case of Landry's acute ascending paralysis, and I was very disappointed that no examination had been made of the spinal cord.

I hope that I shall not be accused of libel when I suggest that if the coroner can satisfy himself that the death has not been due to someone's carelessness or crime he is not particularly interested in the precise diagnosis. Whether this is a safe or desirable attitude to take is another question.—I am, etc.,

Beckenham, Kent.

W. MAXWELL PENNY.

Coronary Artery Disease

SIR,—In a letter in the *Journal* for July 14 (p. 98) Professor Ancel Keys discusses certain factors in the aetiology of coronary thrombosis. The low incidence of this disease in Africans is coupled with dietary factors. I wonder if Professor Keys would be interested in my experience as an anaesthetist whose patients are largely of African descent. In the last four and a half years over 17,500 anaesthetics have been given in the main operating theatres of the University College Hospital of the West Indies, and during that time only one proved case of pulmonary embolus occurred. Another suspected instance in a patient was not proved, as the woman recovered and the signs were equivocal. Nygaard *et al.*^{1,2} report an incidence of 1% after operation, and McCartney³ attributes 5% of all post-operative deaths to it. I would be interested to know whether anaesthetists in other tropical countries have had the same experience.—I am, etc.,

Jamaica.

VICTOR KEATING.

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Speech Therapy

SIR,—In a recent article in *The Times* speech therapy was called a young science dating from the first world war, but Dr. Neil Arnott wrote on this subject in 1828, Dr. James Hunt in 1854, and Dr. Wyllie in 1894. What is of much greater importance, with speech therapy recognized as an auxiliary medical service, is its rapid expansion in the last ten years from 260 members to more than 800, and its wider scope, which now includes correction of slurred s's and l's, speech re-education after brain injuries, cleft palate, and stammering.

As the majority of students are trained by public grants, with a large wastage through marriage, the value of their work should be assessed, for it seems that too much time is spent on correction of slurred consonants which would correct themselves, while stammerers are not having the help they need. I put forward their case because the great majority of them are far above the average in intelligence, so it is because of their potential value to the community that I ask for treatment more suitable for them. A stammering boy of 12 should be treated by a man, not by a young woman, for this reason. At that age or very soon after most boys are attracted by a girl some eight years older than themselves; it is the normal "bridge" between mother and sweetheart, a perfectly healthy phase, but to expect a teen-age boy to benefit from treatment for his stammer given by a pretty girl of 22 indicates ignorance of a normal phase, and, in addition, many boys at this age resent being bossed by a woman. Most boys feel this and sensible mothers accept it.

If it is really important to correct slurred s's, which are actually taught by some elocutionists and are no deterrent from employment, judging by many broadcasting ladies, it should not be a three years' training at a cost of between £160 and £245. When I was in charge at Guy's I never saw backward speakers more than once, when I explained the mistake and saw the child make the right sound, but I did not waste further time on them; schoolteachers or the parents could follow up my advice. But they could not do what I was there to do—the correction of cleft palates

and stammerers. By saving time on backward speakers I was able to increase the time available for the stammerers from 62½% to 75%.

In teaching speech sounds to spastic children the greatest care is needed; it is easier to start them stammering than to improve them. Take the sentence "What a pity it is that people do not take more trouble to speak clearly and distinctly." Spoken slowly, those 17 words of 23 syllables take 5 seconds, but they entail 60 muscular adjustments—that is, 10 per second—a lot to ask from a spastic. Simple consonant correction for infants could be done after a short training; for stammerers men are needed. But if women must be used, they should be older women with grown-up or teen-age sons. It is extremely difficult to be really conscientious about wasting time when working by paid sessions, but for the future reputation of speech therapy a sense of comparative values should be maintained.—I am, etc.,

London, N.W.1.

H. ST. JOHN RUMSEY.

Non-specific Ulcers

SIR,—The condition described by Dr. S. H. Wydel (*Journal*, September 1, p. 553) appears to be "pyoderma gangrenosum" or "dermatitis gangrenosa infantum," possibly due to a strain of *Staphylococcus pyogenes* resistant to most antibiotics and even to "topical" applications of an effective disinfectant. The thin paper-like scar that follows inordinately slow healing is rather characteristic; also the initial "blister"-like lesion. The differential diagnosis includes tropical ulcer and the cutaneous gangrene of Meleney.

Treatment is always difficult and requires much patience. Some cases, when first seen, have already had treatment with corrosive substances which increase the gangrenous area, make the lesion look "clean" and dry, and make an effective bacteriological examination of the exudate almost impossible. Cortisone has been recommended for some cases. The condition of the patient should be "built up" with good food—including milk if possible—luxur quantities of vitamin C, the vitamin B complex, and vitamin A. Cortisone may be effective when one of the underlying conditions is "necrotizing vasculitis." It is necessary to make conditions in the wound as near optimum for healing as possible; too profuse granulations may be controlled by restrained sprinkling with fine potassium permanganate powder; this application provides oxygen and has a disinfectant action. Sterile petroleum jelly can then be applied liberally, covered with sterile petroleum jelly gauze, and the whole encased in a few turns of plaster-of-Paris bandage or other strong "meddle-proof" outer covering. The whole application may be changed at weekly intervals or after ten days; more frequent changes should be avoided unless definitely indicated. The "pansement spécifique" of Dickson Wright is of undoubted value.—I am, etc.,

Epping, Essex

FRANK MARSH.

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Summer Time and Duodenal Ulcer

SIR,—When summer time ends many people will be taking their meals one hour later than formerly. The majority may have stomachs which can or will become accustomed to this change, but those with duodenal ulceration are prone to recurrence every year at this season.

If it were possible to warn such patients to take their meals earlier than usual for a limited period much suffering might be avoided and the waiting time for barium meal examinations not extended.—I am, etc.,

Bristol.

J. V. SPARKS.

Longer Holidays

SIR,—I am concerned by the increasing number of patients who attend surgery with anxiety and tension states and with symptoms of psychosomatic illness. Many of them are physically and mentally exhausted not only by the ever-increasing tempo of modern life but in large measure because of the inadequate annual holiday period, which appears to average about two weeks. The demands of industry to-day surely deserve at least one month's holiday per year for everyone. With increased relaxation, health and efficiency must improve and the pressure on our psychiatric clinics would almost certainly be reduced.—I am, etc.,

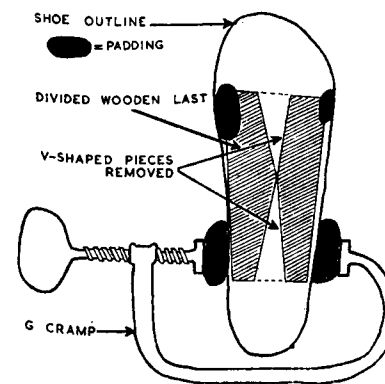
Dorridge, Warwicks.

G. A. POWELL-TUCK.

Shoe-stretcher for Bunions

SIR,—Having recently become afflicted with a bunion through wearing shoes bought while on leave in the United Kingdom and subsequently using them in Malaya, I was rather disappointed to find that a new pair of shoes specially made by a local Chinese shoemaker were still very uncomfortable even after stretching on an instrument that reminded me of Kollman's urethral dilator.

I decided to make a wooden gadget on the principle of the mouth gag, in which pressure applied to the handles opens the jaws. I made a wooden last from 1½ in. (3 cm.) thick hardwood, roughly the shape and size of the foot from the proximal interphalangeal joints to within 2 in. (5 cm.) of the heel. A V-shaped wedge about 4 in. (10 cm.) deep and 1 in. (2.5 cm.) wide was then cut out at the heel end and a similar V piece in front so



as to divide the last, as illustrated, into two. A tuberosity to correspond with the bunion and little toe can be raised on the last with some padding, held in position by adhesive strapping. The divided last can be easily positioned in the shoe, pressure being applied transversely to the proximal ends by a carpenter's G cramp from outside the shoe, the leather being protected by suitable padding. The pressure should be increased by turning the cramp screw at intervals, and thus great pressure can be applied in an outward direction to the leather that presses on the bunion and little toe. A wet compress should be applied to soften the leather for the first 24 hours and then the leather should be allowed to dry out for another 24 hours in the stretched position.

I am not aware if this device is well known, but it is cheap and effective and should be of interest to bunion sufferers who dread wearing new shoes. Needless to say, it is important, even in men's shoes, to have low heels.—I am, etc.,

Malacca, Malaya.

J. E. MCMAHON.

Paediatric Anaesthesia

SIR,—I read with interest Dr. John Bullough's letter (*Journal*, August 11, p. 360). I would endorse his division of children into three main groups from the anaesthetist's point of view, but as far as premedication and anaesthesia for guillotine tonsillectomy are concerned I do not feel that rectal or intravenous thiopentone are to be favoured, as depression of reflexes and nightmare states can follow the former, and post-operative delirium does in a substantial proportion of cases follow the latter.

I have tried methylpentynol in the full dosage recommended for premedication in these children, and more recently "pacatal" in a dosage of 25 mg. per stone (6.4 kg.) body-weight, but neither has proved as effective as syrup of chloral in a dosage of gr. 5 (0.3 g.) per stone (6.4 kg.) body-weight. Since its introduction into medicine in 1869 chloral hydrate has stood the test of time. It is one of the cheapest and most effective sedatives. To-day it receives none of the prominence in medical literature and drug advertising accorded the barbiturates and the tranquillizers, but in my view it is the drug by which the claims for the others should be judged.—I am, etc.,

Hull.

W. N. ROLLASON.

Apartheid in Blood Transfusions

SIR,—May I be permitted, please, to correct a misleading impression which your readers might gain from Dr. R. A. A. R. Lawrence's letter (*Journal*, August 11, p. 356)?

Voluntary blood donors of the Capetown blood transfusion service were overwhelmingly of the white racial group and were bled for emergency transfusions at the Somerset Hospital, which is exclusively for non-white patients. Donors were naturally entitled to refuse permission to any particular doctor to carry out the bleeding. Members of the hospital staff were entrusted with this duty only after having been certified as competent to carry it out.

I leave it to the good sense of your readers to decide whether the profession, whose concern it was to maintain the supply of donors and of blood, would have been wise to interfere with this privilege vested with the individual donor.—I am, etc.,

Capetown.

J. H. L. SHAPIRO.

Amnion Implantation in Peripheral Vascular Disease

SIR,—Mr. E. Troensegaard-Hansen reported on 40 cases of peripheral vascular disease treated by amnion implantation (*Journal*, August 4, p. 262). It might be of interest to report briefly on another patient successfully treated by this method.

A man, aged 58 in January, 1956, complained of pain in both calves after walking short distances. He had cold cyanosed feet and barely perceptible dorsalis pedis pulses. He derived no benefit from peripheral vasodilators and finally was compelled to halt seven times in the half-mile level walk from the station, and then to take a bus up the final steep hill to his home. On May 8, 1956, Mr. Troensegaard-Hansen did an amnion implant in his left thigh; three days later he was able to walk half a mile without pain.

Now, four months after the implant, he can walk two miles without discomfort, and no longer finds it necessary to ride up the final steep furlong.—I am, etc.,

Arundel, Sussex.

J. N. WARREN.

"Old Elthamians 13; U.C.H. 8"

SIR,—As an Old Elthamian and for several years a regular O.E. 1st XV player, I was surprised to see a reference to the above rugby result in the excellent paper by Drs. W. D. M. Paton and Hannah Steinberg on ganglion block in human subjects (*Journal*, September 15, p. 622).

I cannot agree with the inference that this result was due to loss of prowess at sport following the administration of 25 mg. of hexamethonium bromide. Perhaps U.C.H. might find it profitable to use dextro-amphetamine sulphate in their next class experiment. They might then find that they are still missing putts on the 18th green and still losing to the Old Elthamians.—I am, etc.,

Sudcup, Kent.

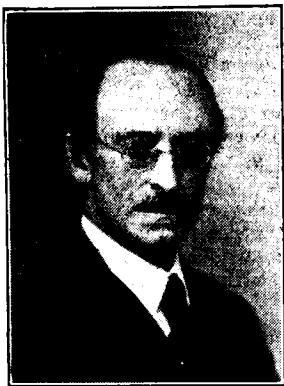
R. A. HARLOW.

Obituary

J. B. LEATHES, D.Sc., B.M., B.Ch., F.R.C.P.
F.R.C.S., F.R.S.

Professor J. B. Leathes, emeritus professor of physiology in the University of Sheffield, died at Montreux on September 14. He was 91 years of age.

John Beresford Leathes was born in London on November 5, 1864, the son of the Rev. Stanley Leathes, D.D. From Winchester, where he was a scholar, he went up to New College, Oxford. Although a classical scholar, he decided to qualify in medicine and completed his clinical training at Guy's Hospital, graduating B.M., B.Ch. in 1893. In the following year he took the F.R.C.S. In those days it was in Germany rather than in America that young men sought experience abroad, and Leathes worked under Drechsel and Schmiedeberg from 1895 to 1897. Returning to England, he was appointed lecturer in physiology at St. Thomas's Hospital, where he remained until 1909, when he was appointed professor of pathological chemistry in Toronto. He had also for some years before this been a member of the staff of the



[Lafayette, Ltd.]

department of pathological chemistry at the Lister Institute. On the outbreak of war in 1914, feeling that his services were required at home, he resigned his chair and returned to England. Just at this time the chair of physiology in Sheffield became vacant, and Leathes was approached by the then vice-chancellor, H. A. L. Fisher, who had known him at Oxford, and he accepted the chair at Sheffield. He occupied this post from 1915 until he retired in 1933 at the age of 69. The fact that he had then already passed by some years the normal retiring age is a measure of the value the University of Sheffield attached to his services.

Few men in the academic world are able to achieve major distinction in the three branches of their work—research, teaching, and administration—and most are satisfied with fame in one of these. Leathes not only achieved the highest distinction in all three branches, but in addition he was always a humane and civilizing influence in the community which he served.

His researches were chiefly concerned with the metabolism of fats. At that time biochemistry had not yet split off from physiology, and Leathes was one of the first who recognized the great importance of bringing accurate chemical knowledge and chemical techniques to biological problems. He was an early member of the Biochemical Society, and did much to develop the biochemical outlook both in Sheffield and elsewhere. His many researches culminated in the publication of a monograph on fats in 1913, and this was enlarged in collaboration with the late Professor H. S. Raper into a second edition which appeared in 1925. Leathes's contribution to physiology was recognized by his election to the Royal Society in 1911. He became a Fellow

of the Royal College of Physicians in 1921, and two years later he gave the Croonian Lectures. In 1930 he gave the Harveian Oration, and for the following two years he served on the council of the College.

When Leathes went to Sheffield he had already completed his best scientific work, and, while he remained keenly aware of the importance of research and gave every encouragement and stimulus to his colleagues, his main effort in Sheffield was in teaching and in administration. His tenure of office included the period of the return to the university of the ex-soldiers of the first world war, and his patience and sympathy with this group was widely known. The problem of interesting medical students in chemistry is still not entirely solved, but Leathes by the force of his personality and his great scientific distinction was able to interest his students in his own field of work, and was universally loved and respected by those who went through his department. The medical school at Sheffield was undergoing considerable development at the time of his appointment, owing to the activities of the late Sir Arthur Hall, and Leathes threw himself enthusiastically into the problem of trying to evolve a medical course which would bring modern scientific methods into clinical medicine, and which would also keep the laboratory scientist in closer touch with what was happening in the hospital wards. He served as dean of the faculty of medicine from 1916 to 1922 and again from 1931 to 1933, and he was largely responsible for the initiation of the medical course in Sheffield which constituted an important experiment in medical education. Leathes's idea was that the clinical and preclinical sciences should be closely integrated and the teaching of anatomy and physiology continue throughout the clinical periods. His work for medical education was recognized by his election as chairman of the Education Committee of the General Medical Council. With the appointment of full-time clinical professors, the course introduced by Leathes seemed to be less necessary, and in 1947 Sheffield reverted to the more orthodox course similar to that in other universities. Leathes's work was, however, not wasted, and it is not impossible that his curriculum in a modified form will yet be found to have an important place in medical education. He received the honorary degrees of D.Sc. from the University of Sheffield in 1933 and from the University of Manchester in 1936, and he was an Honorary Fellow of New College.

In spite of his numerous activities, Leathes found time for those other things which add so much to a university. He was a classical scholar by education, and always retained a broad humanitarian outlook and a wide interest in education. His wife was a talented musician, and with her assistance Leathes did much to stimulate interest in music in the university. The following words written by Sir Arthur Hall, who knew him well and worked with him for many years, convey something of the magnitude of his contribution to the University of Sheffield. "The deep influence for good which during all those years he exercised, not only on the faculty of medicine but throughout the whole university, cannot be measured in words. He was a tower of strength and has left a stamp on us as no other man did before. . . . His strength to our school lay in his deep and far-seeing wisdom in all that pertained to university life and education, particularly as regards the relation of science to medicine. A classical scholar, a profound thinker, and a physiologist of the highest distinction, it was the conscientious and unselfish

personality of the man himself which created an atmosphere in the place we can only hope we may never lose."

M. SILVERSTONE, Ch.M., M.B., F.R.C.S.

Mr. Maurice Silverstone, consulting surgeon to the Liverpool Royal Infirmary, died on September 22, aged 50. Though he had been ill for some years, he had never wavered in his determination to continue his surgical career to the end.

Maurice Silverstone was born on January 30, 1906, and educated at Liverpool. As a final-year medical student he won a B.M.A. prize in 1928, and in the same year he graduated M.B., Ch.B., with honours, at the University of Liverpool. After holding a number of resident appointments at the Royal Infirmary he was awarded the Samuels Memorial Scholarship in Surgery in 1931. In the following year he took the F.R.C.S. and in 1933 he proceeded to the degree of Ch.M. Before being elected to the staff of the Royal Infirmary he had been senior surgical registrar there and tutor and radium curator. Mr. Silverstone avoided the spectacular and was the reverse of thrusting, but he soon built up a reputation on Merseyside as a first-class surgeon and was a tower of strength to several of the local hospitals, including the Birkenhead General Hospital, the Birkenhead and Wirral Children's Hospital, and the Clatterbridge Hospital. For the last ten years he had been assistant to Professor C. A. Wells on the professorial unit at the Liverpool Royal Infirmary. At the university he held the position of assistant lecturer in clinical surgery: the students liked him and appreciated the qualities that helped him to overcome the handicap of serious ill-health during the past few years. From his wife he received great support, and to her and his three young children the sympathy of his many friends will be extended.

We are indebted to Professor CHARLES WELLS for the following appreciation:

It is with a deep sense of personal loss, which all who knew him and all those who in recent years admired his fortitude will understand, that I write of the untimely death of Maurice Silverstone. He did a full day's operating on Friday; on Saturday morning, though far from well, he attended hospital for his duties in the out-patients' department; at sunset he died. Thus his death, when it came, was mercifully swift, but he had known for some years that his days were numbered and he had set himself to do precisely what he did—work to the end. He will be remembered as a man of character and of courage.

In his work as a surgeon he always showed sound judgment and good sense; his operating was purposeful and quick, and he regularly achieved outstanding success with a minimum of fuss. His teaching of students and graduates was remarkable for its impersonal modesty and for constant reference to the writings and work of others. Instant counsel he was outspoken but utterly free from either malice or self-interest. As a colleague he was an infallible and good-humoured ally who could be critical but not disloyal. A fervent devotion to his family rounded off a life of unstinted service for which there can be no regret except that it ended too soon.

W. CLEMENT, M.B., F.R.C.O.G., F.R.F.P.S.

Dr. William Clement, consultant gynaecologist to the Royal Samaritan Hospital and honorary lecturer in clinical gynaecology to Glasgow University, died on September 10 after a long illness. He was 53 years of age.

Born at Dunlop in Ayrshire on September 13, 1902, William Clement was educated at Glasgow Academy

and Glasgow University, where he graduated M.B., Ch.B. in 1926. After holding several resident appointments in the Royal Infirmary, the Royal Samaritan Hospital, and Glasgow Royal Maternity Hospital, and spending a period of postgraduate study in America, he was appointed to the consultant staff of the Royal Samaritan Hospital, and later to the Royal Maternity Hospital in Glasgow. He also acted as consultant obstetrician and gynaecologist to the Southern General Hospital, Glasgow, being in charge of wards there for a period before the inception of the Health Service. During the early part of the war Dr. Clement took charge of the maternity service in Ayrshire, returning to Glasgow in 1941 to become chief of a unit in the Royal Samaritan Hospital and resuming his work at the Royal Maternity and Southern General Hospitals. In 1937 he had obtained the Membership of the Royal College of Obstetricians and Gynaecologists and was elected to the Fellowship in 1948. He had already been elected to the Fellowship of the Royal Faculty of Physicians and Surgeons of Glasgow in 1940.

In the last fourteen years of his life Dr. Clement worked under the serious disability of poor health, and in 1948 and 1953 had illnesses which kept him from work for long periods. In spite of his disability, when he was able to attend to his duties he wholeheartedly carried out both his clinical and teaching work with a devotion and attention to detail which inspired his staff with enthusiasm and made him one of the favourite clinical teachers of Glasgow University. He was a neat and dexterous surgeon who always considered the needs and circumstances of his patients.

Dr. Clement was well known as a breeder of King Charles spaniels and Pekinese. Probably his happiest hours were spent at dog shows, at which he was a popular figure. He had a great love for his native village and for his home in Glasgow, in the history of both of which he was well versed. He had the good fortune to be born and brought up in a lovely part of Ayrshire, whose natural beauties and interest he appreciated to the full, and into a happy and devoted family. Dr. Clement was unmarried.

E. B. JAMIESON, M.D.

R. M. H. writes:

The passing of Dr. E. B. Jamieson marks the loss of a great Edinburgh figure revered by several generations. I had the privilege of living in his company for many years and also of being one of successive groups of students who visited his home at Twagios, Lerwick, and of seeing shades of his character less evident to others. The tribute in the *Journal* (September 8, p. 607) from T. B. J. contained a reference to a photograph of "Old Jimmie" fishing from the stern of his boat. This photograph, more than any which I took during a visit 31 years ago, so pleased him that he used reproductions on which to convey his Christmas greetings. The reference recalls, as it will to many others who enjoyed the hospitality of their kindly and courteous hosts, the undimmed memory of the long walks across the island, the bathing in the cold clear water, the games of golf, the offshore fishing amid the wonderful bird life, and all the features of Shetland to which he returned each summer vacation with almost boyish enthusiasm. On behalf of those who knew Dr. Jamieson under these circumstances and of those with whom he lived for so long in St. Giles House, University Hall, I presume humbly to add a personal appreciation.

A legendary character at an early age, he is best remembered for his clarity of judgment and expression, his disdain of humbug, and the frank advice he gave to any of us callow

young men who sought his help. He had a delight in simple things which only the truly great mentality can reveal. Outwardly stern and at times awe-inspiring mien, he had a puckish sense of humour and a kindly smile which was quite disarming. He exerted on us an influence far greater than we realized. My last meeting with him only a year or two ago is perhaps a most characteristic remembrance. I had not seen him for twenty years, but on meeting at the door of the anatomy department he looked quizzically for a minute as first my surname and then my Christian name came to his lips with that kindly smile of recognition which is a cherished memory. A great anatomist, an erudite teacher, but especially a man of fine character, steadfast faith, and simple kindness, he will live long in the thoughts of all who were privileged to know him.

One of Dr. Jamieson's students writes: Dr. E. B. Jamieson entertained many students and gave them large and interesting meals which were cooked by himself. He once said to me: "When I die and something is written about me in the *B.M.J.* you will be able to say, 'He was also able to cook.'" I said that I would write and tell you.

Miss M. E. GREGG, L.D.S. R.C.S.

It is with deep regret that we have to announce the death on September 23 of Minnie Elizabeth Gregg at the age of 45, after a short and painful illness bravely borne. Miss Gregg was a dental surgeon, and daughter of Dr. E. A. Gregg, who has recently retired from the position of Chairman of the Council of the British Medical Association. Miss Gregg carved out a career for herself and took the L.D.S. of the Royal College of Surgeons in 1938 after studying at University College Hospital Dental School. For some years she worked for the London County Council in their school clinics and hospitals, eventually giving up this appointment to nurse her mother in her final illness. In recent years she was dental officer to Carreras Limited at their factory in Hampstead Road. Here she cared for the dental health of a large number of employees, and they will greatly miss her, not only because of her skilled attention, but more especially because of her cheerful and radiant personality and human sympathy. Members of the B.M.A. will have a different but equally vivid memory of someone whom so many came to know simply as Min Gregg. When Dr. Gregg became Chairman of Council in 1949 he was a widower, and so in the seven years of his chairmanship Miss Gregg assumed the by no means light duties of the Chairman's lady on the many official occasions that are part of the life of a Chairman of Council. To those who knew her it was indeed remarkable that Miss Gregg could carry on an active professional life, supervise the house of a busy general practitioner, and yet with all this could appear fresh and charming at so many receptions and other occasions as the Chairman of Council's lady. Miss Gregg accompanied her father on official visits abroad, and at the Annual Meeting of the World Medical Association made many warm friends with doctors and their wives from other countries. She was a valued ambassadress for the B.M.A. Miss Gregg was such a happy, friendly, and warm-hearted person, with so much vitality and courage, that it is difficult to believe she is no longer with us. Her many friends mourn her loss, and extend their heartfelt sympathy to her father and her family.

Dr. R. A. G. SMITH, medical officer to Carreras Ltd., writes:

The untimely death of Miss M. E. Gregg has come as a great shock to her colleagues, friends, and patients at

Carreras'. Nine years ago she organized a dental service for the factory and quickly dispelled any doubts that existed as to whether so slight a young woman could do a man-sized job. Her reputation as a "good dentist" soon became so firmly established that her waiting-list grew to several months. Miss Gregg always said that she tried not to be a "bluestocking." Those of us who knew her could never have imagined such a thing. She combined charm and dignity with efficiency and sympathetic understanding which endeared her to many in the factory community. This was expressed in the concern shown by large numbers of employees and managers alike when it became known that she was seriously ill. She will long be remembered at Carreras' with gratitude and affection.

Dr. V. F. SOOTHILL, who was medical officer of health for the city and county of Norwich for over a quarter of a century, died suddenly at Bramerton, Norwich, on September 10. He was 68 years of age. Victor Farrar Soothill was born on October 21, 1887. From Emmanuel College, Cambridge, he went on to Guy's Hospital, qualifying M.R.C.S., L.R.C.P. in 1912. He took the M.B., B.Chir. degrees in the following year, proceeded to the M.D. in 1918, and obtained the D.P.H. in 1920. His work as assistant medical officer at the Poplar and Stepney Sick Asylum was interrupted by the first world war, in which he served in the R.A.M.C., attaining the rank of major. Soothill began his career in the public health service in 1920 as assistant county medical officer of health for Dorset, and two years later he was appointed assistant (subsequently deputy) medical officer of health for the Ilford Urban District Council. In 1926 he succeeded Dr. H. Cooper Pattin as medical officer of health and school medical officer to the city of Norwich. He remained in that office for 26 years and was responsible for a great expansion in the public health services. At the time of his appointment there was only one infant welfare centre, but there were twelve when he retired, and during that time the infant death rate fell from 53 to 27. The slums in the centre of the city are no longer a serious problem, and new housing estates have been built on the outskirts of the city. It was a measure of his popularity that he was elected chairman of the Norwich Division of the B.M.A. within five years of his arrival in the city. Since his retirement in 1952 he had continued to live in Norwich. He leaves a widow, one daughter, and two sons.

Dr. A. A. FITCH died at Ambleside on September 2 at the age of 69. Arthur Alfred Fitch was born on March 29, 1887, and received his medical training at Liverpool University and St. Bartholomew's Hospital, qualifying M.R.C.S., L.R.C.P. in 1917. After serving in the R.A.M.C., he returned to Liverpool, where he was in general practice for a time, besides holding the appointments of medical officer in charge of the venereal diseases clinic at the David Lewis Northern Hospital and honorary dermatologist and physician in charge of the actinotherapy and venereal diseases departments at the Royal Southern Hospital. He left Liverpool shortly before the outbreak of the second world war, and for the last three years his home had been in Bath.

J. T. M. writes: Arthur Fitch was an unusual and complex personality. He was educated partly in France and spoke French fluently and German well, but not with the same ease. He served for a few years on the staff of the Hearst papers in America and used to declare he was the only Englishman ever employed by that by no means Anglophile agency. They sent him to the Middle East, where he learnt Arabic and claimed to have sat as a member at one time on the Young Turk Committee. Some time before the first world war he came home and began the study of medicine. When war broke out in 1914 the military authorities in their wisdom thought that his special gifts and experiences would fit him best for service in India, and there he stayed during

most of the hostilities. On demobilization he returned to the Liverpool and for a time was on the staff of the Royal Southern Hospital as a dermatologist. There was, however, to Arthur Fitch a wholly different side. He had a fine questing mind which led him to forsake the orthodox in his search for spiritual truth. For a time he linked himself with the Unitarian fellowship and indeed at one time was invited to accept the pulpit of one of the best-known of their churches in Liverpool. He loved his fellow men, and everything that concerned their welfare touched his heart. It was this emotional appeal that drew him at one time to join the ranks of the Labour Party. Particularly, however, it was children that most deeply stirred his feelings. He turned to the study of psychology and the problems of child delinquency. So to his friends it was no great surprise—however they might question the worldly wisdom of the move—when he gave up everything and opened—as a private venture—a residential school in Yorkshire for the benefit of "difficult" children—he would never call them delinquents. This was his real vocation, and this was his life so long as health permitted him to carry on. The practical problems arising out of the handling of these children led to a gradual acceptance of the view that a simple religious faith was essential if they were to be weaned from their warped ways and kept thereafter on the straight road. He came to associate himself and his school more and more with the beliefs and practices of the Quakers, and it was in this spiritual home that he died.

Dr. SIMON WIGODER died in Batley Hospital on September 13 from injuries received when struck by a car while he was on his way to visit a patient. He was 53 years of age. Simon Wigoder was born in Dublin and studied medicine at Trinity College, where he graduated M.B., B.Ch., B.A.O. in 1924. He proceeded to the M.D. in 1935 and took the D.O.M.S. in 1938. After graduation he worked for a short time in Wales and then settled in practice in Morley in 1924. He specialized in ophthalmology and worked for a time as registrar and assistant in the ophthalmological department at Leeds General Infirmary. He was on the executive of the North of England Ophthalmological Council and served as representative of the B.M.A. on the West Riding Ophthalmic Service Committee. He is survived by his wife and three children.

L. K. writes: Dr. Simon Wigoder's untimely death will be felt by a very great many people in Morley, where he had practised since 1924, becoming one of the town's best-known patients but to the community in general, serving for 19 years the town council and as chairman of its health committee. He was corps surgeon of the St. John Ambulance Brigade, physician to the four Morley courts, and superintendent of the juvenile court. Dr. Wigoder will be especially missed by his aged patients, to whom he showed every kindness and consideration. Simon Wigoder died as he lived—serving his fellows.

Dr. W. R. MARTINE, who practised in Haddington, East Lothian, for many years, died in Edinburgh on September 16 aged 85. William Robert Martine was born on June 18, 1871, the son of Dr. William Martine, a general practitioner in Haddington. His ancestors had lived in the district for several centuries: records show Martines as farmers in the county as far back as 1600, and many of them took an active interest in the public affairs of the county and the burgh. There was a provost Martine of the burgh in 1781, and other members of the family held the same office in later years. W. R. Martine was educated at the Knox Memorial Institute in Haddington, entering it on its opening day in October, 1880. At the age of 17 he started his medical course at Edinburgh University. During his student days an attack of rheumatic fever caused a setback in his medical education, but he graduated M.B., C.M. in 1894, and then held two assistantships, first to Dr. Barclay, of Inver Granton-on-Spey, and then to Dr. Sutherland, of Inver-gordon. Returning to Edinburgh, he was appointed house-

surgeon to Mr. A. G. Miller at the Edinburgh Royal Infirmary in 1895, but he had to relinquish this post because of the illness of his father and assume the responsibility of a large urban and country practice. Like all country doctors of his kind, he used a horse and gig to take him on his rounds. When he did have a car he never liked driving it. In addition to his work as a family doctor he was medical officer of the County Fever Hospital and a number of parishes in the district. A member of the B.M.A. for 60 years, he was chairman of the Lothians Division on two occasions, from 1914 to 1917 and from 1936 to 1937. In the years between he was honorary secretary of the Division. He was an active opponent of the National Health Insurance Bill, though, like many others, he came to accept the Act as a beneficial provision for many of his patients. He was president of the Edinburgh Branch of the B.M.A. from 1923 to 1924, and a member of the Scottish Committee from 1931 to 1934. He also served as a member of the Insurance Acts Committee for ten years and of the Rural Practitioners Subcommittee. For several years he was chairman of the Scottish Rural Practitioners Subcommittee. In 1936, after he had retired from practice in Haddington, he went to live in Edinburgh, and during the second world war he assisted the late Dr. Robert Craig, with whom he had a long and enduring friendship, in the secretarial work of the Scottish House of the B.M.A. Dr. Martine's recreations were curling, fishing, shooting, and, if not active gardening, at least the joy of a large garden and the cultivation of flowers. He was a successful exhibitor at the Royal Caledonian Society's shows and was Grand Master of the Ancient Fraternity of Freegardeners at Haddington for over 20 years. He married in 1897 a daughter of Mr. Charles Taylor, a solicitor before the Supreme Court, and had a family of three sons and one daughter, to whom the sympathy of a wide circle of friends is extended.—A. F. W. M.

Medico-Legal

MEDICAL EVIDENCE IN DIVORCE ON GROUNDS OF INSANITY

[FROM OUR MEDICO-LEGAL CORRESPONDENT]

In the recent case of *Usher v. Usher*,¹ Lord Merriman, President of the Probate, Divorce, and Admiralty Division of the High Court, called attention to a change in the medical evidence required to support petitions for divorce on the grounds of incurable insanity. It is a result of the sanction given by the Minister of Health to medical superintendents to delegate responsibility for the clinical treatment of patients to psychiatric consultants on their staffs.

The President pointed out that as a result the medical superintendent was sometimes unable to give first-hand evidence about the diagnosis of the respondent's mental illness and the nature of the treatment. In that event the superintendent's affidavit must include a statement that he has delegated responsibility for treatment to a consultant, and when, and give the full name of the consultant concerned. There should also be affidavits from any consultants to whom responsibility has been delegated bringing the picture of the diagnosis and treatment of the patient up to date as at the presentation of the petition, and stating it to be the fact that in the opinion of the consultant, and in the light of present-day medical knowledge, the mental illness is incurable, and giving the reasons for the opinion. The evidence should also include information on whether the patient is able to appreciate "extra comforts" and if so to what amount, and anything else which is relevant. The President stressed that the evidence must bring the picture properly up to date and that the date of the assumption of responsibility by each and every consultant, and its duration, must be specifically stated.

¹[1956] 1 W.L.R. 894.

INFECTIOUS DISEASES AND VITAL STATISTICS

Summary for British Isles for week ending September 8 (No. 36) and corresponding week 1955.

Figures of cases are for the countries shown and London administrative county. Figures of deaths and births are for the 160 great towns in England and Wales (London included), London administrative county, the 17 principal towns in Scotland, the 10 principal towns in Northern Ireland, and the 14 principal towns in Eire.

A blank space denotes disease not notifiable or no return available. The table is based on information supplied by the Registrars-General of England and Wales, Scotland, N. Ireland, and Eire, the Ministry of Health and Local Government of N. Ireland, and the Department of Health of Eire.

CASES in Countries and London	1956					1955				
	Eng. & Wales	London	Scotland	N. Ireland	Eire	Eng. & Wales	London	Scotland	N. Ireland	Eire
Diphtheria ..	4	0	10	0	1	6	1	2	0	1
Dysentery ..	330	33	146	13		399	105	266	5	2
Encephalitis, acute	2	1		0		8	0			0
Enteric fever:										
Typhoid ..	15	3	1	0	5	4	0	1	0	4
Paratyphoid ..	8	1	3(B)	1		85	18	6	3	
Food-poisoning ..	189	16		1		897	82			1
Infective enteritis or diarrhoea under 2 years ..										
Measles* ..	1,092	104	63	34	25	1,663	38	35	25	50
Meningococcal infection ..	27	5	15	2	1	20	2	16	0	
Ophthalmia neonatorum ..	23	1	5	0		33	2	8	0	
Pneumonia† ..	171	11	127	1		170	9	78	5	
Poliomyelitis, acute:										
Paralytic ..	37	4		0	20	206	26			7
Non-paralytic ..	68	6				252	31			
Puerperal fever‡ ..	208	44	3	0		227	22	7	2	
Scarlet fever ..	253	20	72	18	9	267	18	56	20	18
Tuberculosis:										
Respiratory ..	509	85	116	28		594	74	125	16	
Non-respiratory ..	76	7	16	0		74	8	26	8	
Whooping-cough ..	2,315	179	336	16	34	1,461	84	71	59	87

DEATHS in Great Towns	1956					1955				
	Eng. & Wales	London	Scotland	N. Ireland	Eire	Eng. & Wales	London	Scotland	N. Ireland	Eire
Diphtheria ..	0	0	0	0	0	1	0	0	0	0
Dysentery ..	0	0		0		0	0		0	
Encephalitis, acute						0				
Enteric fever ..	1	0	0	0		0	0	0	0	
Infective enteritis or diarrhoea under 2 years ..	2	0	0	0	0	2	0	1	0	1
Influenza ..	5	0	1	0	0	1	0	0	0	0
Measles ..		0	0	0	1	0	0	0	0	
Meningococcal infection ..		0	0			0	0			
Pneumonia ..	158	29	9	8	1	113	12	9	6	4
Poliomyelitis, acute	2	1			1	6	0			0
Scarlet fever ..		0	0	0	0	0	0	0	0	0
Tuberculosis:										
Respiratory ..	55	7	10	1	4	64	7	8	6	6
Non-respiratory ..		1	1	0	0		2	3	0	0
Whooping-cough ..	2	0	0	0	0	1	0	0	1	0
Deaths 0-1 year ..	190	24	25	5	8	156	22	27	7	23
Deaths (excluding stillbirths) ..	4,656	644	512	82	138	4,006	543	471	92	140
LIVE BIRTHS ..	7,419	1,126	876	191	431	6,976	1,020	856	222	373
STILLBIRTHS ..	169	14	29			181	21	25		

* Measles not notifiable in Scotland, whence returns are approximate.
† Includes primary and influenza pneumonia.
‡ Includes puerperal pyrexia.

Vital Statistics

Infectious Diseases

The only large variation in the trends of infectious diseases in England and Wales during the week ending September 8 was a fall of 290 for measles, from 1,382 to 1,092; the largest rises were 33 for whooping-cough, from 2,282 to 2,315, and 26 for dysentery, from 304 to 330. A fall of 19 was reported for acute poliomyelitis, from 124 to 105.

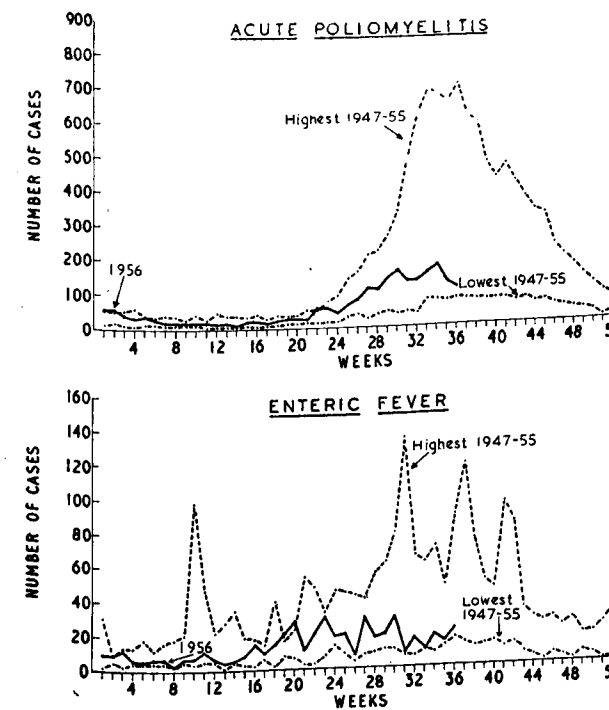
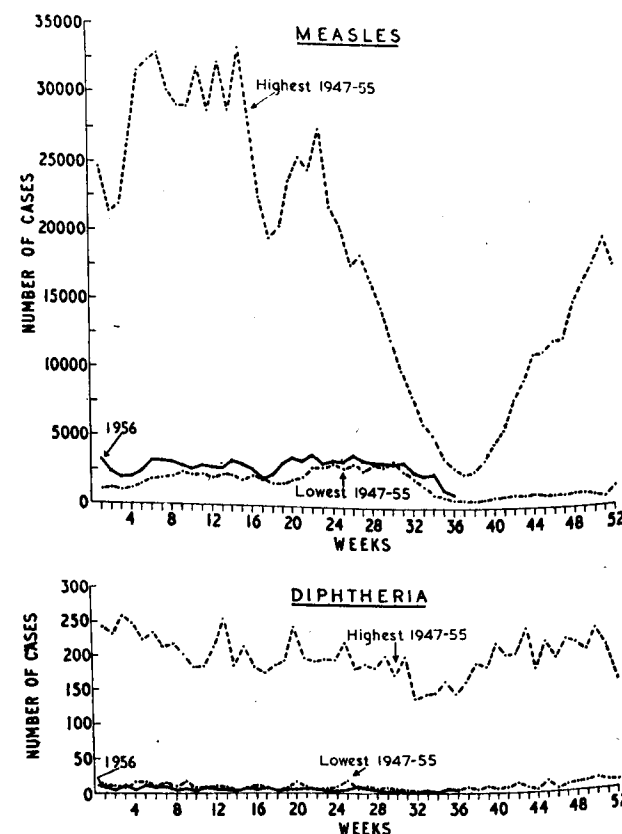
The largest falls in the number of notifications of measles were 68 in London, from 172 to 104, and 49 in Yorkshire East Riding, from 98 to 49. Only small fluctuations occurred in the local returns of scarlet fever. The largest fall in the number of notifications of whooping-cough was 32 in Yorkshire West Riding, from 198 to 166. 4 cases of diphtheria were notified, being 1 fewer than in the preceding week; 2 of the cases were notified in Birmingham C.B.

The rise in the incidence of dysentery was mainly due to cases in Yorkshire West Riding, where the number of notifications were 33 more than in the preceding week. The largest returns were Lancashire 78 (Liverpool C.B. 17, Blackpool C.B. 10, Salford C.B. 9); Yorkshire West Riding 66 (Leeds C.B. 35); London 33 (Southwark 8).

In Scotland 10 cases of diphtheria were notified, being 8 more than in the preceding week. 8 of the cases were notified from Stirling county and 2 from Edinburgh.

Graphs of Infectious Diseases

The graphs below show the uncorrected numbers of cases of certain diseases notified weekly in England and Wales. Highest and lowest figures reported in each week during the nine years 1947-55 are shown thus -----, the figures for 1956 thus ———. Except for the curves showing notifications in 1956, the graphs were prepared at the Department of Medical Statistics and Epidemiology, London School of Hygiene and Tropical Medicine.



Week Ending September 15

The notifications of infectious diseases in England and Wales during the week included: scarlet fever 313, whooping-cough 2,271, diphtheria 7, measles 932, acute pneumonia 205, acute poliomyelitis 111, dysentery 321, paratyphoid fever 6, typhoid fever 4.

Medical News

Hospital Building Programme.—Capital allocations to regional hospital boards for the year 1958-9 are announced in a memorandum from the Ministry of Health (H.M. (56) 80), and those for 1957-8 confirmed. The "plant replacement" programme is to continue, and £11m. has been earmarked for it in 1958-9; £11m. is expected to be available for other capital work that year. These sums are additional to any central expenditure on major projects from the list to which plans should be completed so that they may be begun in 1958-9. Regional boards are reminded that these capital allocations remain contingent on Government and parliamentary approval of the Health Service Estimates. The boards are asked to submit revised capital estimates for 1956-7 and 1957-8, to forecast estimates for 1958-9, and, as a help to planning for 1959-60, to notify any changes affecting major projects on their lists of such schemes. Capital

Capital Allocations (in Thousands of Pounds) for 1958-9

Hospital Board	Plant Replacement	Basic Allocation	Balance of Centrally Financed Schemes	Modernization of Mental Hospitals
Newcastle ..	140	679.69	—	100
Leeds ..	200	613.14	—	50
Sheffield ..	175	929.9	—	50
East Anglian ..	80	324.04	—	40
N.W. Metropolitan ..	210	775.16	—	75
N.E. ..	165	604.24	—	150
S.E. ..	225	643.16	—	50
S.W. ..	370	1,014.63	—	150
Oxford ..	80	303.05	—	150
South-western ..	175	554.09	9.198	100
Birmingham ..	220	922.46	31.262	40
Manchester ..	270	880.7	—	45
Liverpool ..	150	419.96	—	
Wales ..	150	617.08	—	

allocations to boards of governors for 1958-9 are to be notified to each board of governors separately.

Association of Industrial Medical Officers.—This week the Association of Industrial Medical Officers has been celebrating its coming of age. Its first official meeting was held on September 27 and 28, 1935, at the London School of Hygiene and Tropical Medicine, when a company of 18 assembled under the chairmanship of Dr. N. HOWARD MUMMERY, medical officer to J. Lyons & Co. Ltd. At this meeting Dr. DONALD STEWART (Imperial Chemical Industries Ltd.) was elected honorary secretary, and somewhat later Dr. MARGARET DOBBIE-BATEMAN (Harrods Ltd.) was appointed honorary treasurer. Since those days the association has expanded enormously: it has now a membership of over 820, and there are eleven local groups covering the whole of Britain. In 1944, in conjunction with the British Medical Association, the association launched the *British Journal of Industrial Medicine*, and in 1951 the first number of its *Transactions* appeared. The 21st birthday celebrations were held from Monday to Friday this week at the London School of Hygiene and Tropical Medicine, under the chairmanship of the president of the association, Dr. R. S. F. SCHILLING. The meeting was opened by the Minister of Labour and National Service, Mr. IAIN MACLEOD, on the second day, and this was followed by Dr. Schilling's presidential address. At the scientific sessions there were discussions on "The Elderly Worker," "Research in Occupational Health," "The Impact on Medicine and Industry of the Use of Atomic Energy," and "Mental Health in Industry." There was also a lecture-demonstration on "Weight Handling." Two lectures were given during the meeting: the Mackenzie industrial health lecture, which is summarized elsewhere in this issue (p. 764), and the John C. Bridge memorial lecture, given by Professor R. E. LANE, on "The Place of Occupational Medicine in a Teaching Hospital." Other notable events of the meeting were the anniversary dinner on September 27 at the Royal College of Surgeons, and the presentation of the presidential jewel, given by the members of the association, by Sir WILSON JAMESON.

NAPT Canadian Scholarship.—The National Association for the Prevention of Tuberculosis offers a scholarship to enable a British chest physician to visit Canada for three months next year. The object of the scholarship is to promote the exchange of ideas and experience between British and Canadian doctors. The tour in Canada, which will start in May, will be arranged in conjunction with the Canadian Tuberculosis Association. The amount of the award is £350. The scholar will reside free of cost in Canadian sanatoria. Further particulars can be obtained from the secretary-general, NAPT, Tavistock House North, Tavistock Square, London, W.C.1. The last date for applications is December 31.

Surgeons' Visit to South Africa.—Mr. ALEXANDER MILLER, visiting orthopaedic surgeon at the Victoria Infirmary, Glasgow, and Mr. E. A. NICOLL, orthopaedic surgeon to the Chesterfield Royal Hospital, are leaving on September 30 for a six weeks' tour in South Africa as the guests of the gold-mining industry. They will give lectures and demonstrations in traumatic and orthopaedic surgery in hospitals owned by the industry in the Transvaal and Orange Free State. They have also been invited to lecture in the university centres of Johannesburg, Pretoria, Durban, and Capetown.

William Hunter Memorial Lecture.—Professor J. M. MUNRO KERR, a past president of the Royal Faculty of Physicians and Surgeons of Glasgow, and formerly regius professor of midwifery at Glasgow, delivered the inaugural William Hunter memorial lecture in the hall of the Faculty on September 12. The lecture is sponsored by the Glasgow Obstetrical and Gynaecological Society.

A Teaching Film.—In the United States medical audiences have recently had several opportunities of seeing closed-circuit television programmes on medical subjects sponsored by the pharmaceutical industry. One such programme, entitled "The Grand Rounds—Acute Abdominal Problems,"

has been filmed, and the film was recently shown in London by Upjohn of England Ltd. It is an interesting venture in medical film-making, for it records the unrehearsed remarks of some distinguished American clinicians and teachers who were presented with cases to diagnose and discuss in front of an audience at the Tufts University School of Medicine and the New England Medical Centre, with the co-operation of the Boston City Hospital. The film takes one hour to run, and three cases are shown—acute cholecystitis, haemorrhage from the spleen, and a duodenal ulcer which first perforated and then bled. The discussions on these cases were instructive without being didactic.

Melanocyte-stimulating Hormone.—Last week we noted the publication in the *Journal of the American Chemical Association* of a letter from Professor C. H. Li and his colleagues at California University on the structural formula of intermedin (see *British Medical Journal*, September 22, p. 719). An earlier publication on the same subject in *Nature* (July 14, p. 90) appeared under the title "Amino-acid Sequence of a Melanophore-stimulating Peptide," in which Dr. J. I. HARRIS, a member of the scientific staff of the Medical Research Council, and Mr. P. ROOS, a biochemist from Upsala University, Sweden, working together at Cambridge, recorded not only the complete amino-acid sequence of the hormone but also their appreciation of the possible significance of its central group of amino-acids at positions 7-13.

Scottish Hospitals.—On September 20 Mr. J. NIXON BROWNE, M.P., Joint Parliamentary Under-Secretary at the Scottish Office, began a fortnight's tour of hospitals in Scotland by inspecting the Edinburgh Royal Mental Hospital, where he saw examples of overcrowding; in the afternoon he visited the Royal Infirmary.

Sir Sydney Smith, Rector of Edinburgh University, has been elected an honorary member of the Royal Society of New Zealand. This honour is limited to thirty of the world's outstanding men of science at any one time. Sir Sydney was born in New Zealand, and received his early education there.

Dr. Macdonald Critchley has been elected an honorary member of the Rumanian Society of Medical Sciences. He is the first foreigner to receive that distinction. He has just returned from a lecture tour in Rumania.

Dr. H. Gardiner-Hill, physician to St. Thomas's Hospital, London, played himself into office as captain of the Royal and Ancient Golf Club at St. Andrews last week. According to reports, the ball proved difficult to find, as it disappeared into a thick mist. However, it was eventually retrieved and the traditional golden sovereign claimed.

COMING EVENTS

Charing Cross Hospital Medical School.—Viscount KILMUR will give the inaugural address at 3 p.m. on September 28 in the Egyptian Hall of the Mansion House, London, E.C.4.

Institute for the Study and Treatment of Delinquency.—Six lectures on "The Problem Family" will be given from October, 1956, to March, 1957, at St. George's Institute, Bourdon Street, Davies Street, London, W.1. Details from the general secretary, I.S.T.D., 8, Bourdon Street, Davies Street, London, W.1.

Institute of Dermatology.—Semi-permanent exhibition on "Dyskeratosis," October 1-27.

Medical Protection Society.—Annual meeting at Victory House, Leicester Square, London, W.C.2, on October 3 at 3 p.m.

London Hospital Old Students Dinner.—Will be held at the Trocadero, 7 p.m. for 7.45 p.m. on October 11, with Sir HENRY TIDY in the chair. Tickets, 32s. 6d. (or 25s. for those qualified under five years), from Dr. R. R. BOMFORD, 22, Harley Street, London, W.1.

British Council for Rehabilitation.—One-day conference on "Injury, Compensation, and Employment," October 12, from 10 a.m. to 5 p.m., at B.M.A. House. Details from the general secretary, British Council for Rehabilitation, Tavistock House (South), Tavistock Square, London, W.C.1.

Royal Society of Tropical Medicine and Hygiene.—The opening meeting at Manson House, London, will be on October 10 at 7.30 p.m., instead of October 18 as previously arranged. Dr. H. A. REID will read a paper on "Sea Snake Research."

SOCIETIES AND LECTURES

A fee is charged or a ticket is required for attending lectures marked ●. Application should be made first to the institution concerned.

Tuesday, October 2

INSTITUTE OF DERMATOLOGY.—5.30 p.m., Dr. P. F. Borrie: Circulation and Vascular Reactions.
ROYAL ARMY MEDICAL COLLEGE.—5 p.m., Dr. L. Guttman: Modern Trends in the Treatment of Traumatic Paraplegia (with lantern slides).
WEST END HOSPITAL FOR NEUROLOGY AND NEUROSURGERY.—5.30 p.m., Dr. J. N. Milnes: neurological demonstration.

Wednesday, October 3

INSTITUTE OF DERMATOLOGY.—5.30 p.m., Dr. P. J. Hare: Sweat Secretion and Abnormalities.
INSTITUTE OF DISEASES OF THE CHEST.—5 p.m., Mr. N. R. Barrett: Acalasia.
INSTITUTE OF UROLOGY.—4.30 for 5 p.m., Mr. J. G. Sandrey: Urological Emergencies in General Practice.
MANCHESTER MEDICAL SOCIETY: SECTION OF MEDICINE.—At Medical School, Manchester University, 4.30 p.m., Dr. R. M. Forrester: Cerebral Palsy.
MIDLAND MEDICAL SOCIETY.—At Birmingham Medical Institute, 8.15 p.m., Professor Walter Bauer (Harvard): Management of Gout.
POSTGRADUATE MEDICAL SCHOOL OF LONDON.—2 p.m., Professor M. Meizels: Place of Chemical Pathology in Medicine.
SOCIETY FOR ANALYTICAL CHEMISTRY.—At Chemical Society, Burlington House, W., 7 p.m., subject: Chromatography. Mr. W. H. C. Shaw, F.P.S., F.R.I.C., Mr. J. P. Jefferies, B.Sc., A.R.I.C., and Mr. T. E. Holt, B.Sc., A.R.I.C.: Determination of Vitamin D and Related Compounds. Part I.—Introduction and Preparation of Compounds in the Irradiation Series. Part II.—Analysis of Irradiation Products. Dr. A. S. Curry, Ph.D.: Some Examples of the Use of Paper Chromatography in Toxicological Analysis.

Thursday, October 4

ST. GEORGE'S HOSPITAL MEDICAL SCHOOL.—5 p.m., Dr. J. H. Paterson: neurology demonstration.
ST. JOHN'S HOSPITAL DERMATOLOGICAL SOCIETY.—4.30 p.m., demonstration and discussion of clinical cases.

Friday, October 5

BIRMINGHAM MEDICAL INSTITUTE: SECTION OF PSYCHIATRY.—At Midland Hotel, 8 p.m., annual dinner. Guest speaker, Dr. J. R. Rees.
●INSTITUTE OF DERMATOLOGY.—5.30 p.m., Dr. M. S. Thomson: clinical demonstration.
INSTITUTE OF DISEASES OF THE CHEST.—5 p.m., Dr. E. H. Hudson: clinical demonstration.
INSTITUTE OF LARYNGOLOGY AND OTOTOLOGY.—3.30 p.m., clinical meeting for general practitioners. Mr. S. E. Birdsall: Tonsillectomy in Children and Adults.
POSTGRADUATE MEDICAL SCHOOL OF LONDON.—10 a.m., Mr. F. R. Edwards: Atrial Septal Defects and their Treatment.
SOCIETY OF CHEMICAL INDUSTRY: FINE CHEMICALS GROUP AND MICROBIOLOGY GROUP.—At London School of Hygiene and Tropical Medicine, 7 p.m., Professor A. Neuberger, F.R.S.: Some Uses of Isotopes in Biochemistry.
WHIPPS CROSS HOSPITAL MEDICAL SOCIETY.—8.30 p.m., Dr. R. M. B. MacKenna: Common Problems of Dermatology.

Saturday, October 6

ASSOCIATION OF CLINICAL BIOCHEMISTS.—At Royal College of Surgeons of England, 9.30 a.m., joint meeting with Association of Clinical Pathologists. Lecture by Sir Rudolph Peters, F.R.S. Also symposium: Biochemical Lesions: Keto-acid Metabolism and the Citric Acid Cycle.
NORTH OF ENGLAND OTOLARYNGOLOGICAL SOCIETY.—At Beckett Hospital, Barnsley, 2 p.m., 10th annual meeting.

Sunday, October 7

UNIVERSITY COLLEGE HOSPITAL MEDICAL SCHOOL.—10.15 a.m., clinical demonstration for general practitioners—obstetrics and gynaecology.

BIRTHS, MARRIAGES, AND DEATHS

MARRIAGES

Fox-Akker.—On September 13, 1956, in Cochin, South India, Wallace Fox, M.D., M.R.C.P., of Tuberculosis Research Unit, Medical Research Council, London, and now at Tuberculosis Chemotherapy Centre, Government Tuberculosis Institute, Chetput, Madras, India, to Gaye Akker, of 3, Chesham Close, London, S.W.

DEATHS

Bindley.—On September 11, 1956, at his home, Ninfeld, Sussex, Robert Alfred Bindley, M.B., late of Harlesden, London, N.W., and Prestwood, Bucks, aged 96.
Butler.—On September 9, 1956, at Tunbridge Wells, James Alfred Butler, M.D., of The Shrubbery, Firs Road, West Mersea, Essex.
Clement.—On September 10, 1956, in a nursing-home, Glasgow, William Clement, M.B., F.R.C.O.G., late of Kirkland, Dunlop, Ayrshire.

Any Questions?

We publish below a selection of those questions and answers which seem of general interest. It is regretted that it is not possible to supply answers to all questions submitted.

Human Anthrax

Q.—A patient of mine, a veterinary surgeon, quite often encounters cases of anthrax. Can he be protected against the disease by a vaccine? What treatment is advised for a human case of anthrax?

A.—For reasons given in the second paragraph of this answer it is doubtful whether active immunization of the human subject against anthrax, even in specially exposed individuals, is worth while. Commercially available vaccines are intended for use in cattle. It seems likely that they may be superseded by the antigen recently isolated by workers at Porton.^{1,2} This is a protein of which only 25 µg. will produce solid immunity in the rabbit. The serum of horses immunized with it contains at least as much protective antibody as that obtained in the usual way by hyperimmunizing the horse with a living-spore vaccine.

B. anthracis is regularly and highly sensitive to penicillin, and this antibiotic has been used with uniform success in the treatment of anthrax, even in patients with bacteraemia or meningitis. Judging by the experience of LaBocchetta³ it is not even really necessary to use large doses: he gave only 100,000-200,000 units daily to 36 patients, all of whom recovered. The organism is also sensitive to all the other major antibiotics, the order of their activity after penicillin (most active) being chlortetracycline and oxytetracycline, streptomycin, chloramphenicol.⁴ There are records, reviewed in Garrod's paper,⁵ of the successful clinical use of each of these drugs. It is significant that 7 of the 8 cases of Gold and Boger⁶ were treated as out-patients. That it should be thought safe merely to give a patient capsules to take at home is a striking indication of the altered outlook in this disease.

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1. Belton, F. C., and Strange, R. E., *Brit. J. exp. Path.*, 1954, 35, 144.
2. Strange, R. E., and Belton, F. C., *ibid.*, 1954, 35, 153.
3. LaBocchetta, A. C., *Amer. J. med. Sci.*, 1948, 216, 407.
4. Garrod, L. P., *Antibiotics and Chemotherapy*, 1952, 2, 689.
5. Garrod, L. P., and Boger, W. P., *New Engl. J. Med.*, 1951, 244, 391.
6. Gold, H., and Boger, W. P., *New Engl. J. Med.*, 1951, 244, 391.

"Mental Deficiency"

Q.—(1) What constitutes mental deficiency from the legal point of view? (2) How does the legal definition compare with the clinical connotation?

A.—(1) In England and Wales since 1913 the term mental deficiency has been used to describe arrested or incomplete development of mind existing from an early age. An early age has since been defined as "before the age of 18 years." From the legal standpoint a mental defective is a person certified by the legal authorities as such. Ascertainment is carried out by the medical officers of the local authority and is frequently done in conjunction with the education authority, so that children deemed to be ineducable, or, in certain cases, children leaving special school at 16, are ascertained as mentally defective. Certification implies the compiling of a medical certificate of mental deficiency; for most purposes two of these are required. This procedure is carried out prior to "dealing with" a mental defective by putting him into an institution or under guardianship. In the case of a child, that of Mental Deficiency Act a magistrate's approval is also required, and under Section 3, in the case of a child, that of the parents. Mental defectives are dealt with under Section 8 and 9 of the existing Acts by courts and prison authorities, respectively.

(2) The clinical connotation of mental defect may be wider or narrower, depending on the point of view of the clinician.

Some persons who are of very limited intelligence will make do in society, given favourable circumstances. From the clinical angle these people may be said to be handicapped by mental deficiency; a few of them may also suffer from physical handicaps as well as their mental defect. At the other end of the scale many young persons who are in social difficulties, suffering from mental disorder, or classifiable as psychopaths are dealt with under the Mental Deficiency Acts as a matter of convenience, though they could well be handled by the ordinary social agencies. From the clinical standpoint there is little to recommend the classification of such persons as mental defectives, though legally they may be such. The criteria of mental defect are primarily social. There is no advantage in designating a person as mentally defective if he is able to fit into the community. On the other hand, not all people who have social difficulties can be classed as mental defectives, and it seems most logical to reserve the term for those persons who have both difficulty in fitting into society and who at the same time show gross limitation of mental ability existing from an early age.

Severe Reactions from Midge Bites

Q.—What treatment would you recommend for midge bites which weal and blister?

A.—Wealing and blistering of midge bites occur only if the subject is hypersensitive. This is an acquired specific allergic hypersensitivity to the minute amount of material which the midge injects into the skin.

Prevention is better than cure, so people who are subject to troublesome reactions from insect bites should use a repellent whenever they are likely to be bitten. Dimethyl phthalate is an excellent repellent for midges, since it is effective, colourless, odourless, and without any irritant effect on the skin. It is effective for several hours.

Midge bites which proceed only to the stage of wealing can usually be satisfactorily treated by the local application of an antihistamine cream. Prompt inunction will usually relieve irritation and diminish the duration of the weal, even if it does not entirely prevent its development. In those cases where blisters arise, these may be prevented if the antihistamine is applied in the early stage before blistering begins. After the blister has developed no local treatment is likely to influence it very much. Sometimes these blisters are very tense and may rupture, leaving a troublesome raw area which may then become secondarily infected. If they are large enough to threaten spontaneous rupture, it is best to prick the blisters with a sterile needle so as to allow the fluid to escape. They are then best dusted with a plain zinc oxide and starch powder and kept dry.

Brachial Plexus Block in the Unconscious

Q.—In what conditions is a brachial plexus block indicated in an unconscious or anaesthetized patient? How is the block best done and how is its effectiveness judged?

A.—Brachial plexus block in an unconscious or anaesthetized patient is performed in order to block the sympathetic nerve supply to the arm. In the anaesthetized patient the procedure is indicated if an inadvertent intra-arterial injection of thiopentone has been made, or if during the operation the main blood supply to the limb has been interfered with. The plexus is also infiltrated by some operators during high amputations of the limb, in particular during a forequarter amputation. In these latter instances, however, the block is part of the operation and is performed under direct vision. In unconscious patients the plexus is blocked to help restore a poor circulation due, for example, to trauma. Thus an unconscious patient, concussed as a result of a road accident, may at the same time have suffered an injury of the arm leading to an interference with its blood supply.

The best method of blocking the brachial plexus is to deposit local analgesic solution on the upper surface of the first rib, where this is crossed by the plexus. The elicitation

of paraesthesiae is not possible when the patient is unconscious. However, this is not a disadvantage, and indeed in Patrick's method paraesthesiae are not deliberately sought. A barrage of local analgesic solution is laid down in the path of the plexus where it crosses the first rib. The effectiveness of a brachial block in a patient who is not conscious may be judged by the following signs: the hand on the blocked side becomes noticeably warmer than that of the other side; a stimulus—for example, a pinch by a towel clip on the skin of the hand—sufficient to cause the unblocked arm to move does not cause this reaction on the blocked arm; sweating ceases in the blocked limb and the subcutaneous veins become more prominent. A detailed and well-illustrated description of brachial plexus block by a modification of Patrick's method is described in *Local Analgesia; Brachial Plexus*, by R. R. Macintosh and W. W. Mushin (3rd ed., Livingstone, 1955).

Aluminium and Dental Amalgam

Q.—Amalgam used in filling teeth commonly consists of approximately 90% silver with some mercury and tin. If the unused surplus is left overnight on any aluminium surface, white fluffly flakes are given off. How is this explained?

A.—In air aluminium rapidly forms a coating of oxide which protects it from further corrosion and is strongly adherent. If the formation of the film is prevented by amalgamating the surface of the aluminium with mercury, as will occur if amalgam is placed upon it, oxidation in air occurs so fast that the temperature of the metal is raised and a feathery growth of oxide develops in the course of a few minutes.

Blood-clotting Time after Dicoumarol

Q.—Why cannot the effects of dicoumarol and similar anticoagulants be assessed by the whole-blood clotting time rather than the prothrombin time?

A.—Blood-clotting time is controlled, to a great extent, by the rapidity of thromboplastin generation. The formation of active thromboplastin under appropriate conditions is dependent upon the interaction of numerous substances, among which factors V and VII are of considerable importance. Following ingestion of dicoumarol, factor VII is the first component to be inhibited, while factor V is unaffected. In practice, whole-blood clotting time is little affected when small changes in factor VII only are involved, as all the other factors are present; only if factor VII is grossly depressed is the whole-blood clotting time prolonged. The single-stage prothrombin technique, which in fact does not measure "prothrombin concentration" but rather the efficiency of the factor V-factor VII complex, is sensitive to even small reductions of factor VII and is therefore satisfactory in controlling dicoumarol therapy.

Action of Heparin

Q.—How does heparin exert its anticoagulant effect? Why does it affect the one-stage but not the two-stage prothrombin time?

A.—Heparin is a polysulphuric acid ester of mucoitin. It carries an exceptionally high negative electric charge, by virtue of which it exerts its effect by altering the charges on other coagulation factors. It has two main points of action; in the presence of plasma proteins (co-factor) it inhibits the conversion of prothrombin to thrombin. Heparin also inhibits the thrombin-fibrinogen conversion when plasma albumin is present.

The one-stage prothrombin estimation is a "blunderbuss" reaction. It should be given some non-specific name, since it does not measure prothrombin concentration but is affected by alterations in the thrombin-fibrinogen reaction, the true prothrombin concentration, and the presence of factors V and VII. It will therefore reflect changes caused

by heparin at the prothrombin-thrombin and thrombin-fibrinogen levels. The two-stage method measures the amount of prothrombin present irrespective of the rate at which it becomes available. The administration of heparin, though retarding the conversion of prothrombin to thrombin, does not influence the absolute amount of prothrombin present, and thus the two-stage test is no help in controlling heparin therapy.

School Medical Inspection

Q.—Under Section 48 of the Education Act, 1944, the local education authority may require any pupil attending a school maintained by the authority to submit to medical inspection. Any person who fails, without reasonable excuse, to comply with any such requirement shall be liable to penalty. Is there any case law which clarifies whether the following constitute "a reasonable excuse": (1) conscientious objection to medical examination by a parent who belongs to a certain religious sect; (2) the production of a certificate of fitness from the child's family doctor?

A.—I know of no case in the Courts on the interpretation of "reasonable excuse" in Section 48(2) of the Education Act, 1944. Any such case would come before the local bench of magistrates, and it is impossible to predict their attitude. I can only say that, if I were a principal school medical officer and a parent told me that he wished his child exempted from school medical inspection for either of the two reasons given, I would try to persuade him to change his mind; but if he were adamant I would let him have his way and advise the local education authority to do the same.

Sore Tongue from Pipe-smoking

Q.—A man wishes to change from cigarette-smoking to a pipe, but he cannot smoke more than a couple of pipefuls a day without his tongue getting very sore. What is the reason for this, and how can it be prevented? Does the soreness indicate any predisposition to lingual cancer?

A.—The soreness of the tongue is due to direct irritation by the tobacco smoke, though it is not possible to specify which component. Some tobaccos are more likely to burn the tongue than others, and it may be possible to find one which gives a cool smoke. A filter in the pipe stem may also help. It is true also that the tolerance of the tongue is likely to improve with practice. It is not possible to say whether this symptom indicates an undue predisposition to lingual cancer; it might well be the other way round. Although pipes and cigars are now regarded as safer than cigarettes, it is probably true that the statistics about their effects are not so comprehensive as those for cigarettes.

Books of "Any Questions?" and Refresher Course Articles.

The following books are still available through booksellers or from the Publishing Manager, B.M.A. House. Prices include postage. *Any Questions?* Volumes 2 and 3 (8s. each); *Refresher Course for General Practitioners*, Volume 2 (26s. 6d. inland, 26s. overseas); *Clinical Pathology in General Practice* (22s. 3d. inland, 21s. 9d. overseas).

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BRITISH MEDICAL JOURNAL

LONDON SATURDAY OCTOBER 6 1956

INTRAVENOUS CHOLANGIO-CHOLECYSTOGRAPHY WITH "BILIGRAFIN"

ITS VALUE AS COMPARED WITH THE ORAL CONTRAST METHOD

BY

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[WITH SPECIAL PLATE]

Intravenous cholecystography was first introduced by Graham and Cole in 1924, but, owing to the relatively high degree of toxicity of the phenolphthalein compounds employed, its clinical use was almost completely abandoned when a number of effective and less toxic oral contrast media became available. The intravenous method of visualization of the biliary tract has recently received a fresh impetus with the introduction of the new contrast medium "biligradin" by Messrs. Schering, available in this country since 1954. As this dye appears to offer an advance in the accurate diagnosis of diseases of the biliary tract, the benefits which may be derived clinically from its use, and the subject generally, would seem worthy of review.

Pharmacology and Toxicity

"Biligradin intravenous" is the disodium salt of N:N'-adipic-di(3-amino-2:4:6-triiodobenzoic acid), in a watery solution, which is practically isotonic to normal saline. The substance is of very low toxicity. Winzer *et al.* (1954) found in experiments on rats that the lethal dose of biligradin is 3.4 g. per kg. body weight; this compares very favourably with the lethal dose of most oral contrast media for cholecystography, which is in the region of 0.4 g. per kg. body weight. It is therefore not surprising that the drug is very well tolerated.

This dye has been in wide use in various countries and there are reports on large series of cases—for example, by Frommhold (1953), Hornykiewytch and Stender (1953, 1954), and Gaebel and Teschendorf (1953, 1954) from Germany; Caroli *et al.* (1954) from France; Huber and Stoessel (1954) from Switzerland; Glenn *et al.* (1954) and Orloff *et al.* (1954) from the United States, where the dye is marketed under the name of "cholografin"; Sethna (1954) from India; Sutton and Tillett (1954) and Aldridge (1955) from Great Britain. Only mild side-reactions were recorded by these authors. In our own series of 106 cases we have not seen any severe reactions, but there have occasionally been slight nausea, a feeling of heat or of flushing in the face, and one of our patients had a mild and transient erythematous rash. Though biligradin is an eminently stable compound and does not liberate iodine in the body, it is generally agreed that it should not be used in cases of known iodine idiosyncrasy. However, the slight allergic reactions which occasionally occur are thought to be due to sensitivity to the whole molecule rather than to free iodine.

Generally our impression is that biligradin is better tolerated than the dyes used for oral cholecystography. The frequent side-reactions of oral cholecystography, such as nausea or vomiting, are rare, and diarrhoea is unknown after biligradin.

Technique of Examination

We have used 40 ml. of biligradin as a routine, as this amount did not seem to produce any more side-effects than 20 ml. and gave pictures of better diagnostic quality. Examination has recently been simplified by the introduction of "biligradin forte." This is the methylglukamine salt of the compound in a more concentrated solution, 20 ml. of which is adequate for diagnostic purposes. The injection can be completed in three minutes. Side-reactions are also negligible. Intravenous examination can easily be fitted into the routine of the x-ray department. For the bile ducts films are taken 30 and 50 minutes, and for the gall-bladder up to 3 hours, after the injection. Upright spot films under screen control are taken if necessary. Between exposures the patient is allowed to move about freely. Small accidental paravenous injections cause a slight local burning sensation, but no necrosis or other after-effects.

It has been suggested that oral cholecystography and the intravenous examination can be carried out in one session. We had not originally the courage to do this, in view of the possible cumulative toxic effects of the two dyes, and preferred to leave an interval of at least two days between the two examinations, but recently, in order to come to a quick conclusion, we have examined several patients in this way without noticing any unfavourable effects. We have not used any of the drugs recommended to provoke spasm of the sphincter of Oddi, such as neostigmine, morphine, pethidine, or paregoric, the results usually being adequate without such complicating procedures.

When cholangiography only is to be performed the patient is kept fasting, but when visualization of the gall-bladder also is required a fatty meal is given 1½ hours before the injection, in order to empty the gall-bladder as completely as possible. In agreement with Aldridge we have the impression that this accelerates filling of the gall-bladder with dye and facilitates uniform mixing of dye and bile.

Concentration in the Bile

Soon after injection biligradin appears in a high concentration in the bile, the flow of which is increased by the strong choleric effect of the drug. Frommhold (1953) quotes from animal experiments and observations of patients with external biliary fistulae that the concentration of

biligradin in the bile reaches 30 to 100 times that in the blood within 10 to 15 minutes of the injection. By this time the hepatic and common bile ducts are already clearly outlined. The filling of the gall-bladder follows later by gradual infiltration of the dye by way of the cystic duct towards the fundus. Full filling of the gall-bladder takes from one to three hours. Visualization of the biliary system by biligradin thus operates in the reverse order to that which occurs in oral cholecystography. In oral cholecystography the original concentration of the dye is not enough to visualize the ducts or gall-bladder, and further concentration in the gall-bladder is required to render that organ opaque.

Shehadi (1954) has shown that in a high percentage of cases the common bile duct can also be demonstrated by oral cholecystography while the gall-bladder is emptying after a fatty meal. Twiss *et al.* (1954) have even demonstrated that it is possible to visualize the common duct by oral cholangiography in cholecystomized patients. Their rather elaborate techniques appear, however, to be unnecessary in view of the more reliable results obtainable by the new intravenous method. With biligradin visualization of the common duct occurs with great regularity, the duct becoming visible whether the gall-bladder has filled with the dye or not, and in patients whose gall-bladders have been removed. As the filling of the gall-bladder with biligradin is a passive process dependent only on the cystic duct being patent and its lumen adequate, and as it does not require the concentrating power of the gall-bladder wall, it is sometimes possible with biligradin to visualize a gall-bladder which has failed to show with oral cholecystography. A fact to be remembered is that on occasions the thick bile in the gall-bladder mixes poorly with the dye. This leads to unequal densities, and may simulate a filling defect due to calculi, but the phenomenon disappears when time is allowed for adequate infiltration and mixing to take place.

It must be emphasized that in oral cholecystography the concentration of the dye or its failure to concentrate in the gall-bladder remains a valuable test of the function of that organ. A negative oral cholecystogram may be the only radiological sign of inflammatory or metabolic disease of the gall-bladder in cases where the findings with biligradin are normal. We therefore believe that for the time being these two methods are complementary and that neither can fully replace the other. The same point was stressed by Graham in a recent discussion on a paper by Glenn *et al.* (1954).

Jaundice

In obstructive jaundice results with biligradin are consistently poor, it being rarely possible to outline either bile ducts or gall-bladder, though the injection of the dye does not cause any harm. Such failure is probably due to the presence of inspissated bile in the tract, preventing the dye from infiltrating adequately. Useful results have, however, been obtained as soon as the jaundice begins to subside. We have demonstrated stones in the common duct in three of our patients under such circumstances (Special Plate, Figs. 1, 5, and 7). On the other hand, a case of haemolytic jaundice which was examined with biligradin produced a perfect filling. This patient had a splenectomy, during which stones were felt in the gall-bladder, which was left intact. As the jaundice showed little sign of improvement after the operation the question of an obstructive factor arose. Biligradin filled the stone-containing gall-bladder and demonstrated a slender common duct without stones, thus clearly eliminating an obstructive element.

Excretion of Biligradin

With normal liver function 90% of biligradin is excreted by the liver, about 10% by the kidneys. No reabsorption of the dye takes place in the bowels and its bulk is evacuated with the stools. Trebbin (1954) found that liver damage may lead to a rise in urinary excretion of up to 50% of the intake of the dye and to a protraction of its excretion time to several days. While traces of a transient intravenous pyelogram are not uncommonly present when liver function

is adequate (Special Plate, Fig. 4), in cases of liver insufficiency a prolonged pyelogram may be seen with greater regularity. The kidney takes over when the liver fails. Simple loss of portions of liver substance does not seem to affect the excretion of biligradin to a detectable extent. In three of our cases with extensive neoplastic infiltration of the liver, but without clinical jaundice, good excretion of the dye occurred.

Plan of Investigation

Altogether we examined 106 patients with biligradin—75 with an intact gall-bladder and 31 after cholecystectomy. The first group consisted of strictly selected cases, in all of which oral cholecystography was performed in the first instance. The examination with biligradin was undertaken only when oral cholecystography had failed to produce a satisfactory shadow of the gall-bladder or when it was considered that the questions raised by the clinical aspect of the case had not been adequately answered. It was thus attempted to assess the comparative values of oral cholecystography and intravenous cholangio-cholecystography. It may be mentioned that for oral cholecystography the double-dose method was employed, and that a series of upright spot films under screen control was taken in all cases with a clearly visible gall-bladder. A conclusive result regarding the condition of the gall-bladder itself can usually be obtained with this method alone, and in only a minority of cases did we find it desirable to continue the examination with biligradin.

Patients with Intact Gall-bladder

The results in the 75 cases with intact gall-bladders in which both tests were performed are given in Table I.

TABLE I.—Results of Intravenous Cholangio-cholecystography in Patients with Intact Gall-bladders

A. After Unsuccessful Results of Oral Cholecystography			
1. Ducts and gall-bladder filled:			
a. With stones—			
i. In the gall-bladder alone	16		
ii. In the common duct alone	1		
iii. In the gall-bladder and common duct	3		
		20	
b. Without stones	6		
c. Unclassified	1		
		27	
2. Hepatic and common ducts only filled	28		
3. No demonstration of gall-bladder or ducts	3		
		58	
B. After Successful Oral Cholecystography			
1. Stones in common duct	1		
2. Normal bile ducts	15		
3. No demonstration of gall-bladder or ducts	1		
		17	
Total			75

A. Biligradin Examination After Unsuccessful Oral Cholecystography

In the 58 cases in this group the gall-bladder had either not filled with the oral method or had given such a faint shadow that no definite diagnosis as regards calculi could be made. Among these 58 cases the gall-bladder filled with biligradin in 27, thus indicating the patency of the cystic duct. Stones were shown in 20 of these cases—in 16 in the gall-bladder alone, in one in the common duct alone (Plate, Fig. 1), and in three in both gall-bladder and common duct. In all but one case the presence of stones had remained doubtful after oral cholecystography. The exception had a solitary giant stone in the gall-bladder, whose small opaque centre had been seen as a faint shadow in a plain film but whose actual size and position were demonstrated only by biligradin.

The case with the solitary stone in the common duct (Plate, Fig. 1) deserves special description. This patient had just recovered from an attack of obstructive jaundice. An oral cholecystogram showed a very faintly filled gall-bladder of normal size. With biligradin a large stone was demonstrated high up in the common duct approximately at its junction with the cystic duct, and only an incomplete filling of the gall-bladder was obtained. At operation to remove the stone the wide cystic duct and the gall-bladder

were found clear of stones. It appears that the stone in the common duct had intermittently occluded the cystic duct.

Two of the three patients with stones in the gall-bladder and common duct had never been jaundiced. Oral cholecystography had failed to outline the gall-bladder and had not shown any stones. The most spectacular of three cases showing gross lobulations of the gall-bladder as well as calculi is illustrated in Fig. 2 on the Special Plate. At operation the deformities were found to be due to the gall-bladder being partly embedded in the substance of the liver. An interesting feature in each of these cases was that stones were found in the distal compartment only of the gall-bladder, where stasis must have been most marked. None of this pathological picture was visible on oral cholecystography.

One of the six cases with a normal intravenous cholangio-cholecystogram following the failure of oral cholecystography turned out to have a benign pyloric stenosis. Oral cholecystography is naturally condemned to failure by any abnormality preventing the absorption of the contrast medium, and the risk of a mistaken diagnosis of biliary-tract disease in such cases is well known. With the intravenous method mistakes of this kind can now be avoided. No such cause for unsuccessful oral cholecystography was, however, found in the other five cases without calculi (Table I, A1b), and in our view these illustrate the persisting importance of oral cholecystography, demonstrating the failure of a pathological gall-bladder to concentrate the dye.

The unclassified case (Table I, A1c) showed features of particular interest. It was one in which two large gall-stones causing intestinal obstruction had been removed from the jejunum a short time previously. The common and cystic ducts showed normal outlines with biligradin, but the gall-bladder was only faintly demonstrated with its fundus pulled strongly across towards the duodenum, in which much dye could be seen. The very faint gall-bladder shadow and its distorted position suggested a cholecysto-duodenal fistula with leakage of the dye into the duodenum. There were no obvious residual calculi in the gall-bladder.

In the 28 cases where the hepatic and common ducts only were outlined (Table I, A2), obstruction of the cystic duct was presumed. This was confirmed in all cases at operation, and found to be due to calculus. We have not so far encountered any case of neoplastic obstruction of the cystic duct, but would expect the appearances to be similar. In two patients a non-opaque stone in the cystic duct became outlined by biligradin during the examination (Plate, Fig. 3). Another patient had had more prolonged jaundice than would normally be expected with temporary impaction of a stone at the lower end of the cystic duct. Biligradin showed pronounced dilatation of the hepatic ducts and of the common duct above the junction with the cystic duct, but the lower end of the common duct also appeared dilated to some extent (Plate, Fig. 4), suggesting that a calculus, after being impacted for a time in the first position, had been held up at the ampulla before being passed into the duodenum. At operation fine grit and inspissated bile only were found in the cystic duct, and the common duct was clear, so that this may well have been the case. In cases presenting the clinical picture of "acute cholecystitis" biligradin usually shows a blocked cystic duct, even if the examination is delayed until the acute stage has subsided.

Of the last three cases, in which neither ducts nor gall-bladder were demonstrable by biligradin (Table I, A3), one had advanced hepatic cirrhosis and one was a case of recent obstructive jaundice. The third had recently undergone transduodenal excision of a small tumour at the ampulla of Vater; this apparently resulted in incompetence of the sphincter of Oddi, with consequent entry of air into the biliary tract and rapid leakage of dye into the duodenum. Another similar post-operative case, included in Group A2 in Table I, showed alternate filling of the common duct with dye and air in a series of films after biligradin injection. In such cases only the presence of dye in the duodenum may indicate that it has been excreted by the liver.

B. Biligradin Examination After Successful Oral Cholecystography

The discovery of stones in the gall-bladder with oral cholecystography does not necessarily reveal the full pathological picture, particularly in view of the possibility of calculi in the common duct. The incidence of calculi occurring in the gall-bladder alone was stated by Walters and Snell (1940) to be 87%, in the gall-bladder and common duct 7%, and in the common duct alone 6%; but Bernhard (1935) found the incidence of common-duct stones as high as 20% of all cases of calculus. The occasional absence of obstructive jaundice with common-duct stones has been emphasized by various authors. Four such cases were seen in our series, two pre-operatively and two after cholecystectomy. As these common-duct stones can be readily demonstrated with biligradin, intravenous cholangiography should be performed in every case before cholecystectomy is undertaken. This will usually indicate whether the common duct needs to be explored or not.

Group B of Table I comprises 17 cases where oral cholecystography had been successful but where clearer anatomical detail of the gall-bladder was desirable or there was a suspicion of stones in the ducts. One patient in this group was found to have stones in the common duct in addition to those already diagnosed in the gall-bladder (Table I, B1). This patient had just recovered from a first attack of mild transient obstructive jaundice. It was the unusual degree of clinical shock during an attack of biliary colic on admission to hospital that prompted the biligradin investigation (Plate, Fig. 5). Another case examined early in our series (Table I, B3) showed no shadow of biligradin in gall-bladder or ducts, though a functioning gall-bladder full of stones had been demonstrated by oral cholecystography. The reason apparently was that the biligradin examination had been carried out too soon after an attack of obstructive jaundice, probably due to temporary impaction of a stone, which had intervened since the cholecystography. Had this negative result occurred later in the series the intravenous examination would have been repeated. No stone was, however, found in the common duct at operation.

The remaining 15 patients in this group had normal common bile ducts. Among them were a few with a normal oral cholecystogram without stones, examined because of recent attacks of jaundice believed to be possibly obstructive. In none of these did we encounter stones in the common duct, and the jaundice had probably been due to infective hepatitis. It appears that the presence of common-duct stones affects the quality of the oral cholecystogram, and that good concentration of the dye in a gall-bladder free of stones makes it unlikely that stones are present elsewhere in the biliary system. A normal oral cholecystogram thus seems to remain a reliable sign of a healthy biliary tract.

Intramural Diverticulosis of the Gall-bladder

In one case among the 15 referred to above the examination was carried out because oral cholecystography had demonstrated a bilocular deformity of the gall-bladder. The patient was a young man with several years' history of biliary dyspepsia. The intravenous examination with biligradin showed delicate protrusions of dye outside the main lumen



Operative specimen of gall-bladder shown in Fig. 6 of Special Plate.

of the gall-bladder, best seen at the waist between the two compartments (Plate, Fig. 6). A diagnosis of intramural diverticulosis of the gall-bladder (cholecystitis glandularis proliferans; Aschoff-Rokitansky sinuses) was made, and this was confirmed at operation. The operative specimen (see photograph) demonstrates the gross leathery thickening of the wall of the lower compartment and shows cuts through some of the sinuses. According to the histological report (Dr. E. N. Trounson) there were also extensive inflammatory changes. This condition is now generally considered as associated with chronic inflammation of the gall-bladder (March, 1948; Bean and Culver, 1950; Lawler, 1952; Sutton, 1955). The radiological demonstration of such sinuses thus appears to justify the diagnosis of chronic cholecystitis. It is likely that many cases of this kind have escaped detection by oral cholecystography, for, in spite of the frequency with which these sinuses are seen in pathological specimens, their radiological diagnosis has been rare. This may in future be altered owing to the increased anatomical detail which biligrafin can reveal even in a poorly functioning diseased gall-bladder.

Post-cholecystectomy Examinations

The second main group are patients who had undergone cholecystectomy. The results are given in Table II.

TABLE II.—Results of Intravenous Cholangiography in Post-cholecystectomy Patients

1. Without symptoms	..	..	..	..	..	11
2. With symptoms:						
a. Stones in common bile duct	..	..	..	..	..	5
b. Fibrosis of common bile duct	..	..	..	..	..	1
c. Demonstrable stump of cystic duct	..	..	..	..	..	4
d. Normal ducts	..	..	..	..	..	10
						20
Total	..	..	..	..	..	31

Normal Findings After Cholecystectomy

In the early stages of our investigation we examined 11 patients after cholecystectomy, without symptoms, in order to gain experience with regard to the range of normal findings. This subject has since been dealt with in greater detail by Don (1955). Visualization of the common duct was obtained in all cases. In most instances the duct was slender, measuring about 3 mm. in diameter, but in a few cases the duct measured up to 10 mm. It was noted that the time during which the common duct remained visible varied greatly; in some cases it was demonstrated up to several hours after injection. It seemed unlikely that these variations in the size of the duct or in the degree of spasm of the sphincter of Oddi, as indicated by the retention of dye, had any clinical significance. A grossly dilated common duct may be due to pre-operative obstruction which has been relieved.

Post-cholecystectomy Syndrome

Having excluded coincident peptic ulcer, hiatus hernia, chronic appendicular dyspepsia, and other possible causes of discomfort, there still remain a certain small number of patients in whom symptoms of a biliary-tract type continue or recur after cholecystectomy.

Stones in the Common Duct After Cholecystectomy

Moynihan, in his book *Abdominal Operations* (1926), claimed that the tiniest fragment of stone within the common duct could be detected by expert fingers. Most surgeons like to feel that this is the case, and in performing cholecystectomy do not open the common duct unless there has been jaundice or unless palpation raises the suspicion of stone or other obstruction. The fact remains, however, that occasionally a stone is missed during palpation of the common duct or has been lurking out of reach in one of the hepatic ducts and is allowed to remain, with consequent persistence of symptoms. It has been optimistically hoped in the past that these post-operative symptoms might be due to spasm of the sphincter of Oddi, but it now appears open to doubt whether such spasm in itself ever gives rise to symptoms.

Davidson *et al.* (1949) stated that in a series of patients with common-duct stone no less than 30% required operation because stones had been overlooked at previous cholecystectomy, and it is more disturbing still that Hughes *et al.* in 1948 and Thiessen in 1951 reported the discovery, at post-operative cholangiography, of retained stones in the common duct after choledochostomy in 24% and 15% of cases respectively. It is of interest also that Corff *et al.* in 1952 found that 41% of their patients with stones in the common duct had never been jaundiced. It is therefore of the greatest importance that intravenous cholangiography should be carried out as soon as possible when biliary symptoms recur after cholecystectomy, whether there has been jaundice or not. As recurring jaundice has always been an indication for laparotomy, the examination appears particularly important in the non-jaundiced patient. In the past, as there has been no non-surgical method of examining the common duct, there has been much speculation upon the cause of symptoms in these patients, with consequent delay and suffering. The advent of biligrafin, however, provides a reliable method of demonstrating the common and hepatic ducts without laparotomy.

Among 20 patients examined because of symptoms following cholecystectomy, five had stones in the common duct. The cholecystectomy had been performed at varying times up to ten years previously. In four of the five the stones were clearly demonstrated by biligrafin (Plate, Figs. 7 and 8) and corresponding numbers were removed subsequently at operation. Two of these (Plate, Fig. 8) had never been jaundiced. In one who had had recurring jaundice a rather wide and winding common duct was seen. At operation a small stone was found in the common duct which had not been diagnosed pre-operatively, but was seen on post-operative scrutiny of the films. It is to be hoped that with growing experience mistakes of this kind may be avoided.

A case with recurring jaundice after cholecystectomy and removal of stones from the common bile duct showed a rather complicated network of dilated branches of the hepatic ducts but no clear visualization of the common duct. The density of the hepatic-duct shadows was poor. This case proved at operation to have an extensively fibrosed common duct and early biliary cirrhosis (Table II, 2b). Although this is a solitary experience, we have the feeling that the picture may be characteristic of common-duct fibrosis with obstruction.

Small cystic-duct stumps were shown in four cases (Table II, 2c), but, although this condition has been held possibly responsible for symptoms in the past, the discomforts described by our patients passed off spontaneously.

Conclusions and Summary

Intravenous cholangio-cholecystography with biligrafin is a quick, safe, and reliable method of examination in biliary-tract disease. Unfortunately it is usually ineffective in the presence of obstructive jaundice or severe liver insufficiency, although its attempted use in such cases is not harmful. It may be used as a supplementary method to oral cholecystography: (1) in cases in which oral cholecystography has been successful; to show clearer and more comprehensive anatomical detail and to demonstrate the possible presence of stones in the hepatic and common bile ducts; and (2) in cases where oral cholecystography has been unsuccessful; to differentiate between calculous and non-calculous disease of the gall-bladder and to determine the detailed location of stones within the tract.

A series of cases in both the above groups is described and illustrated. In most of the cases which were subjected to both types of examination it was found that the intravenous examination provided greater diagnostic information than oral cholecystography. Moreover, the intravenous method makes cholecystography independent of absorption of the dye in the alimentary tract.

For these reasons intravenous cholangio-cholecystography might be substituted for oral cholecystography as the primary method of investigation. From a surgical point of view this can usually be expected to give all the information required. Where, however, it is desired to assess the concentrating power of the gall-bladder it can be supplemented by oral cholecystography. In abdominal emergencies the use of biligrafin intravenously may offer a means of quick differential diagnosis by confirming or excluding the biliary tract as the cause of symptoms.

The fact that the common bile duct becomes outlined with great regularity represents the main advantage of the intravenous method. After cholecystectomy the injection of biligrafin offers the only practical non-operative method of examining the bile ducts.

We are indebted to our colleagues for allowing us to use some of their case notes. We are also grateful to our radiographic staff for the help they have given us, and to Miss A. J. Wright particularly for the prints.

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FUNGUS DISEASES OF BRITAIN*

BY

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During the past five years a number of different factions in British medicine and biology have shown increasing interest in fungous diseases. Fortunately, at this time, too, observations made in various parts of the world have become more reliably comparable now that the old confusion in nomenclature has disappeared. The most widely accepted present-day opinions in this subject have been summarized elsewhere (Riddell, 1951a, 1951b, 1952), but it is perhaps timely that recent trends in the study of these diseases in Britain should be reviewed.

*Read in the Section of Pathology at the Annual Meeting of the British Medical Association, Brighton, 1956.

Dermatophyte Infections

The recrudescence of epidemic ringworm of the scalp which occurred largely as a result of relaxation of preventive measures during the second world war has now abated, and *Microsporum* infections of the scalp now involve small groups of children only sporadically. Dr. H. G. Adamson, who died only last year, was responsible for the first fundamental observations upon the pathogenesis of this disease 60 years ago in Britain, but, surprisingly enough, the work was not adequately followed up until Kligman's studies on experimental infections, published in 1955 from Philadelphia.

TABLE I.—Susceptibilities of Different Keratin Structures to Infection by Dermatophyte Species

	Skin	Nail	Hair (Scalp)
<i>Microsporum</i> :			
<i>M. audouinii</i> ..	+	—	++ (SSE)*
<i>M. canis</i> ..	++	—	++ (SSE)*
<i>M. gypseum</i> ..	++	—	± (SSE)
<i>Trichophyton</i> :			
<i>T. mentagrophytes</i> ..	++	—	± (SSE)
<i>T. discoides</i> ..	++	—	± (LSE)
<i>T. interdigitale</i> ..	++	++	—
<i>T. rubrum</i> ..	++	++	++ (E)
<i>T. sulphureum</i> ..	+	+	++ (E)
<i>T. violaceum</i> ..	+	+	++ (E)†
<i>T. schoenleini</i> ..	+	+	++ (E)†
<i>Epidermophyton</i> :			
<i>E. floccosum</i> ..	++	±	—

(SSE)=Small-spored ectothrix hair infection. (LSE)=Large-spored ectothrix hair infection. (E)=Endothrix hair infection. *Bright yellow-green fluorescence produced in hair. †Dull green fluorescence produced in hair.

It is now possible to attribute the characteristic wide sheath of small spores indiscriminately arranged around a *Microsporum*-infected hair shaft to sporulation of much-branching fungous hyphae as they re-emerge into a follicle from the hair cortex. The sheath of spores is not derived from fungous hyphae growing down into a follicle and entwining the hair, as was previously supposed, and as is assumed to be the case in ectothrix infections caused by those *Trichophyton* fungi which infect lower animals as well as man. It would be difficult to repeat Kligman's experiments with *Trichophyton* species which produce only human infections, for these are of low pathogenicity. As to why fungous elements should completely disappear from the hair surface in this last type of infection and leave only an endothrix disposition of fungous hyphae and spores is an intriguing but unsolved problem.

An explanation for the differences which *Microsporum* and *Trichophyton* fungi exhibit in the production of fluorescing substances while growing as parasites in the hair-root keratin has been sought by Chattaway and Barlow (1954), using paper chromatography and electrophoresis. The production of three fluorescent fractions was demonstrated in *Microsporum* infections, and two additional fractions in infections due to the favus *Trichophyton*. Whether similar chemical substances are produced in hair by other *Trichophyton* species in quantities undetectable by ultra-violet light has not been investigated, nor whether they are produced in other keratin structures. Ringworm fungi virtually behave as saprophytes, for they invade only mature keratin and do not parasitize parakeratotic cells. An explanation for the rather specific way in which they attack different kinds of keratin has yet to be found (Table I). Some fungi have a predilection for certain body regions, and there are forms of tinea infection which differ greatly in their sex incidence. Chemical and/or physical differences in keratin structure, possibly occurring at different cutaneous sites, may in part determine this issue, and it has been suggested that the completeness of naturally occurring cross-linkages between radicals of the keratin molecule may be important in this respect.

Barlow and Chattaway (1955) have shown that measures which encourage the breakdown of disulphide linkages and hydrogen bonds of hair keratin facilitate fungal attack in

in vitro, while the reverse is the case where cross-linkages are increased between free amino- and carboxyl groups. The enzyme systems of dermatophytes which might explain their keratolytic properties have not so far been well characterized. Their amino-acid oxidase and asparaginase activities have been studied by Bentley (1953) and by Chattaway *et al.* (1954). An elucidation of the physico-chemical aspects of ringworm infections may lead on to much-needed advances in therapy, for the past decade has seen little improvement over the well-tried measures aimed at producing desquamation of infected keratinized cells and some fungicidal action.

Therapeutically, the fungicidal fatty acids have not given the results which might have been expected from the pertinent observations of Rothman and his colleagues in Chicago (1947), though these substances would appear to be important in providing the relative immunity of the adult scalp to fungous infection. Innumerable substances of very varied chemical structure are active fungicides, and the large number which come to be recommended for treatment of ringworm bears evidence of their inadequacy. This is explained by the failure of topical application to produce concentrations of fungicides sufficient to inhibit fungal growth in the deeper keratin of skin. Could this be achieved, the natural processes of keratin formation and desquamation would eliminate the fungus parasite. Prognosis in a ringworm infection appears to be determined chiefly by the toxigenic properties of the invading fungus and also by immunological factors, either natural or induced by fungous infection. A skin or follicular infection produced by a fungus which is naturally pathogenic for lower animals will be acute and short-lived in man, and be associated with the development of skin hypersensitivity. In contrast, obligate anthropophilic ringworm fungi produce long-standing infections in susceptible subjects usually associated with negative trichophylin skin reactions. In experimental infections, however, self-limitation of ringworm lesions weakens this distinction between anthropophilic and zoophilic dermatophytes (Sloper, 1955). While natural infection produces varying degrees of resistance to subsequent infection, active immunity acquired by inoculation with fungous antigens has not yet been achieved.

Regional changes in prevalence of fungous infections have been well recognized in various parts of the world. In Britain, as in many other European countries, our attention has been drawn to the increased incidence of infection due to one of the anthropophilic fungi, *Trichophyton rubrum*. Before the second world war this disease was recorded infrequently, but it has become the most prominent problem amongst ringworm infections in Britain. This increase is both real and apparent. Some of the real increase is to be found in patients who have resided overseas, but many new cases have occurred in persons who have never been abroad and have contracted the disease in their 'teens or earlier. On the other hand, the greater awareness of the problem by dermatologists and the improvement in laboratory facilities for clinical mycological work are undoubtedly responsible for an apparent increase in this type of ringworm infection.

Calnan (unpublished observation) has made careful clinical studies on 250 patients suffering from *T. rubrum* infection at St. John's Hospital in London, where between 100 and 200 new cases of this disease are recorded annually. The syndrome associated with this infection is typified by a low-grade inflammation of corium underlying infected keratin. Very occasionally inflammation is acute and vesicular, as is more usual in *Trichophyton mentagrophytes* infection, but is unassociated with hypersensitivity reactions. Follicular and hair invasion, little recognized until lately though reported 20 years ago by Lewis in New York, may produce lesions on the legs misdiagnosed as erythema induratum or nodular vasculitis; very occasionally kerion is produced. Unilateral hyperkeratotic infections of the palms and fingers are among the best-known manifestations of this condition; nail infections are practically always due to *T. rubrum*. In the United States, hyperkeratotic flexion

crease infections of the palms have been recorded less frequently than in this country (Silva *et al.*, 1955). Disease may present as patches of acute vesicular and crusted eczema, and fungous infection is thought of only belatedly. The feet are hardly ever spared, though classical ringworm of the toe-webs is not produced. Calnan has followed up contacts of these patients and has discovered that familial cases occur not infrequently, a fact not appreciated in the past; infection in children and babies is always associated with disease in parents. Other ringworm species may be associated with the primary pathogen in the *T. rubrum* syndrome (Partridge, 1955). There has been much speculation as to possible predisposing factors in this disease. In our experience a depressed glucose tolerance curve has not been found to be positively associated with these infections in the way suggested by Rothman (1953). That many of the patients suffer from acrocyanosis may prove to be significant. The main reason for the concern about *T. rubrum* infections is the permanent unequal disfigurement which may result and the failure of all available therapeutic agents to remove the causative organism. Customary measures for preventing infection or reinfection by ringworm fungi are largely unavailing, particularly in foot infections where frequent exposures are practically inescapable (Rosenthal *et al.*, 1956). Holmes and Gentles (in press), studying ringworm in a mining community, found that *T. rubrum* predominated in certain places of work. There was a much higher incidence of tinea pedis among men who had used communal baths than among those who had not.

Whereas the natural habitat for ringworm fungi has been assumed to be either man or the lower animals, the isolation of *Microsporum gypseum* from several soil samples has suggested a wider ecology for these fungi (Ajello, 1953) (Table II). Whittle (1954) has reported a small outbreak

TABLE II.—Natural Habitat of Ringworm Organisms

Human	Animal	Soil
Microsporum species: <i>M. audouinii</i>	<i>M. canis</i>	<i>M. gypseum</i>
Trichophyton species: <i>T. interdigitale</i> <i>T. rubrum</i> <i>T. sulphureum</i> <i>T. violaceum</i> <i>T. schoenleini</i>	<i>T. mentagrophytes</i> <i>T. discoides</i>	
Epidermophyton species: <i>E. floccosum</i>		

of *M. gypseum* infection among workers in a plant nursery in Hertfordshire, but was unable to isolate the fungus from soil. The first observation of the isolation of a dermatophyte from a non-living source was made by Muende and Webb (1937) in Britain; *Trichophyton mentagrophytes* was found to be growing on dry horse-dung in a shed where infected calves were kept. Whittle (1956) and Rook (1956) have made detailed observations upon the occurrence of animal ringworm due to *T. mentagrophytes* and *T. discoides* in Cambridgeshire; it is suggested that their relative incidences may differ in various parts of the country and may change significantly over quite short periods of time. Extensive measures are now being taken in this country to reduce the animal reservoir of infection responsible for a large part of human ringworm (Report by the Medical Mycology Committee of the Medical Research Council, 1956).

Superficial Infections

Though these common infections are unimportant in themselves from a clinical standpoint, they offer a challenge to our understanding of the skin flora. In their attempts to culture the causative organism of trichonocardiosis axillaris, Crissey *et al.* (1952) regularly isolated a lipophilic diphtheroid bacillus (*Corynebacterium tenuis*). A lipophilic yeast-like organism, *Pityrosporum obiculare*, was isolated

from a high percentage of cases of pityriasis versicolor by Gordon in 1951 and independently by Martin-Scott (1952), but it may also be found on skin unaffected by this disease. Insufficient attention has been paid to these infections, and to erythrasma, the pathological diagnosis of which continues to be made only by direct examination.

Aspergillosis

Apart from the allergic diseases, aspergillosis is the most important pulmonary condition due to fungi occurring in Britain. Primary aspergillosis of the kind well known in avian pathology is practically never seen in man. *Aspergillus fumigatus* is, nevertheless, a not infrequent secondary invader of lung tissues damaged in some way, for example by infection, mechanical trauma, or infarction. Necrosis and vascular thrombosis are the main histological features of tissues in proximity to growing fungous colonies. Haemoptysis is often a symptom of this disease, and signs of toxæmia may be pronounced if extensive invasion occurs. If a pulmonary cavity becomes infected with the fungus an increase in thickness of its walls is seen radiologically, and where drainage by the bronchi is established the sputum becomes profuse and purulent and may contain mycelium within fragments of necrotic material.

At the Brompton Hospital, our recent experiences with cavitary infections due to *A. fumigatus* have indicated that progression of fungous growth may lead in some cases to the development of a mycetoma. This consists of a mass of mycelium, usually spherical in shape, which lies more or less freely within the lumen. Partial or complete epithelization of the cavity from a communicating bronchus may or may not ensue, and the occurrence of haemoptysis will depend largely on whether this occurs. A most characteristic feature of the condition is to be found radiologically in the form of a crescentic area of translucency around the circumference of the mass (Monod *et al.*, 1952). The term "aspergilloma bronchiectasiant" is probably too limited a description for these lesions. Occasionally, movement of the fungous mass within the cavity may be demonstrated radiologically by changing the posture of the patient. Cultures of *A. fumigatus* from two cases of mycetoma have recently interested us in being white and non-sporing except for occasionally small areas of typical smoky-green sporing growth. These patients had been receiving isoniazid, but it is unlikely that the drug affects the growth of the fungus *in vivo*. It has, however, been observed that isoniazid in concentrations of 5 µg. per ml. or more inhibits sporulation of *A. fumigatus* under certain conditions *in vitro*, though not to any extent its mycelial growth (Clayton, unpublished observation). Hinson *et al.* (1952) have drawn attention to a manifestation of broncho-pulmonary aspergillosis not previously described. In this condition recurrent pyrexial attacks occur with radiographic evidence of pulmonary collapse and consolidation. Blood examination shows eosinophilia, and purulent sputum is expectorated containing "plugs" in which *A. fumigatus* is scantily present. Without treatment the prognosis is not good, for exacerbations continue indefinitely and may lead to a fatal termination in status asthmaticus. In our experience, termination in status asthmaticus. In our experience, inhalation of "nystatin" in suspension, or of solutions of brilliant green or hydroxystilbamidine, is effective in suppressing or removing *A. fumigatus* from the bronchial secretions.

Subcutaneous Mycoses

Mycotic infections of the subcutaneous tissues due to traumatic introduction of material contaminated by pathogenic fungi are virtually non-existent in Britain, though there is plenty of opportunity for these to occur—for example in agricultural workers—were these pathogenic fungi present in the soil. Climatic conditions and types of vegetation may determine the ecology of soil fungi. From his extensive experience of subcutaneous mycetomata in the Sudan, Abbott (1956) has pointed to the apparent importance of rainfall in the distribution of these infections; the habit

of going barefoot he believes to be of lesser importance. There is no explanation for the virtual disappearance of sporotrichosis from France, where it was observed with regularity in the early part of the century; to our knowledge, it has not occurred in Britain for a number of years.

These subcutaneous mycoses are only slowly progressive, so that it is to be expected that they may be met with from time to time in Britain among those who have lived abroad. One example was recently encountered in a West Indian male who had been resident in this country for two years prior to diagnosis. An infiltrated lesion with central scarring, thought at first to be tuberculous in nature, was present on one elbow and had apparently been increasing in size for 12 years. A diagnosis of chromoblastomycosis was made from histological and cultural findings (Crow and Riddell, 1954).

Infections by Yeast-like Fungi

While the conditions which predispose to moniliasis are well known, the intrinsic reasons for the occasional assumption of a pathogenic role by *Candida albicans* remain undiscovered. Henrici's hypothesis that this yeast may produce a toxin has received support from the experimental work of Winner (1956). The presence of agglutinins does not protect animals from the lethal effects of this organism. In man, humoral antibody titres are quite unreliable indicators of *C. albicans* infection. The predicted rise in incidence of moniliasis as a result of the increasing use of broad-spectrum antibiotics has not been experienced in Britain. Pulmonary moniliasis has not been seen as a true pathological entity, and there is little to add to Shrewsbury's studies in 1936 on secondary thrush of the bronchi. In vulvo-vaginitis a positive relationship between *C. albicans* in the secretions and certain features of the disease has been demonstrated (Dawkins *et al.*, 1953).

In contrast to *C. albicans*, *Cryptococcus neoformans* in exudates is practically pathognomonic of disease. One exception only has been brought to our notice where this yeast was present in bronchial secretions in the absence of evidence of bronchial or pulmonary disease. It is clear from residential histories that torulosis is endemic in Britain, where, though still rare, it is being reported with increasing frequency. Meningo-encephalitic infections occurring sporadically are sufficiently well recognized to go largely unreported. Torulosis of the lungs is best known to present as a pulmonary tumour of the kind described by Cruickshank and Harrison (1952), but in two recent instances of this infection in which the disease was unsuspected prior to operation, there were poorly circumscribed areas of pneumonic infiltration with cavitation (Beck *et al.*, 1955; Nightingale, unpublished observation). *Cr. neoformans* has been associated with a condition resembling Hodgkin's disease often enough to have raised doubts whether or not it was an aetiological agent (Symmers, 1953; Levene and Michaels, 1955; Misch, 1955).

Histoplasmosis and Other Systemic Mycoses

There are no reasons for supposing that the fungi responsible for these generalized mycotic diseases occur naturally in Britain. Restricted geographical distribution is a prominent feature of these infections, the extent of which has been supported by skin-testing surveys and soil studies. Those rare instances of blastomycosis, coccidioidomycosis, and histoplasmosis met with in this country occur in those who have resided in areas endemic for these diseases, particularly in the United States and Africa. Very exceptionally they may be contracted through inhalation of dust from imported materials by persons who have not been overseas. Healed histoplasmosis is the most frequent systemic mycosis encountered in Britain, and is discovered incidentally by its radiological appearances. Small spherical calcifying lesions are typically situated mainly in the middle and lower lung zones (Crofton, 1950). These patients are positive to the histoplasmin skin test, which is rendered the more significant

when the Mantoux reaction proves negative. Disseminated histoplasmosis has been seen in Britain, and three recent examples have been notable for the long interval recorded between the patients' last visit abroad and the onset of symptoms. This period was 14 years in the case reported by Hutchison (1952), and 7 years in each of those reported by Locket *et al.* (1953) and Poles and Lavertine (1954). With the increase of world travel the systemic mycoses, which almost without exception are acquired by the respiratory route, require consideration more frequently in differential diagnosis. Although they produce widely varying x-ray appearances, most of which are identical with those of tuberculosis, they each have their own individuality. At some stage during the course of infection they may present radiological features which should suggest the diagnosis (Pierce, 1953).

Summary

An increasing interest in mycotic diseases has been clearly evident in Britain during the past five years. A change of emphasis is occurring towards investigative studies of the kind which have long been established in the study of bacterial infections. The taxonomy of the pathogenic fungi is now sufficiently well adapted for accurate comparative studies, and pathologists are therefore no longer discouraged by a subject confused by synonymy. Critical laboratory opinion is now forthcoming for the support of clinicians in their widening appreciation of the diseases due to fungi.

Trichophyton rubrum infections of the skin and *Aspergillus fumigatus* infections of the lungs present difficult problems and are being recognized with greater frequency than in the past. The more unusual forms of torulosis have received study, and the subcutaneous and systemic mycotic diseases require consideration more often now that world travel is easier.

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HISTOPLASMOSIS CONTRACTED IN BRITAIN

A CASE OF HISTOPLASMIC LYMPHADENITIS FOLLOWING CLINICAL RECOVERY FROM SARCOIDOSIS

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[WITH SPECIAL PLATE]

The case described in this paper is believed to be the first mycologically proved case of histoplasmosis in which the infection was undoubtedly acquired in Britain. The characteristic causative organism, *Histoplasma capsulatum*, was isolated from a biopsy specimen. The patient had never been out of the British Isles before the infection developed. Four years earlier he had developed sarcoidosis; this appeared to have subsided completely a year before the mycotic infection presented as a localized lymphadenitis.

Histoplasmosis has seldom been recognized in this country (see below), where it is looked upon as an exotic disease and consequently has attracted little attention. A brief account of it may therefore be helpful as an introduction to the case report which follows. Fuller descriptions are accessible in the periodical literature (cf. Monroe and Kurung, 1953; Poles and Lavertine, 1954; Schwartz, 1954; Leigh and Thomas, 1955; Silverman *et al.*, 1955); the disease is dealt with scantily, when at all, in current general textbooks.

Clinical Features of Histoplasmosis

Histoplasmosis was discovered in 1905 by Darling (1906) in the Panama Canal Zone. No cases were found elsewhere until some 20 years later, when a case in Minnesota was reported by Riley and Watson (1926) and one from Honduras by Phelps and Mallory (1926); since then the disease has been recognized in many parts of the world.

For many years histoplasmosis was thought to be both rare and mortal; since the introduction of a specific skin test for sensitivity to histoplasmin (cf. Palmer, 1945) it has been realized that fatal infections are in fact exceptional. The histoplasmin test has helped to define large areas, particularly in the United States of America, where histoplasmosis is endemic; a high proportion of the population of these areas has passed through a clinically silent infection, as judged by the demonstration of sensitivity to histoplasmin—a circumstance which has its parallel in the comparable response to infection by the tubercle bacillus. A very large majority of subclinical histoplasmic infections occur in the lungs, where the calcified healed foci may present a striking radiological picture. When histoplasmosis does cause symptoms the clinical picture can be remarkably diverse—overt histoplasmosis has been appropriately described as a disease of protean clinical manifestations (Schwartz, 1954), for no organ is immune from colonization by the fungus.

Pulmonary involvement is among the commonest causes of clinical illness in histoplasmosis, just as it is the commonest form of subclinical infection. Many varieties of acute and chronic pulmonary lesions occur (Monroe and Kurung, 1953; Schwartz, 1954). Radiologically these lesions can mimic any form of pulmonary tuberculosis; diagnosis between pulmonary histoplasmosis and tuberculosis depends upon the bacteriological findings, supported by the results of skin tests with histoplasmin and tuberculin, and possibly by serological investigations. Occasional cases of combined tuberculous and histoplasmic infections have been reported. Some cases of pulmonary histoplasmosis present

as tuberculoma-like lesions which may simulate peripheral neoplasms (Zimmerman, 1954). The lesions in the lungs may heal or may remain active for many years; the infection may remain localized to the lungs or it may become disseminated in the lymphatic and blood streams, setting up fresh lesions anywhere in the body.

Both the self-limiting and the progressive forms of histoplasmosis may present as single or multiple granulomatous or ulcerative lesions of the upper respiratory tract, throat, mouth, or skin. The cutaneous lesions, like those of cryptococcal infection, may simulate rodent ulcers (Symmers, 1953, 1956). The clinical picture may be dominated by adrenocortical deficiency due to destruction of the adrenals occur unexpectedly in any patient with active histoplasmosis—for example, after surgical operations—unless the possibility of adrenal involvement is remembered (Crispell *et al.*, 1956). In other cases lymphadenopathy and hepatosplenomegaly, alone or in combination, may be the only findings. Bone-marrow involvement is usual in cases of disseminated infection and may lead to anaemia, leucopenia, or purpura. Localized destructive lesions of bones and joints are rare (Key and Large, 1942). Histoplasmic meningo-encephalitis (Sproffkin *et al.*, 1955) and endocarditis (Beamer *et al.*, 1945) have been recorded.

Cytology

An interesting feature of some cases of the serious disseminated form of histoplasmosis is the predilection of the fungus for the cells of the so-called reticulo-endothelial system. In these cases the macrophages throughout the body may be filled with such great numbers of organisms, in the virtual absence of extracellular organisms, that it was even proposed that the disease should be described as "cytomycosis" (DeMonbreun, 1934). It is still uncertain whether this phenomenon is the result of active parasitic invasion of these cells or of brisk phagocytosis. The intracellular parasites are finely illustrated by photographs, reproduced by Payling Wright (1953), of preparations from a Southern Rhodesian case which came to necropsy in England (Cunningham and Garrod, 1950; Murray and Brandt, 1951—Case 3). However, histoplasmosis is by no means always associated with this type of systematized intracellular parasitization; a tuberculoid granulomatous reaction is characteristic of some cases, and in such lesions the parasites are usually found in foreign-body giant cells and may be scanty.

Mycology

Darling (1906) discovered histoplasmosis when he was actually looking for the organism which Leishman (1903) and Donovan (1903) had then just recently described independently as the cause of Dum-Dum fever, or kala-azar. Darling examined every enlarged spleen which he found at necropsy in Panama, and, although he found no leishmaniae at this time,* he collected three cases in which an encapsulated intracellular organism was present. He believed that this organism was a protozoon, and he gave it the name by which it is now generally known. Da Rocha-Lima (1913) drew attention to the morphological resemblance between Darling's *Histoplasma capsulatum* and *Cryptococcus farciminosus* (now commonly known as *Histoplasma farciminosum*), the causative organism of one form of epizootic equine lymphangitis; he suggested that *H. capsulatum* might belong to the fungal group of *Blastomyces*. The fungal nature of this organism was proved when DeMonbreun (1934) succeeded in cultivating it. *H. capsulatum* grows in two forms on culture media, a yeast-like growth developing at 37° C. and a mycelial growth at room temperature (cf. Conant, 1948; Conant *et al.*, 1954). Although the yeast-like phase seems to be the more patho-

*In view of Darling's (1906) discovery of histoplasmosis while looking for cases of leishmaniasis in Panama, it is interesting to note that, later, he was in fact the first to recognize and prove the occurrence of leishmaniasis ("oriental sore") in that country (Darling, 1911).

genic, both forms cause the disease when inoculated into animals. In each case it is the yeast-like form which develops in the tissues; the mycelial form has been found in naturally or experimentally infected tissues only as an extraordinarily rare phenomenon (Moore, 1955).

It is not certain whether all cases of human histoplasmosis are caused by a single type of histoplasma. Dubois *et al.* (1952) have suggested that at least some cases of the disease occurring in Africa are caused by an organism which they have named *Histoplasma duboisii*, and which differs from the usual strains of *H. capsulatum* in the presence of uncommonly large yeast-like forms in infected tissues. These large forms measure about 13 by 10 μ , while the yeast-like form of *H. capsulatum* measures about 3–4 by 2 μ . Such a large-cell strain was present in the skin lesions of Robb-Smith's (1943) case (mentioned by Duncan, 1945, 1946–7), in which the infection was probably contracted in West Africa, and also in my two cases in Nigerians (Symmers, 1956). Duncan (1946–7) also suggested that the large-cell strain might be a species or variety different from *H. capsulatum*. It should be noted that large yeast-like forms have been observed in exceptional American cases (Moore, 1955), although usually only in necrotic lesions (Binford, 1955; Silverman *et al.*, 1955). Similar large forms developed in tissue explants from organs infected with *H. capsulatum* which had been isolated from an American case (Schwarz, 1953). The significance of these atypical American observations is not clear, but Moore (1955) cited them in his rejection of the existence of *H. duboisii* as a distinct species. Drouhet and Schwarz (1956) also felt that there is not enough evidence to establish the African strains as a species different from *H. capsulatum*.

Some Epidemiological Factors

Histoplasmosis occurs as a natural infection in many species of domesticated and wild animals, including rats and house-mice (for references see Schwartz, 1954). Although there is no evidence of case-to-case transfer of infection in man, there is experimental evidence that infections can be transmitted naturally from dog to dog (Prior and Cole, 1951). It is possible that human infection has resulted from contact with infected animals in cases where the disease in man has occurred in households where pets or house-mice are also infected (Pará, 1946; Olson *et al.*, 1947); however, it may well be that in such cases man and beast have been infected from a common source, such as dust. Spread of the infection by vectors has not been observed. Ticks can be infected experimentally by feeding on blood from infected dogs, but there is still no evidence that they can then transmit the fungi to other animals (Olson *et al.*, 1947).

H. capsulatum has been isolated repeatedly from soil and dust (for references see Grayston and Furcolow, 1953). In some instances small local epidemics of acute pulmonary histoplasmosis, usually non-fatal, have been traced to exposure to infected dust, such as in cleaning out or demolishing derelict buildings, particularly on farms. Exploring caves and playing in hollow trees have been linked to other outbreaks. Sawdust, decaying wood, and excreta of animals and birds have been incriminated as the source of infection in some outbreaks; they possibly provide the moist environment necessary for growth of the fungus, while yet allowing the infective material to dry out enough to be carried on air currents, when disturbed, and so to enter the lungs of those exposed.

Incidence

Although only about 300 cases of histoplasmosis in which the diagnosis was confirmed by cultivation of the organism or by its histological demonstration have been published, the incidence of the infection is enormously higher than this figure suggests, if one judges it by the high proportion of individuals with positive histoplasmin reactions in endemic areas. Histoplasmosis is known to occur in many parts of

the world; its geographical distribution is far from completely worked out, and may prove to be world-wide. Its incidence varies greatly in those areas where it has been recognized. In some areas only sporadic cases have been found, and histoplasmin-sensitivity surveys show a low incidence of positive reactors. Elsewhere, as in parts of the great endemic areas of the Mississippi, Missouri, and Ohio valleys, as many as 80 or more persons in every hundred show evidence of past subclinical infection in the form of a positive histoplasmin skin reaction (cf. Schwartz, 1954), and according to Silverman *et al.* (1955) it has been estimated that 20 to 30 million people in the U.S.A. have histoplasmic infection. Outside the United States the infection is said to be most prevalent in Mexico and Central America; an increasing number of cases is being recognized in Canada, South America, Africa, the East Indies, the Pacific islands, and Australasia. Sporadic cases have been found in countries bordering the Mediterranean, and the few European cases appear to have been confined to that area.

Histoplasmosis Recognized in Britain

In an earlier paper (Symmers, 1953) reference was made to eleven occasions on which the diagnosis of histoplasmosis was suggested by various workers in Britain; this series included two then unpublished cases of my own which have now been reported (Symmers, 1956). Three more case reports have been published in this country, making, with the case recorded in the present paper, a total of 15 cases diagnosed here as histoplasmosis. This diagnosis appears to have been adequately substantiated in 13 of the cases, in six of which the causative organism was isolated by culture. These 13 cases are listed in the Table.

In Limerick's (1951) two cases the evidence is insufficient to warrant the diagnosis of histoplasmosis. The only evidence in his first case was that *H. capsulatum* was said to have been found on microscopical examination of pus obtained on incision of an abscess which developed in the

right iliac fossa following interval appendicectomy; his second case was given only passing mention as a case of "histoplasmosis of lungs following a visit to Ireland, where this infection is known to occur—possibly spread from the U.S.A." Limerick's first patient had never been outside England; he did not say whether his second patient had been farther afield than Ireland. Apart from Limerick's case and the one described below, in all cases in which histoplasmosis has been diagnosed in Britain the patient is known to have spent some time abroad in a country where histoplasmosis occurs. In view of Limerick's (1951) statement that histoplasmosis occurs in Ireland, it may be noted that there does not appear to be any published record that such is the case; the only histoplasmin-sensitivity survey which has been reported gave negative results (McWeeney *et al.*, 1946). I am obliged to Dr. J. A. D. Deeny, Chief Medical Adviser to the Department of Health of the Republic of Ireland, and to Dr. F. F. Main, Chief Medical Officer of the Ministry of Health and Local Government of Northern Ireland, for the information that they know of no cases of histoplasmosis occurring in Ireland.

The case of Poles and Lavertine (1954) is of particular interest because of their suggestion that their patient, a post-office clerk, acquired the infection in England about eight months before his death in 1951. Their diagnosis was based on the presence of morphologically typical histoplasmas in sections of tissues obtained at biopsy and necropsy; histoplasmin tests were negative and attempts to cultivate the organism failed. The patient had been in France in 1939, in Nigeria (where histoplasmosis is known to occur: Clarke *et al.*, 1953) in 1942, and in Burma in 1944; while overseas he had no illness except "jungle sores." Not enough is known about the natural history of histoplasmosis to exclude the possibility that the infection could have remained dormant for several years. Poles and Lavertine (1954) mentioned a personal communication from Furcolow, in which he stated his belief that relapses of histoplasmosis do not occur, but commented that the

Table Showing Cases of Histoplasmosis Recognized in Britain*

Authors (Chronological Order)	Type of Disease	Cultivation of <i>H. capsulatum</i>	Histological Finding of Organisms	Histoplasmin Sensitivity	Patient's Age at Time of Diagnosis (Years)	Year of Diagnosis	Patient's Residential History†
Derry <i>et al.</i> , 1942	Fatal disseminated	Positive	Typical	No data available	30	1940	India, 1932-6. Sudan, 1936-7. Britain, 1937-9. France, 1939-40 (about 4 months). Britain, 1940
Robb-Smith, 1943 (Case mentioned by Duncan, 1945, 1946-7)‡	Cutaneous (benign). (History of sputum-positive pulmonary tuberculosis, 1940)	"	Large-cell type	Negative at time of re-examination in 1948, when skin lesions had disappeared	64	1943	Born in Australia. Australia, 1879-1911; West Africa, 1911-14; Burma, 1914-30; Britain, 1930-3; Gold Coast, 1933-40. Britain, 1940 onwards
Arblaster, 1950	Pulmonary (? chronic active; ? healed)	Negative	No data available	Positive	36	1949	Canada (Montreal and Great Lakes), 1931-7. Britain, 1937 onwards
Crofton, 1950: Case 1	Pulmonary (healed)	No data available	" "	"	43	No data available	30 years before diagnosis spent 3 years in Ontario, with 2 short visits to Michigan. Britain from then onwards
Crofton, 1950: Case 2	" "	" "	" "	"	41	1950	Southern and central States of U.S.A., 1929-38. Britain, 1938 onwards
Hutchison, 1952	Laryngeal (benign)	Negative	Typical	No data available	72	1948	Spent 30 years in India, with short periods in Malaya. Britain, 1934 onwards
Sakula, 1953	Pulmonary (healed)	"	No data available	Positive	36	1951	Born in Kentucky. Kentucky, 12 years; Florida, 18 years; South Carolina, 3 years. Britain, 1951
Locket <i>et al.</i> , 1953	Fatal disseminated	Positive	Typical	Negative	32	1952	War service, 1939-45: mostly in Egypt, with short visits to Tobruk, India, S. Africa, and in Near East. Britain, 1945 onwards
Poles and Lavertine, 1954	" "	Negative	"	"	45	1951	France, 1939; Nigeria, 1942; Burma, 1944. Britain, 1945 onwards
Leigh and Thomas, 1955	Pulmonary (healed)	"	No data available	Positive	42	1955	Born in Jamaica. Jamaica until 1944; Ohio, 1944-7; New Jersey, Florida, New York, 1947-9; Jamaica, 1949-51. Britain, 1951 onwards
Symmers, 1956 (case in this paper)	Lymphadenitis	Positive	Typical	"	46	1955	Never out of British Isles
Symmers, 1956: Case 1	Cutaneous (benign)	"	Large-cell type	Negative	30	1953	Born in Nigeria. Nigeria until 1951. Britain, 1951-4
Symmers, 1956: Case 2	" "	"	" "	Positive	24	1953	Born in Nigeria. Nigeria until 1952. Britain, 1952 onwards

* The case demonstrated in London by Cunningham and Garrod (1950), and reported by Murray and Brandt (1951—Case 3), is not included. The patient, a boy, contracted histoplasmosis while living in Southern Rhodesia; the diagnosis was made in South Africa; he died soon after arriving in England. This is the case mentioned by Locket *et al.* (1953) at the end of their paper (Atkinson, 1953).

† Unless otherwise stated, the available data suggest that the patients were born in Britain and lived there except during the times mentioned.

‡ This case was shown before the Section of Dermatology, Royal Society of Medicine, London, on January 21, 1943 (Carleton, 1942-3).

evidence for this is not yet conclusive. Observations such as have been made by Monroe and Kurung (1953) and others suggest, in fact, that the infection may sometimes lie dormant for years and then break out again. If it is eventually shown that histoplasmic infection does not exist in a dormant state, the case of Locket *et al.* (1953), and possibly that of Derry *et al.* (1942), as well as that of Poles and Lavertine (1954), will have to be accepted as indigenous British infections. The case which is reported here shows that the causative organism can be acquired in this country.

CASE REPORT:

Traumatic Siliceous Granuloma of Skin; Sarcoidosis; Histoplasmic Lymphadenitis

A man, born in 1909, fell and cut his forehead on a path of splintered flint near the Gobbins, County Antrim, when on holiday in 1936. The wound, about 2 cm. long, healed rapidly without suturing. In April, 1950, the scar became livid, and indurated, forming a slowly growing, smooth linear swelling (about 2×0.5 cm.). It was excised in August, 1950; sections showed a typical siliceous granuloma formed of tubercle-like structures of sarcoid type around irregular fragments of birefringent yellow or blackish material which withstood micro-incineration at 660° C. for ninety minutes.

In August, 1951, the patient consulted his doctor because of increasing enlargement of the lymph nodes in his neck, armpits, and groins. He had first noticed these nodes about six months earlier. He had no other symptoms. Examination showed generalized symmetrical enlargement of the superficial lymph nodes; none was larger than 1.5 cm. in longest dimension. The nodes were discrete, firm, and mobile. There was no other clinical abnormality. His skin, the scar following excision of the siliceous granuloma, and the scars of old superficial wounds on the knees and hands were healthy.

Investigations.—Radiograph of chest: sparse "woolly" miliary shadows in both lungs, mainly in the middle zones; pronounced enlargement of hilar shadows. Mantoux reaction negative with 0.2 ml. of 1 in 1,000 old tuberculin, weakly positive with 1 in 100. Wassermann and Kahn tests negative. Serum albumin 4.4 g., globulin 4.0 g. per 100 ml. Haematological findings normal. Biopsy of an epitrochlear lymph node (August 12) showed a picture consistent with sarcoidosis (Special Plate, Fig. 1). The node was uniformly and closely studded with rounded aggregates of epithelioid and histiocytes. In places the aggregates merged together, maintaining their rounded contour so that the constituent aggregates remained identifiable. No giant cells were seen; there was no necrosis.

Progress.—No treatment was given. The patient continued his administrative occupation without interruption. The lymphadenopathy subsided completely within the following year and the radiological changes in the lungs slowly resolved. In April, 1954, he felt perfectly well; chest radiographs were completely normal; Mantoux reaction positive (1 in 1,000); serum albumin 4.8 g., globulin 2.6 g.; erythrocyte sedimentation rate 3 mm. in one hour (Westergren). In May, 1955, he noticed two small, mobile lymph nodes above the medial end of the left clavicle. Clinical examination showed no other abnormality. At the patient's request, as he was about to go overseas, one of the nodes was excised (May 6).

Histology and Mycology.—Section of the lymph node excised in May, 1955, showed a granulomatous lymphadenitis quite different from that in the biopsy of August, 1951. There was patchy replacement of the lymphoid tissue by epithelioid histiocytes, without formation of rounded aggregates; moreover, in striking contrast to the earlier biopsy, every field contained many large multinucleated giant cells (Plate, Fig. 2), in which many organisms resembling *H. capsulatum* were present (Plate, Fig. 3). The organisms were exclusively intracellular, mostly in giant cells, although occasionally a single organism was seen in a simple histiocyte. Many of the organisms stained faintly

and appeared to be fragmentary or undergoing lysis. The siliceous granuloma of 1950 and the lymph node excised in 1951 were now re-examined; serial sections were cut at different levels in the paraffin blocks and stained by a variety of methods, including Gram, Gridley, and periodic-acid-Schiff stains; no organisms were found in either of these specimens.

The second supraclavicular node was excised (May 25, 1955) and cultures were prepared on blood-agar and on Sabouraud's medium at room temperature and at 37° C.; the pathologist did not keep the specimen for histological examination, a mistake which is the more regrettable as the paraffin block of the specimen of May 6 was lost while in transit to London. The cultures yielded an abundant pure growth of *H. capsulatum*. The yeast-like phase grew up well, within 48 hours at 37° C., as cream-coloured, smooth colonies of oval, budding cells 1 to 4 μ in diameter. Growth was slower at room temperature, but on the sixth day small, whitish, cottony colonies of fine, branching, septate mycelium were present; the mycelium carried smooth, rounded conidia, about 3 μ in diameter, on short lateral branches. After 16 days at room temperature the colonies had become ochre-coloured, and numerous characteristic thick-walled tuberculate chlamydospores, about 10 μ in diameter, had developed.

The laboratory where the case was being investigated was taken over by another pathologist at this time. He at once destroyed all the cultures and the animals which had been inoculated by his colleague, under the impression that *H. capsulatum* is particularly dangerous to laboratory workers. It is true that laboratory infections with *H. capsulatum* have occurred (Furcolow *et al.*, 1952; Nilzén and Paldrok, 1953; Spicknall *et al.*, 1956); the risk seems to be slight, however, and the opinion of Raphael and Schwarz (1953) that "reasonable precautions will protect the laboratory worker against Histoplasma infections" is generally accepted; moreover, laboratory infections usually result in the localized pulmonary form of the disease, which has a good prognosis, in contrast to the lethal but comparatively uncommon disseminated form.

The patient took up a post abroad before detailed investigations could be completed; at that time (May, 1955) there were no symptoms or abnormal physical signs. The chest radiograph was normal. A skin test (intradermal injection of 0.1 ml. of 1 in 1,000 histoplasmin) gave a strongly positive reaction, producing a 3-cm. circle of erythema with a central zone of induration, 1.5 cm. across, in 48 hours. When last heard from (September, 1956) he reported excellent health, with no symptoms.

Until leaving England in 1955 this patient had never been out of the British Isles. None of his household had ever been abroad, none reacted to intradermal histoplasmin, and there was no family history relevant to his illness. His work brought him into frequent contact with American visitors; this is probably without significance, as there is no evidence that the infection is transmitted from person to person. He did not handle stores or packings from abroad. His hobbies and recreations did not expose him to any environment which has been incriminated as a source of infection. He lived in the country, but had no interest in gardening or farming; he kept no pets and he had no contact with live-stock. Attempts to isolate *Histoplasma* from the soil of his garden and from various outhouses and wood-piles were fruitless.

Comment

This patient's initial illness (sarcoidosis) ran a benign course over about three years. All its manifestations had disappeared by April, 1954, a year before the histoplasmic lymphadenitis developed. The growth of a siliceous granuloma in a 14-year-old scar about six months before he noticed the generalized lymphadenopathy is interesting; this lesion was a typical example of Shattock's (1916-17) "pseudotuberculoma silicoticum." It is only recently that the occasional relationship between the appearance of this delayed and typically sarcoid tissue reaction around some

foreign bodies and the development of the manifestations of systemic sarcoidosis has been recognized (Reffvem, 1954; Löfgren *et al.*, 1955). There is no reason to presume any relationship between the old injury in this case and the eventual development of the fungal infection.

It is unlikely that the original illness, believed to be sarcoidosis, was in fact a manifestation of histoplasmosis. The absence of symptoms, the apparently complete recovery, the character of the radiological changes in the lungs and their disappearance without calcification, the clear-cut histological picture of sarcoidosis, and the failure to find parasites in the original biopsy and in the siliceous granuloma are all features which favour the diagnosis of sarcoidosis. However, none of these observations is incompatible with the diagnosis of histoplasmosis, and therefore the latter cannot be altogether excluded in considering this earlier phase in the patient's history.

There does not appear to be any record of histoplasmosis occurring in a patient who at that or any other time showed evidence of any illness which could reasonably be interpreted as sarcoidosis. There have been a few cases in which histoplasmosis mimicked sarcoidosis histologically, but none of these showed anything like the apparently clear picture of sarcoidosis in the case described here (Reimann and Price, 1949; Pinkerton and Iverson, 1952; Israel *et al.*, 1952; Binford, 1955; Crispell *et al.*, 1956).

The association of sarcoidosis with other fungal infections, particularly torulosis, is discussed briefly elsewhere (Plummer *et al.*).

Summary

A case of histoplasmosis is described. The only manifestations of the infection have been enlargement of two cervical lymph nodes and a positive histoplasmin skin reaction. Fungi were found in sections of one of the lymph nodes. The diagnosis was proved by the isolation of *H. capsulatum* in cultures from the second node. The patient is without symptoms 16 months after the mycotic lymphadenitis appeared.

The patient had never been out of the British Isles before he developed histoplasmosis. His case is believed to be the first unequivocal instance of mycologically proved histoplasmosis in which the infection was contracted in Britain.

He had previously had sarcoidosis, the course of which was benign. The first manifestation of sarcoidosis was probably the development of a siliceous granuloma at the site of an old injury.

I am much obliged to Mr. R. J. Lunnon, A.I.B.P., A.R.P.S., Department of Medical Photography, St. John's Hospital for Diseases of the Skin, London, for his kindness in preparing the photomicrographs.

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LOCALIZED CUTANEOUS HIPOPLASMOSIS

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Two cases of localized cutaneous histoplasmosis, confirmed by isolating *Histoplasma capsulatum*, are described in this communication. Both patients are Nigerians. The diagnosis was made while they were living in England; it is clear that the infection was acquired before they came here. Their cases were referred to as "unpublished observations" in an earlier paper (Symmers, 1953), and were listed in a more recent paper (Symmers, 1956) in a table of 13 acceptable cases of histoplasmosis which have been recognized in this country. A mycologically proved histoplasmic infection has only once been reported in a patient who had never been out of Britain (Symmers, 1956).

Case 1

A Nigerian man, aged about 28, came to England at the end of 1951. He had not been away from Nigeria before. His health had always been good. He travelled to England by sea from Lagos, where he lived, calling ashore at Accra on the Gold Coast, Freetown in Sierra Leone, and Bathurst in Gambia. Two days after sailing from Bathurst he developed a pustule on one cheek: thinking that this might be due to a bite by a tumbu-fly (*Condylobia anthropophaga*) he incised it carefully with a sterile scalpel and evacuated its purulent contents—no larva was present. The lesion healed over quickly, but a little painless nodule remained at its

site. Eighteen months later the nodule became slightly itchy and began to enlarge, and within a few weeks a small ulcer appeared at its centre.

Examination showed a shallow ulcer, 0.5 cm. in diameter, with a thin dry crust and a firm, slightly raised, rolled, pearly marginal zone about 0.2 cm. wide. The lesion was indistinguishable from a rodent ulcer. Films of fluid expressed from it contained a few leucocytes and some Gram-positive cocci; culture of the fluid yielded *Staphylococcus albus* and a diphtheroid bacillus.

The lesion was excised along with a 0.5 cm. rim of healthy skin. An immediate frozen section showed a giant-cell granuloma containing large yeast-like intracellular organisms; cultures were at once set up from the fresh specimens. After eight days' incubation at 37° C., on blood-agar and on Sabouraud's medium, a sparse growth of a yeast-like organism was present. This was subcultured at room temperature and at 37° C.: at room temperature a mycelial growth gradually appeared, with eventual formation of tuberculate chlamydo-spores. The cells of the yeast-like form, which grew only at 37° C., were of practically uniform size, not exceeding about 4 by 2 μ . The cultural characteristics were typical of *H. capsulatum*. Animal inoculation was not carried out.

Paraffin sections of the skin lesion confirmed that it was a tuberculoid giant-cell granuloma, with central ulceration and no caseation; histologically it resembled any other simple foreign-body reaction, except that the foreign bodies were clearly yeast-like fungi. The organisms were present only within the giant cells (see Fig.): most of the organisms were



Facial lesion in Case 1. Multinucleated giant cell containing many large histoplasmas. The organisms appear as round or oval double-contoured bodies, sometimes with a broad pale giant cell's nuclei, which they resemble in size. (Haematoxylin-eosin. $\times 435$.)

large (about 10–12 by 8–10 μ), although many giant cells also contained some small forms (about 4 by 2 μ). The organisms had a double-contoured "capsule"; many were birefringent. Periodic-acid/Schiff was the most satisfactory stain for demonstrating them, although they were clearly visible in haematoxylin-eosin preparations. Some organisms stained poorly, and some appeared to be disintegrating.

Investigations and Progress.—The operation wound healed quickly and cleanly. The patient had no other symptoms. The investigations showed no sign of disease clinically. There was rest of his skin and the mucosae were healthy. There was no lymphadenopathy; the liver and spleen were not palpable. Chest radiographs were normal. Haematological examination, including sternal marrow, showed nothing abnormal; no parasites were found in films of marrow, and marrow cultures were sterile. Wassermann reaction was negative. Serum albumin was 4.3 g. per 100 ml., globulin 2.1 g. Histoplasmin skin tests were repeatedly negative with concentrations up to 1:10.

The patient returned to Nigeria in 1954; he has remained perfectly fit. No treatment was given. When last heard from (December, 1955) he had no symptoms.

Case 2

A Nigerian woman, aged 23, left her home for the first time in September, 1952, and came direct to England. She had a routine medical examination soon after arrival here and was found to have an annular skin lesion, 2 by 1 cm., over the lower end of the sternum. This lesion consisted of an irregularly ovoid ring of induration, about 0.4 cm. wide, slightly raised, sharply outlined at its periphery, and less clearly demarcated at its inner margin. The normal skin markings were smoothed out over the indurated area, but elsewhere were unaffected. The skin within the ring was healthy, but very slightly less pigmented than that around the ring. The appearances were reminiscent of Majocchi's erythema annulare centrifugum (illustrated by Andrews, 1954). The patient said that this skin lesion had been present for two years, slowly enlarging for the first 18 months and then remaining stationary. No other abnormality was found; her health had always been good. The chest radiograph was normal.

Six months later, when a fellow-student (Case 1) was found to have a histoplasmic lesion, she raised the possibility of this diagnosis in her own case. A histoplasmin test was positive (induration 2 cm. in diameter 48 hours after intradermal injection of 0.1 ml. of 1:100 histoplasmin). She asked for a biopsy of the skin lesion, which remained unchanged: this request was agreed to, as it was remembered that the multiple skin lesions in an earlier case of histoplasmosis* seen in this country resembled her lesion.

Part of the indurated ring was excised; the wound healed uneventfully. The biopsy showed a histological picture identical with that in Case 1, except that there was no ulceration. As in Case 1, a typical strain of *H. capsulatum* was cultivated from the biopsy specimen: no large yeast-like cells were formed in the cultures, although they predominated in the lesion.

No other abnormality has been found in this patient. Marrow examination was not undertaken. She has remained in this country and her health is excellent: the skin lesion gradually disappeared completely during the year following the biopsy. No treatment was given.

Comment

The infection in each of these patients appears to have been confined to the single skin lesion. The source of their infection is unknown. The first patient had no knowledge of having been bitten by any insect: he merely mentioned his awareness of the possibility of early dermal myiasis as the cause of the pustule, particularly as he was not liable to boils; he had seen several tumbu-flies in the neighbourhood of Freetown. There is as yet no evidence that histoplasmosis can be transmitted by insects or other vectors.

Cutaneous lesions in histoplasmosis are not uncommon; when they occur they are usually multiple and are part of a disseminated infection, with visceral involvement (Miller, Keddie, Johnstone, and Bostick, 1947). Occasionally the infection is seemingly confined to the skin, and recovery takes place (Curtis and Grekin, 1947), as in the cases described above. Poles and Lavertine (1954) stated that signs of dissemination of the infection have been noticed on several occasions to follow a biopsy; it is not apparent, from what I have read, that this is a substantial risk, but it is obviously prudent to keep the possibility in mind until enough observations are available for the risk to be assessed, particularly as no dependable treatment is known yet. In many cases biopsy is likely to be essential for diagnosis.

*The case of Robb-Smith (1943). This is the case mentioned by Duncan (1945, 1946-7); it was previously described briefly by Carleton (1942-3).

It should be noted that the earlier conception of histoplasmosis as a rare and inevitably mortal disease is erroneous. Large-scale surveys of the incidence of histoplasmin-sensitivity, especially in parts of the United States of America, have shown that subclinical infections are infinitely commoner than clinically evident disease: most of these benign subclinical infections occur in the lungs. Greater knowledge of the disease has also shown that even severe clinical illness may be followed by recovery. Recent accounts of histoplasmosis to which reference may be made include those by Schwartz (1954), Poles and Lavertine (1954), and Leigh and Thomas (1955).

An unusual feature of the two cases described here was the uncommonly large size of the organisms in the tissues. Organisms of comparable size were characteristic of the lesions in the case studied by Robb-Smith (1943) and Duncan (1946-7): their patient likewise probably contracted the infection in West Africa. Duncan (1946-7) suggested that this large-cell type of histoplasma might be a species distinct from *H. capsulatum*, or a variant of *H. capsulatum*. Dubois, Janssens, Brutsaert, and Vanbreuseghem (1952) found a similar large-cell strain in a patient in the Belgian Congo and cited eight other African infections, including Duncan's (1946-7) case, which were probably caused by this type of organism; they too suggested that the large-cell histoplasma is a distinct species, and they proposed that it should be named *Histoplasma duboisii*.

Clarke, Walker, and Winston (1953) described an extraordinary case of widespread cutaneous histoplasmosis in a Nigerian: their histological findings appear to have been similar to those in the cases reported in this paper; the intracellular organisms were of the large-cell type. They isolated a histoplasma which they described as *H. duboisii*.

The status of the large-cell type of histoplasma as a distinct species has not been finally decided: if not identical with *H. capsulatum* it is at least closely related to it. It is noteworthy that naturally occurring large-cell strains have been recorded so far mainly in the case of infections originating in West Africa; Schwarz (1953), however, observed the development of comparable large forms in tissue explants from organs of mice which had been infected with *H. capsulatum* isolated from patients in the United States of America, and Moore (1955) cited some American cases in which the large forms were present in the tissues.

Summary

Two cases of solitary localized histoplasmic granuloma of the skin are reported. The patients are Nigerians, and were living in England at the time of diagnosis. The infection was contracted in West Africa in each case. The organisms in the granulomas were of the large-cell type which has been described as *Histoplasma duboisii*: their cultural characteristics were typical of *Histoplasma capsulatum*.

My thanks are due to Mr. K. W. Iles, F.I.M.L.T., A.R.P.S., Photographic Department, Charing Cross Hospital Medical School, for preparing the photomicrograph.

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A CASE OF TRUE HERMAPHRODITISM

BY

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[WITH SPECIAL PLATE]

The literature on true hermaphroditism has recently been adequately reviewed by Bromwich (1955) and by Greene *et al.* (1952). From these surveys it appears that at most 60 proved cases have been recorded. The case described here is presented because the diagnosis was made after puberty and because the sex-chromatin findings have a bearing on sex differentiation.

Case Report

The patient, aged 18 years, lived in a remote Jamaican village. Both parents died during his infancy. He has always dressed and behaved as a boy; and, although he had noticed that his breasts were enlarging and his penis was small, he became concerned about his condition only at the age of 15 when he began to bleed from a small orifice in the perineum (Fig. A). The bleeding occurred every month, lasted about five days, and was occasionally accompanied by hypogastric pain.

When first seen he was dressed as a male. On physical examination he appeared to be a well-developed coloured (mixed African and European) youth. His voice was of average male pitch. The scalp and axillary hair were normal, there was little facial and no chest hair, and the abdominal hair was female in distribution. The breasts were well developed and pendulous (Fig. B). The body contours were not strikingly female and the body measurements were as follows: weight, 122 lb. (55 kg.); height, 5 ft. 6½ in. (166 cm.); span, 5 ft. 9 in. (173 cm.); vertex to pubis, 31½ in. (79 cm.); pubis to ground, 35 in. (88 cm.).

The genitalia are shown in Fig. A. There was no pronounced mons pubis. The phallus was more like a penis than clitoris and measured 3.5 by 1.5 cm.; there was a moderate hypospadias. No labial or scrotal swelling was present and no testes could be palpated. There was a small left indirect inguinal hernia. The perineal region was perforated 3 cm. in front of the anus by a small orifice 2 mm. in diameter through which the monthly bleeding occurred and urine occasionally escaped. The anatomy of the vagina and urethra is shown in Fig. C. On abdomino-rectal examination a small uterus could be palpated, but no prostate could be felt.

Contrast radiography with viscous diodone demonstrated a vagina, a long cervical canal, a small, normally shaped uterine cavity, a left Fallopian tube for a distance of about 2.5 cm., and a right Fallopian tube of normal length. There was no peritoneal spill on either side (Fig. D). Radiologically the pelvis was gynaecoid in type. The femoral-head epiphyses were fusing and the flake epiphyses of the pelvis were well advanced for the patient's age. The bone age was thus within the early limits of normal, which is more characteristic of the female than of the male. Urinary oestrogen and 17-ketosteroid excretion was not estimated.

Repeated interviews with the patient confirmed our first impression that he was definitely male in outlook. He was very anxious to be rid of his enlarged breasts and monthly



Fig. 1.—Large solitary stone in upper part of dilated common duct, opposite junction with cystic duct, causing partial block of cystic duct and incomplete filling of gall-bladder (arrowed). At operation no stones found in gall-bladder or cystic duct. Biligrafin examination soon after attack of obstructive jaundice. Large calcified primary focus in base of right lung.
 Fig. 2.—Gross deformity owing to tunnelling of portions of gall-bladder through liver tissue. Portions bulging out of liver simulate diverticula. Stones in distal compartment. No filling at oral cholecystography.



Fig. 3.—Cystic duct blocked by non-opaque stone (arrowed) becoming outlined with biligrafin (one hour after injection). Suggests recent impact of calculus at junction, with further hold-up at ampulla before passage into duodenum. Cystic duct still obstructed. Also an accidental pyelogram (arrowed). No filling at oral cholecystography.
 Fig. 4.—Dilated hepatic and common ducts. Dilatation most marked above junction of cystic with common duct. Suggests recent impact of calculus at junction, with further hold-up at ampulla before passage into duodenum. Cystic duct still obstructed. Also an accidental pyelogram (arrowed). No filling at oral cholecystography.
 Fig. 5.—Multiple stones in gall-bladder and three stones in common duct (one hour after injection). Following recent attack of colic and obstructive jaundice.

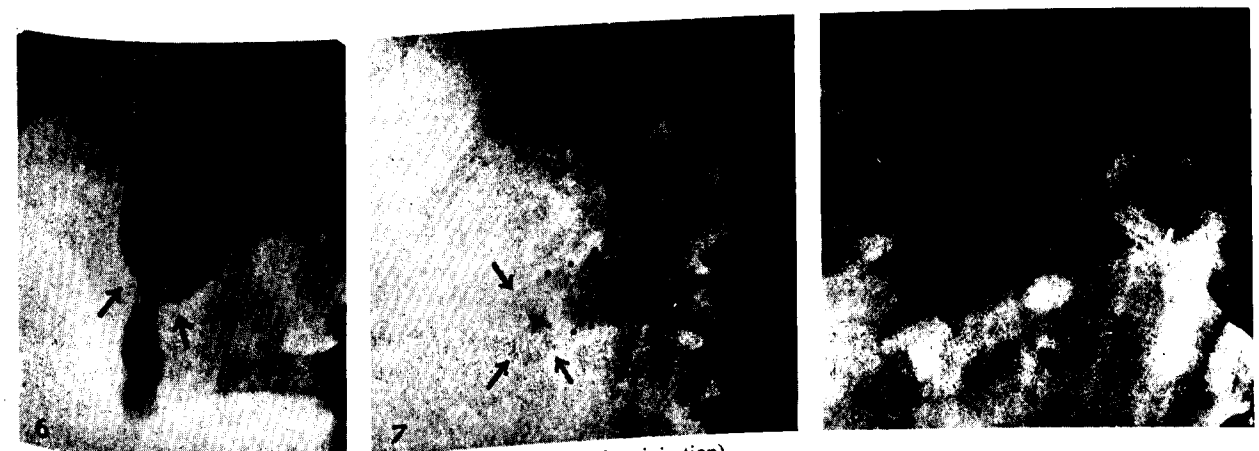


Fig. 6.—Intramural diverticulosis of gall-bladder (one hour after injection).
 Fig. 7.—Stone at lower end of dilated common duct, after cholecystectomy. (30 minutes after injection.) No history of jaundice.
 Fig. 8.—Two large stones in dilated common duct after cholecystectomy.

W. ST. C. SYMMERS: HISTOPLASMOSIS CONTRACTED IN BRITAIN



FIG. 1.—Lymph-node biopsy (August, 1951): sarcoidosis. The absence of multinucleated giant cells is noteworthy. (Haematoxylin and eosin. $\times 200$.)



FIG. 2.—Lymph-node biopsy (May, 1955): granulomatous lymphadenitis, with many multinucleated giant cells. Part of germinal centre of a follicle seen at right of picture. (Haematoxylin and eosin. $\times 150$.)

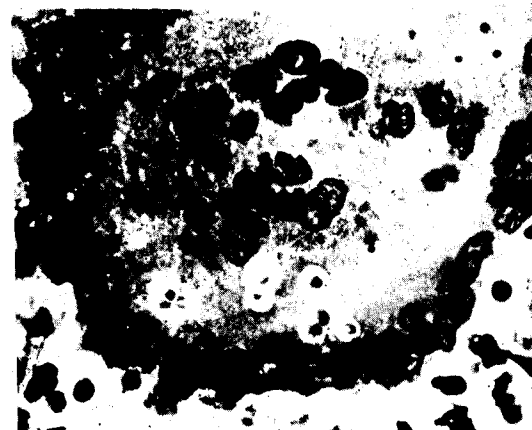


FIG. 3.—Part of giant cell from same section as Fig. 2. Fourteen histoplasmas in cytoplasm; some lie in so-called "digestion vacuoles"; double-contoured capsule of some organisms clearly seen. (Haematoxylin and eosin. $\times 925$.)

G. A. ROSE: RENAL TUBULAR OSTEOMALACIA



FIG. 1.—Radiograph of lower ribs on December 20, 1954, showing Looser's zones in ribs R 10 and 11 and L 11. Bones otherwise well calcified and apparently normal.



FIG. 2.—Radiograph of pelvis on December 20, 1954, showing Looser's zones of both ischial rami.



FIG. 3.—Radiograph of lower ribs on March 14, 1955, showing laying down of callus and calcification of Looser's zones after treatment for ten weeks.

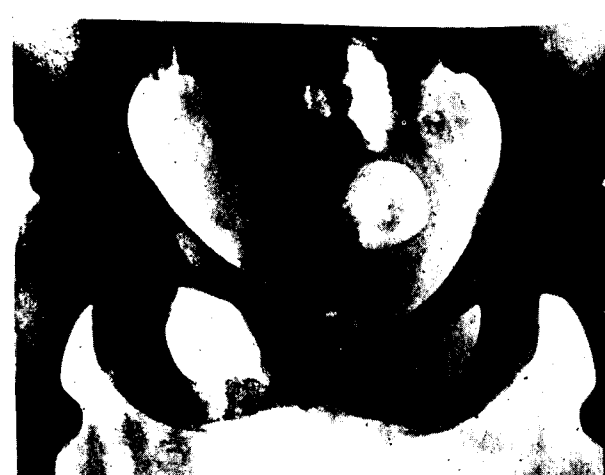


FIG. 4.—Radiograph of pelvis on March 14, 1955, also showing calcification of Looser's zones after treatment.

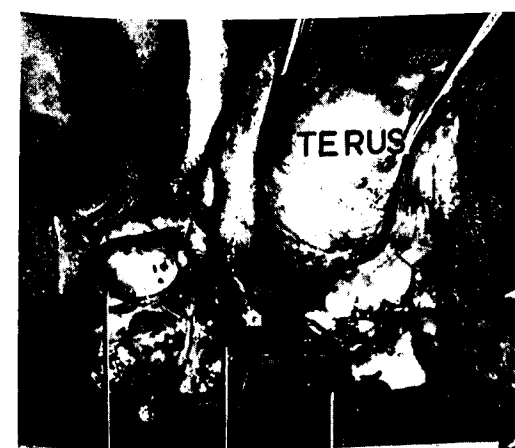
J. D. ARNEAUD *ET AL.*: TRUE HERMAPHRODITISM

FIG. 1.—Internal genital organs at operation.

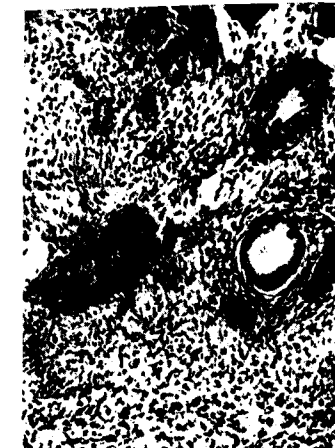


FIG. 2.—Ovarian component of left gonad. ($\times 480$.)

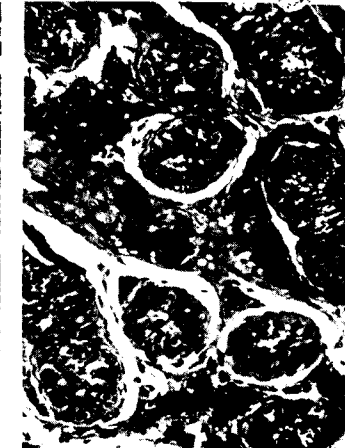


FIG. 3.—Testicular component of left gonad. ($\times 480$.)



FIG. 4.—Epidermis showing sex-chromatin body on nuclear membrane. ($\times 5,350$.)



FIG. 5.—Interstitial tissue of testis showing sex chromatin. ($\times 5,350$.)

A. D. DIXON AND J. B. D. TORR: SEX CHROMATIN IN ORAL SMEARS

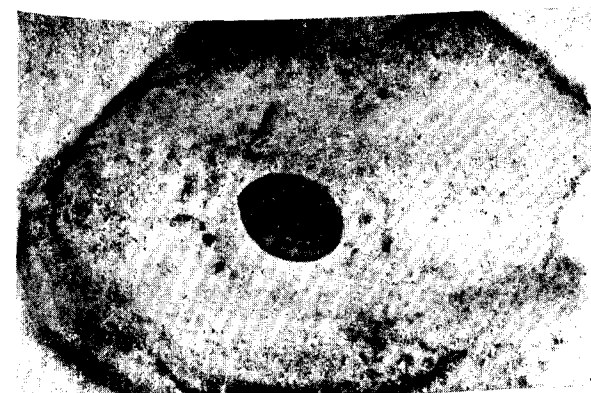


FIG. 1.—Male nucleus typical of those included. ($\times 1,125$.)



FIG. 2.—Female nucleus typical of those included. ($\times 1,125$.)

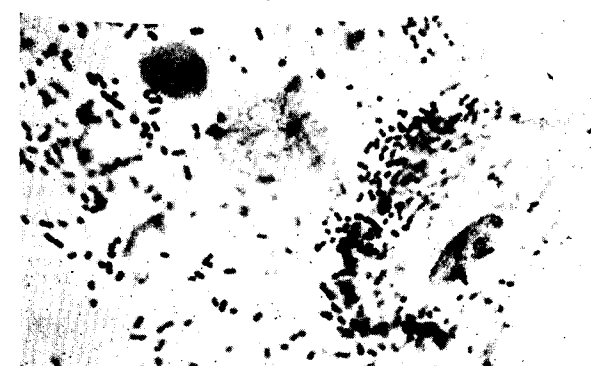


FIG. 3.—Nuclei excluded because of bacterial contamination. ($\times 1,125$.)



FIG. 4.—Nuclei excluded because of folding of cell body. ($\times 1,125$.)

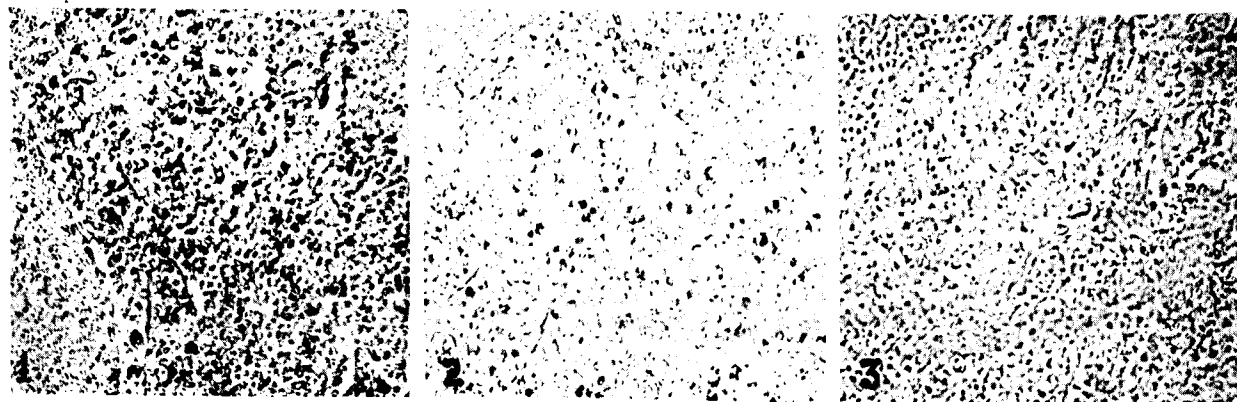


FIG. 1.—Section of spleen of control male guinea-pig given one subcutaneous injection of trypan blue daily for six days and killed the following day. Shows a moderate number of dye-bearing cells in sinuses of red pulp and in reticulum. Dye appears black in photomicrograph. (Stained weak eosin. $\times 200$.)

FIG. 2.—Section of spleen of male guinea-pig given 10 mg. cortisone acetate intramuscularly daily for seven days plus one subcutaneous injection of trypan blue daily during last six days before being killed. Compared with control animal (Fig. 1) the number of dye-bearing cells in sinuses and reticulum has become reduced, indicating reduced phagocytic activity. Dye appears black in photomicrograph. (Stained weak eosin. $\times 200$.)

FIG. 3.—Section of spleen of male guinea-pig given 10 mg. cortisone acetate intramuscularly daily for 14 days plus one subcutaneous injection of trypan blue daily during last six days before being killed. Shows complete absence of dye granules, indicating gross depression of phagocytic activity of reticulo-endothelial cells. (Stained weak eosin. $\times 200$.)

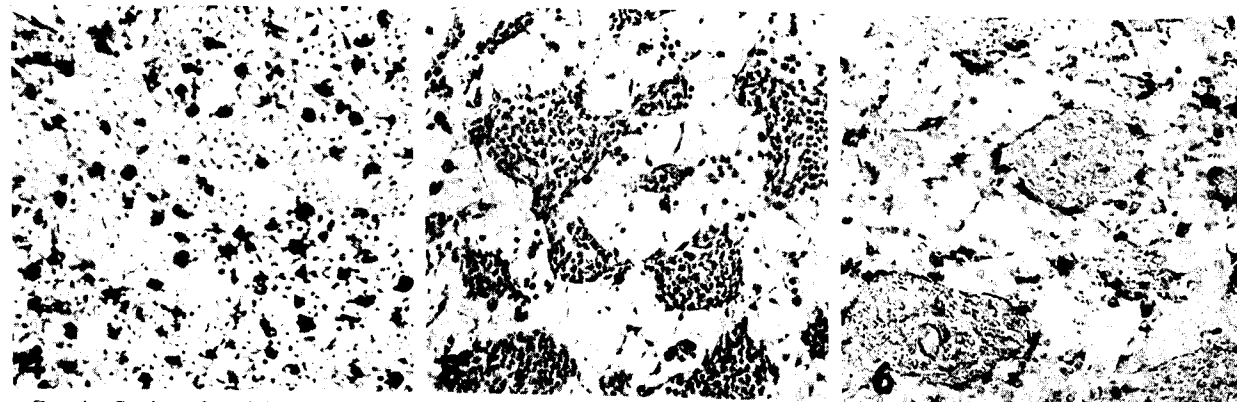


FIG. 4.—Section of medulla of lymph node of control male guinea-pig given one subcutaneous injection of trypan blue daily for six days and killed the following day. Shows numerous phagocytic cells in sinuses of medulla. Large amount of dye present in cells, indicating normal phagocytic activity. Dye appears black in photomicrograph. (Stained weak eosin. $\times 200$.)

FIG. 5.—Section of medulla of lymph node of male guinea-pig given 10 mg. cortisone acetate intramuscularly daily for 14 days plus one subcutaneous injection of trypan blue daily during last six days before being killed. Shows complete absence of dye granules, indicating gross depression of phagocytic activity of reticulo-endothelial cells. Lymphoid tissue shows marked degree of atrophy. (Stained weak eosin. $\times 200$.)

FIG. 6.—Section of medulla of lymph node of male guinea-pig given 10 mg. cortisone acetate intramuscularly daily for 21 days plus one subcutaneous injection of trypan blue daily during last six days before being killed. Shows moderate number of dye-bearing cells, especially on walls of lymph sinuses, indicating that phagocytic activity of reticulo-endothelial cells has started to recover. Dye appears black in photomicrograph. (Stained weak eosin. $\times 200$.)

R. S. CROW: PERIPHERAL NEURITIS IN MYELOMATOSIS



FIG. 1.—Case 1: The hands, showing pigmentation, "white nails," and clubbing. Left-hand nails are tobacco-stained.



FIG. 2.—Case 1: Myeloma of scapula with pathological fracture.

bleeding. A psychiatrist reported that there was strong evidence that he was psychologically masculine.

Cystoscopy under general anaesthesia showed the bladder and ureteric orifices to be normal. At laparotomy the internal genitalia were found to be predominantly female. The uterus was 90 mm. in length, with a long, narrow hypoplastic supravaginal cervix measuring 55 mm. The

right tube was long and hypoplastic and measured 90 mm. The left tube was thickened and its fimbrial end was buried amongst peritoneal folds near the brim of the pelvis. The right gonad looked like normal ovary and contained a corpus luteum; biopsy and frozen section confirmed this. The left gonad lay close to the left internal inguinal ring, covered by peritoneal folds. Dissection disclosed that it was made up partly of a testis and partly of an ovary also containing a corpus luteum (Special Plate, Fig. 1). Subsequent histological examination confirmed that the right gonad was an ovary and the left a combined ovary and testis. Total hysterectomy was performed with removal of the upper third of the vagina, both tubes, the right gonad, and the ovarian portion of the left gonad. Convalescence was uneventful.

Fifteen days later bilateral mastectomy was performed through semicircular incisions in the upper circumference of the areolae, with removal of semilunar pieces of skin and preservation of the nipples and areolae. Eleven days after that operation the hypospadias was repaired, and six days later the perineal orifice was closed in two layers.

Social adjustment of the patient was facilitated by securing him congenial employment as a manservant. He is much happier since his operations and is to all appearances a cheerful, normal young man.

Pathology

The uterus, cervix, right gonad and tube, left gonad and tube, both breasts, and portions of thoracic skin were all examined histologically. The endometrium was in the proliferative phase. The right ovary showed a well-developed corpus luteum with a haemorrhagic centre, the remainder of the section being composed of normal ovarian

tissue. The ovarian portion of the left gonad showed normal ovarian tissue and contained a corpus luteum of later date than the right (Plate, Fig. 2). The small portion of testis removed contained seminiferous tubules and relatively prominent interstitial tissue. The tubules had a thickened basement membrane and the majority of cells appeared to be of Sertoli type. There was no evidence of spermatogenic activity and no definite spermatogenic cells were seen (Plate, Fig. 3). Sections from the isthmic and infundibular portions of the left Fallopian tube were normal. The histo-

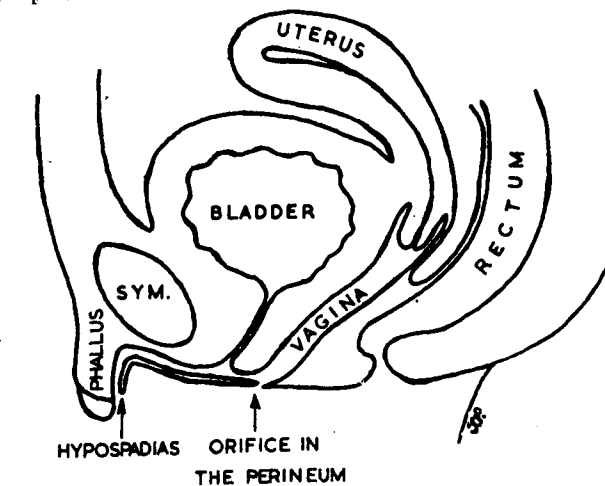


FIG. C.—Diagram showing anatomy of urogenital organs.

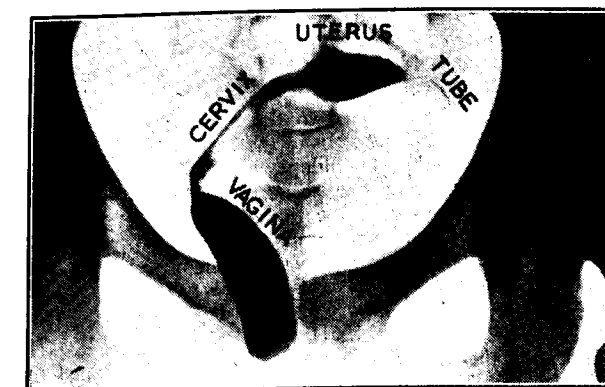


FIG. D.—Hysterosalpingogram, antero-posterior view. Right posterior oblique view taken few minutes later showed normal right Fallopian tube.

logical features of both breasts were essentially the same and showed marked resemblance to those of the normal adult female. Findings of the sex-chromatin studies are summarized in the Table.

Table Showing Results of Sex-chromatin Studies

Tissue	Female Sex Chromatin Count	Type
Skin of right breast ..	62%	Female
" " left ..	69%	"
Testis ..	56%	"
" Leydig and interstitial cells ..	No definite female-type sex chromatin demonstrable	"
Seminiferous tubules ..	59%	Female
Smears from oral mucosa ..	—	"
Polymorphs (blood smears) ..	—	"

Discussion

Success in the management of the hermaphrodite depends on early diagnosis, accurate clinical, psychological, and histological evaluation, and the adoption of appropriate surgical, endocrine, and psychotherapeutic measures to adjust the patient as a normal member of society.

Diagnosis

It is extremely difficult to differentiate clinically true hermaphroditism from other types of intersex. The external

genitalia and physical development are variable. By cystoscopy and urography it may be possible to demonstrate accessory structures and communications between the urinary and genital tracts. The presence of a female genital tract and the extent of its development may be demonstrated radiologically, as in this case.

Blood and urine levels of oestrogens, androgens, and ketosteroids are generally unaltered except in the female pseudohermaphrodite. The possibility that the gonad of the intersex may be abnormal with regard to hormone production has been suggested by Morris (1953). Descent of the gonad is no indication of its nature. Helpert (1939) and Laycock and Davies (1953) have reported cases of ovotestes in the scrotum. Macroscopic appearances of gonadal tissue have been misleading. Fischer *et al.* (1952) stated that there was an associated inguinal hernia in 21 of 49 cases, and stressed its importance in diagnosis. Diagnosis was made at operation for hernia in 6 of 20 cases studied by Young (1937). The hernial sac often contained a gonad, and in some cases part or whole of the uterus. Giacobine (1946) found 36 male cases of hernia uteri inguinalis in the literature. Accurate diagnosis can be established only by gonadal biopsy, which in most cases involves laparotomy.

Management

As our patient was past puberty, it was assumed that no reversal of psychic sex was likely to occur, and his strongly marked maleness was taken as the guide in our surgical endeavours to render him a more normal person. This procedure has the approval of most modern workers in this field (Creadick, 1953; Greaves, 1954; Wilkins *et al.*, 1955; Barr, 1956). Any attempt to make these individuals behave contrary to their psychological sexual bias, whatever their clinical sex, often gives rise to serious mental conflict and doubtless accounts for many of the suicides common amongst these patients.

Attention has been drawn to the association of malignancy and the cryptorchid testis of the hermaphrodite (Taub, 1954; Gilbert, 1942). Orchidopexy did not significantly lower the incidence in one series of cases (Gilbert and Hamilton, 1940). In our case there was a clear demarcation between the components of the left gonad, and we were able to remove the female component and leave the remainder, since the advantages of preserving the gonad for endocrine function were considered to outweigh the risk of malignancy (Howard, 1951).

Hormone therapy was considered, but it was decided to withhold this until the function of the testis could be evaluated, since substitution therapy may depress gonadal function (Marshall, 1954).

Sex-chromatin Studies

The work of Barr and his associates (1949, 1950) has established that intermitotic nuclei of human tissues bear evidence of the true nature of their sex chromosomes. Sex-chromatin studies were made in this material from three aspects: (1) the type of nuclei present in the tissues; (2) the presence or absence of gynandromorphism; and (3) the nuclear structure of the male components of the reproductive system. All the material except the skin was fixed in 10% neutral buffered formal saline. The skin was preserved in a modified Davidson's solution as recommended by Moore *et al.* (1953). For the sex-chromatin studies sections 5 μ thick were stained with haematoxylin and eosin and Feulgen stains, and the counts made on 100 suitable nuclei in each section (Plate, Figs. 4 and 5). The heavy deposit of melanin in the deeper cells of the negro epidermis increased the difficulty of the counts in this area, but this was overcome by the use of the Feulgen stains. Also the squamous cells around the skin appendages in the dermis were found to be relatively free of melanin, so that the nuclear type could be satisfactorily evaluated.

1. Nuclear Types.—Studies on the nuclear types of true hermaphrodites have previously been completed on nine cases (Barr, 1955a); six of these showed female-type nuclei

and three male-type nuclei. Our case had a nuclear pattern of the female type (see Table).

2. Gynandromorphism.—The phenomenon of gynandromorphism has been shown to occur in insects. In the three cases reported to date (Barr, 1955b; Greene *et al.*, 1952), and in the present case, there was no evidence of gynandromorphism.

3. Nuclear Structure of Male Components.—The presence of female-type nuclei in the interstitial tissue of the testis is an interesting finding. As the small piece of testicular tissue removed at operation was fixed immediately, examination by the squash technique (Greene *et al.*, 1952) was not possible. In the sections the cells within the seminiferous tubules did not show any structure that could be regarded as sex chromatin. However, these cells are unsuitable for cytological study in sections (Barr, 1956).

Of 57 cases of true hermaphroditism the social sex was male in 41, or 72% (Bromwich, 1955). Among 10 similar cases in which the sex chromatin has been studied only three were male in type. This suggests that in the majority of instances of true hermaphroditism the genetic sex, which is usually female, has been suppressed by the social and psychic sex, which is usually male. In our case the hormonal influences must have been strongly female, since the patient had nearly normal female secondary sex characteristics and apparently normal ovarian function. Despite this the psychic sex was male.

Graham (1954a, b) has demonstrated in the cat embryo that the nuclear configuration antedates the sexual differentiation of the reproductive system. Bromwich (1955) has suggested that the apparent sex among intersexes may not be absolutely determined by the sex chromosomes and that the genetic direction of development may be overridden by other factors. In our case, however, the genetic sex and the hormonal sex are female, but the psychic sex is strongly male. It would therefore seem that environmental and psychic influences have successfully suppressed the other factors. This is in agreement with the views of Howard (1951), Creadick (1953), and Greaves (1954), who have all stressed the part played by environment in psychic development.

Summary

A case of true hermaphroditism and its treatment are described. Although in this case the genetic sex and hormonal sex were female, the psychic sex was strongly male, and evidence is put forward to suggest that extrauterine environmental factors were responsible for this.

We are indebted to Professor Murray Barr for his comments on our sex-chromatin studies, to Dr. William Davidson for assistance with the polymorphonuclear sexing, and to Dr. K. D. Royes for the psychiatric evaluation of the patient.

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ANALYSIS OF AMNIOTIC FLUID CELLS FOR DIAGNOSIS OF FOETAL SEX

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For many years attempts have been made, by different approaches, to develop a method that would give a reliable prenatal diagnosis of foetal sex. We have previously shown (Serr, Sachs, and Danon, 1955; Sachs, Serr, and Danon, 1956) that a reliable prenatal diagnosis can be made by a study of chromocentres in amniotic fluid cells.

This method of diagnosing sex is based on a well-established theoretical and practical foundation, since it is known that in humans, as in most other mammals, there is a difference in the sex chromosome constitution of normal males and females—males having the sex chromosome constitution XY, and females the sex chromosome constitution XX (reference in Sachs, 1954, 1955)—and since identification of normal males and females by a study of chromocentres has invariably given correct results when applied to human cells from other sources (Moore, Graham, and Barr, 1953; Moore and Barr, 1954, 1955; Emery and McMillan, 1954; Marberger and Nelson, 1955; Marberger, Boccabella, and Nelson, 1955; *Lancet*, 1955; Sachs and Danon, 1956).

The present paper deals with our detailed findings in an analysis of amniotic fluid cells in 40 cases in the ninth month, and in 8 cases in the third, sixth, and seventh months of pregnancy.

Material and Methods

Amniotic fluid was obtained prior to delivery by puncture of the membranes, and in the earlier months of pregnancy, excepting the case in the third month, by abdominal puncture (Dieckmann and Davis, 1953; Alvarez and Caldeyro, 1950). The case in the third month was obtained during hysterectomy performed by Professor B. Zondek.

The fluid was centrifuged at 2,500 rotations a minute for five minutes. The sediment, which contained the cells, was smeared on slides that had previously been coated with Mayer's albumin, and then fixed for at least one hour in a fixative consisting of equal parts of absolute alcohol and ether. We also tested 3:1 alcohol-acetic acid, and although these modified Kahle's fixative (see below), and although these were both satisfactory they were not superior to the alcohol-ether, which was therefore routinely used. If the slides had to be kept for any length of time after fixation, or if they had to be transported, they were rinsed in 70% alcohol, 50% alcohol, water, and then kept after rinsing in glycerin-water.

For the study of chromocentres we routinely used Feulgen staining, with fast green as a counterstain for the cytoplasm. The Feulgen method of staining is specific for desoxyribose

nucleic acid, a chemical constituent that is found only in the chromosomes, and it therefore gives a clear staining of the chromocentres.

For the Feulgen staining, the slides, after rinsing in water, were transferred for eight minutes to normal hydrochloric acid at 60° C., stained with leucobasic fuchsin for one hour, and this was followed by three rinses, totalling 10 minutes, in SO₂ water, and three rinses in distilled water. The slides were then rinsed in 70% alcohol, 95% alcohol, counterstained in a dilute fast green solution in 95% alcohol, followed by two rinses in 95% alcohol, and a rinse in absolute alcohol, equal parts of absolute alcohol and xylol, xylol, and mounting in canada balsam.

For the analysis of the different types of cells the slides were stained, after alcohol-ether fixation, with Papanicolaou EA-36 and OG-6.

When sections of embryonic and foetal membranes were examined, pieces were fixed in a modified Kahle's fixative consisting of 100 parts absolute alcohol, 7 parts glacial acetic acid, and 40 parts 40% formaldehyde. After fixation for at least 12 hours, the pieces were transferred to 70% alcohol if they had to be stored. For embedding they were passed through 95% alcohol, absolute alcohol, equal parts



FIG. 1.—Photomicrographs of cells from the amniotic fluid and the skin of human foetuses. No. 13 stained with Papanicolaou; all others stained with Feulgen and fast green. 1, 2, and 3, Cells from the amniotic fluid of 9-months-old female foetuses. Chromocentre at the nuclear membrane. ($\times 1,500$.) 4, Cell from the amniotic fluid of a 6-months-old female foetus. Chromocentre at nuclear membrane. ($\times 1,500$.) 5 and 6, Cells from the amniotic fluid of 9-months-old male foetuses. Chromocentre absent. ($\times 1,500$.) 7 and 8, Cells from the amniotic fluid of 5-months-old male foetuses. Chromocentre absent. ($\times 1,500$.) 9, Piece of tissue with 70 diagnosable cells from the amniotic fluid of a 5-months-old male foetus. Chromocentre absent. ($\times 500$.) 10 and 11, Sections of skin from 6-months-old male foetuses. Chromocentre absent. ($\times 760$.) 12 and 13, General view of smears from the amniotic fluid of 9-months-old foetuses. ($\times 130$.)

TABLE I.—Percentage of Cells in Amniotic Fluid Suitable for Diagnosis of Sex. In Each Case there are 5 Separate Counts of 100 Cells

Case No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Males															
Cells %	13	13	8	14	8	11	10	12	7	14	9	20	6	17	23
Mean	8.4	14.0	10.2	13.2	8.2	11.2	10.4	14.4	10.6	14.4	12.0	15.0	10.0	13.6	16.2
Standard error ±	1.3	1.8	0.6	1.2	0.7	1.3	2.0	1.0	1.1	1.2	1.3	1.6	1.2	1.0	2.4
Females															
Cells %	13	15	18	12	18	11	8	21	9	19	21	19	18	11	8
Mean	10.0	12.4	13.0	11.0	14.8	7.4	9.0	16.6	9.6	15.6	19.2	16.4	14.4	11.2	8.6
Standard error ±	1.1	1.0	1.7	0.4	1.2	1.4	0.7	1.5	1.2	1.9	0.7	1.3	1.4	0.2	0.6

of absolute alcohol and xylol, two changes of xylol, and embedded in wax. Sections were cut at 10 μ , and the sections, like the smears, were stained with Feulgen and fast green for the study of chromocentres, and with Papanicolaou for the cell types.

Results

Types of Cells in the Amniotic Fluid

An analysis of the types of cells in the amniotic fluid was made on Papanicolaou smears of fluid taken prior to delivery. Three main types of epithelial cells were found, which could be classified (Vincent Memorial Hospital, 1950) as basal cells with vesicular nuclei and green-staining cytoplasm; precornified and cornified cells with vesicular to pyknotic nuclei and square or folded and wrinkled cytoplasm which stains green in the precornified and pink in the cornified cells; and keratinized cells with advanced nuclear degeneration or no nucleus at all and an orange-staining wrinkled cytoplasm. In many anucleate cells the cytoplasm was not stainable.

The basal and precornified cells, with green-staining cytoplasm, are the most suitable for the sex diagnosis. Most of the cells with pink-staining cytoplasm and the cells with orange-staining cytoplasm are unsuitable since they have nuclei with different kinds of degeneration such as pyknosis, loss of stainability, and karyorrhexis.

In order to determine the origin of the cells suitable for the diagnosis of sex we examined Papanicolaou-stained sections of skin from a 6-months-old foetus, and Papanicolaou-stained sections of skin and smears of the oral mucosa and vagina from a newborn infant. The skin of the 6-months-old foetus was found to have a surface sheet of cornified cells without nuclei and pink- or orange-staining cytoplasm. In some places this sheet of dead cells had peeled off, so that small patches of cells suitable for diagnosis could then be in contact with the amniotic fluid. In the skin of the newborn infant there was a continuous surface sheet of dead cells in the pieces that were examined, whereas both the oral mucosa and the vaginal smears showed that nearly all the cells of the surface layers were suitable for diagnosis. The cornified and keratinized cells found in the amniotic fluid thus seem to come from the skin, and it can be assumed that the cells suitable for diagnosis come to a large extent from the mucosae of the foetus. The epithelium of the amniotic membrane as a possible source of suitable cells is also not excluded.

A small proportion of polymorphonuclear leucocytes were found in the amniotic fluid. But these were all degenerate or badly spread, so that it was not possible to make a sex diagnosis such as that which can be made on these cells in blood smears taken after birth (Davidson and Robertson Smith, 1954; Sachs and Danon, 1956).

Percentage of Cells Suitable for the Diagnosis of Sex

Since the amniotic fluid contains many cells that are not suitable for sex diagnosis, we determined the percentage of

diagnosable cells in cases prior to delivery and in earlier stages of pregnancy. The results of five separate determinations on 100 cells each in 15 males and 15 females are given in Table I. In both males and females, Cases 1 and 12 are prior to delivery. In the males, Cases 13 and 14 are from a 5½-months-old foetus and Case 15 from a 6-months-old foetus; and in the females, Case 13 is from a 5½-months-old foetus and Cases 14 and 15 from a 6-months-old foetus.

It can be seen from Table I that the percentages of diagnosable cells in the five- and six-months cases are similar to those found in some of the later cases. One case of hydramnios with a male foetus that was examined in the middle of the ninth month gave, on a count of 500 cells, an average of $15.2 \pm 1.2\%$ diagnosable cells, and this is equivalent to Case 12 among the normal cases of pregnancy. In one of the sixth-months cases there was a piece of tissue in the amniotic fluid with 70 diagnosable cells (Fig. 1, No. 9). A comparison of the totals of the 15 cases in males and females gives an average of 12.1 ± 0.2 for males and 12.4 ± 0.9 for females, so that there is no significant difference between the two sexes.

In the one case that was at the end of the third month there was a total of 36 cells (in 4 ml. of amniotic fluid), of which 22 (61%) were suitable for diagnosis.

Study of Chromocentres for Diagnosis of Sex

The diagnosis of sex on the amniotic fluid cells is based on determinations of the percentage of cells with a chromocentre that may or may not be at the nuclear membrane. The results of five separate counts of 100 cells each in five males and five females prior to delivery are shown in Tables II and III.

The data on 40 cases in the ninth month (Table IV, Figs. 2 and 3), which consist of 39 cases prior to delivery and 1 case of hydramnios in the middle of the ninth month, show that there is a clear difference both in the percentages of cells with a chromocentre and in the percentage of cells with a chromocentre at the nuclear membrane, in the cases diagnosed as males and females. In each of these cases the diagnosis of sex on the amniotic fluid cells was confirmed at delivery.

In the seven cases in the sixth and seventh months (Table V), there is also a clear difference between males and females. One of these was a pathological pregnancy in a woman who had been bleeding intermittently for two months before she was examined, and the diagnosis of sex on the amniotic fluid cells was confirmed both from the appearance of the foetus and from an analysis of a skin biopsy. The other six cases have not yet been delivered, but since there were a sufficient number of diagnosable cells there is no reason to doubt that, as in all the other cases, the diagnosis will be confirmed at delivery.*

*The sex of these foetuses has now been confirmed at delivery.

TABLE II.—Percentage of Cells with a Chromocentre, in the Amniotic Fluid of Male Foetuses. In Each Case there are 5 Separate Counts of 100 Cells

	% Cells With Chromocentre			% Cells Without Chromocentre
	At Nuclear Membrane	Not at Nuclear Membrane	Total	
Case 1	9 6 7 5 12	11 6 9 7 8	20 12 16 12 20	80 88 84 88 80
Mean	7.8	8.2	16.0	84.0
Standard error ±	1.2	0.9	1.8	1.8
Case 2	5 3 7 5 12	22 13 9 10 11	27 16 16 15 23	73 84 85 85 77
Mean	6.4	13.0	19.4	80.6
Standard Error ±	1.5	2.3	2.4	2.4
Case 3	4 1 5 3 5	7 6 8 3 6	11 7 13 6 11	89 93 87 94 89
Mean	3.6	6.0	9.6	90.4
Standard error ±	0.7	0.8	1.1	1.1
Case 4	4 8 4 9 9	7 8 11 8 10	11 16 15 17 19	89 84 85 83 81
Mean	6.8	8.8	15.6	84.4
Standard error ±	1.2	0.7	1.3	1.3
Case 5	8 6 3 4 6	1 11 7 3 8	9 17 10 7 14	91 83 90 93 86
Mean	5.4	6.0	11.4	88.6
Standard error ±	0.9	1.8	1.8	1.8

TABLE III.—Percentage of Cells with a Chromocentre, in the Amniotic Fluid of Female Foetuses. In Each Case there are 5 Separate Counts of 100 Cells

	% Cells With Chromocentre			% Cells Without Chromocentre
	At Nuclear Membrane	Not at Nuclear Membrane	Total	
Case 1	25 33 30 35 24	13 21 17 18 18	53 46 51 52 42	47 54 49 48 58
Mean	29.4	19.4	48.8	51.2
Standard error ±	2.2	2.5	2.1	2.1
Case 2	48 38 38 43 37	23 19 37 26 21	71 57 75 69 58	29 43 25 31 42
Mean	40.8	25.2	66.0	34.0
Standard error ±	2.1	3.2	3.6	3.6
Case 3	29 29 29 27 28	26 29 17 24 28	55 58 46 51 56	45 42 54 49 44
Mean	28.4	24.8	53.2	46.8
Standard error ±	0.4	2.1	2.1	2.1
Case 4	38 42 42 46 41	19 20 18 24 26	57 62 60 70 67	43 38 40 30 33
Mean	41.8	21.4	63.2	36.8
Standard error ±	1.3	1.5	2.4	2.4
Case 5	35 42 46 39 47	27 19 17 18 23	62 61 63 57 70	38 39 37 43 30
Mean	41.8	20.8	62.6	37.4
Standard error ±	2.2	1.9	2.1	2.1

TABLE IV.—Percentage of Cells with a Chromocentre, in the Amniotic Fluid in 40 Cases in the Ninth Month of Pregnancy. Figures in Each Case are Based on a Count of 200 or 500 Cells

	Males			Females		
	% Cells with Chromocentre			% Cells with Chromocentre		
	At Nuclear Membrane	Not at Nuclear Membrane	Total	At Nuclear Membrane	Not at Nuclear Membrane	Total
0.5	0.5	6.0	6.5	22.0	12.0	34.0
1.0	1.0	6.5	7.5	26.5	15.5	42.0
1.5	1.5	11.0	12.5	28.0	11.5	39.5
2.0	2.0	6.5	8.5	29.0	27.5	56.5
2.5	2.5	6.0	8.5	29.4	19.4	48.8
3.0	3.0	8.0	11.0	32.0	14.5	46.5
3.5	3.5	11.0	14.0	32.5	27.0	59.5
4.0	4.0	11.5	15.5	34.0	10.0	44.0
4.5	4.5	4.5	9.0	34.0	11.5	45.5
5.0	5.0	8.0	13.0	34.0	12.5	46.5
5.5	5.5	10.5	16.0	34.0	31.0	65.0
6.0	6.0	11.5	17.5	34.5	11.0	45.5
6.5	6.5	6.0	12.5	35.0	11.5	46.5
7.0	7.0	6.0	13.0	37.0	21.5	58.5
7.5	7.5	5.5	13.0	38.0	17.0	55.0
8.0	8.0	13.0	21.0	40.0	16.5	56.5
8.5	8.5	8.8	17.3	40.0	19.0	59.0
9.0	9.0	8.2	17.2	40.8	25.2	66.0
9.5	9.5			41.8	20.8	62.6
10.0	10.0			41.8	21.4	63.2
10.5	10.5			43.5	15.5	59.0
11.0	11.0			44.5	20.0	64.5
Mean	3.7	8.3	11.9	35.1	17.8	52.9
Standard error ±	0.5	0.2	0.8	1.3	1.3	2.0

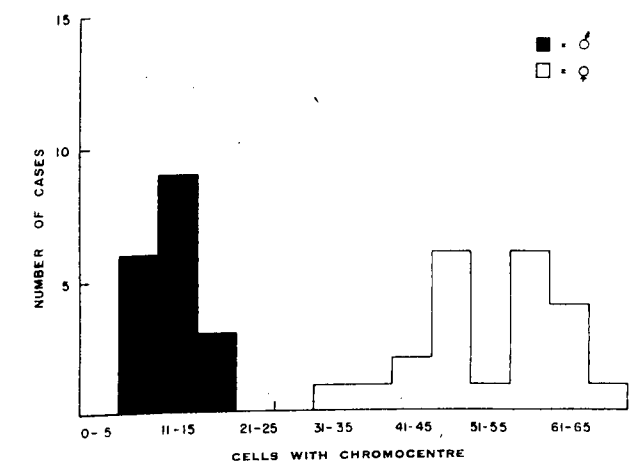


FIG. 2.—Histogram of the percentage of cells with a chromocentre, in amniotic fluid cells from 40 cases in the ninth month of pregnancy. The data have been grouped in intervals of 5.

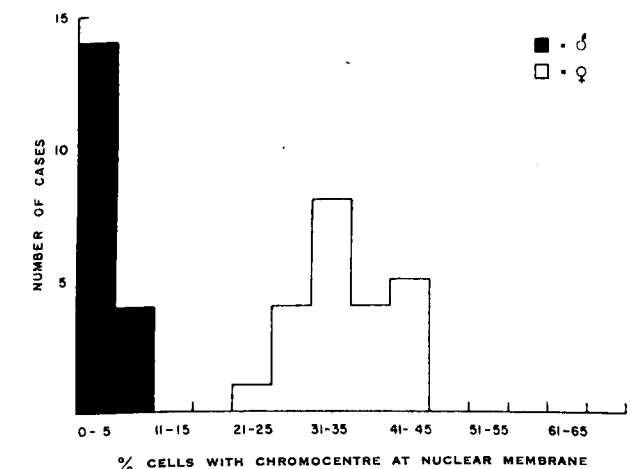


FIG. 3.—Histogram of the percentage of cells with a chromocentre at the nuclear membrane, in amniotic fluid cells from 40 cases in the ninth month of pregnancy. The data have been grouped in intervals of 5.

SEX CHROMATIN IN ORAL SMEARS

BY

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[WITH SPECIAL PLATE]

A sex difference in the morphology of intermitotic nuclei was first described as a feature of nerve cells in the female cat by Barr and Bertram (1949). This difference is characterized by a mass of chromatin which, from its intimate relationship to the nucleolar membrane in nerve cells, was first called the nucleolar satellite, but as its position varies with the condition of the cell and the type of tissue examined it was renamed the sex chromatin. Further studies have shown that sex chromatin may be demonstrated, not only in many tissues of the cat, but also in the cells of other species, including man (Moore and Barr, 1954). These findings have been of value in the study and elucidation of cases of abnormal sex development by the examination of nuclei in biopsy specimens of skin.

Moore and Barr (1955) in Canada and Marberger *et al.* (1955) in the United States, in order to simplify still further the diagnosis of chromosomal sex, examined smears of epithelial cells taken from the mucous membrane of the oral cavity, and found that in the nuclei of these cells also the sex chromatin could be identified.

Recently it has been pointed out (Barr, 1956) that, as the precise relationship of the female mass of sex chromatin to the XX chromosome complex has not yet been established, the use of such terms as male or female chromosomal sex should be replaced, in clinical use, by "chromatin negative" (male) or "chromatin positive" (female).

The purpose of the present investigation is twofold: first, to examine smears from a large number of individuals with a view to testing the validity of the oral smear method, as it has not yet been extensively used in this country; and, secondly, to establish a number of criteria by which the method may be standardized and the diagnosis of chromosomal sex made more or even quite certain.

Materials and Methods

Oral smears were taken from 260 individuals, of whom 98 were female and 162 male. Ages ranged from 16 months to 60 years and there was some racial variation. The smears were obtained by gently scraping the inner surface of the cheek with a wood orange-stick and transferring the material thus removed to a slide previously coated with a thin layer of albumen. Fixation in equal parts of 95% ethyl alcohol and ether was begun immediately, and continued for 24 hours. Following careful hydration, staining was carried out in 1% cresyl violet at 57° C. for 20 minutes. Excess stain was removed by brief rinsing in 95% alcohol (two changes), dehydration was completed in absolute alcohol, and the specimens were then cleared in xylol and mounted in Canada balsam. Other staining techniques, such as the Feulgen reaction, which demonstrates the sex chromatin because of its high content of deoxyribose nucleic acid, were tried, but preference was given to the cresyl-violet method as it was found to give adequate differential staining of the nucleus and has the advantage of greater simplicity.

The slides were numbered serially and examined independently by each investigator, without reference to the records

In the one case that was obtained during hysterectomy at the end of the third month, out of the 22 cells suitable for diagnosis in 4 ml. of fluid there were 21 with a chromocentre, in 12 of which the chromocentre was at the nuclear membrane. The diagnosis of female sex on the amniotic fluid cells was confirmed by a study of embryonic membranes. We also found it possible to make a diagnosis on the cells in the fluid of an 8-weeks-old aborted embryo, and this was again confirmed by a study of embryonic membranes.

In some cases prior to delivery, but never in any of the earlier cases, the fluid was obviously contaminated with cells from the mother, and if there was a male foetus it was possible to distinguish both male and female patches of cells. In these contaminated cases, which have of course been excluded from the data, the membranes had

TABLE V.—Percentage of Cells With a Chromocentre, in the Amniotic Fluid in 7 Cases in the Sixth and Seventh Month of Pregnancy. Figures in Each Case are Based on a Count of 200 Cells

	Males			Females		
	% Cells with Chromocentre			% Cells with Chromocentre		
	At Nuclear Membrane	Not at Nuclear Membrane	Total	At Nuclear Membrane	Not at Nuclear Membrane	Total
1	3.5	4.0	7.5	41.5	11.0	52.5
2	4.5	9.5	14.0	34.0	14.0	48.0
3	8.0	6.0	14.0	41.0	16.0	57.0
4	5.5	7.0	12.5			
Mean	5.4	6.6	12.0	38.8	13.7	52.5
Standard error ±	0.9	1.1	1.5	2.4	1.4	2.6

presumably broken before the fluid was collected, so that maternal cells were mixed with those of the foetus. Papanicolaou smears, which showed the presence of bacteria, confirmed that there had in fact been maternal contamination in these cases.

The present results show that a diagnosis based on the percentage of cells with a chromocentre at the nuclear membrane gives no less a sex difference than a diagnosis based on the percentage of cells with a chromocentre at any position in the nucleus. The former analysis, which is easier to carry out, is therefore to be recommended as a routine procedure. It should also be noted that the chromocentre of the older epithelial cells found in the amniotic fluid, which may really be a double structure (Sachs and Danon, 1956), is larger when found in a female than when found in a male.

The term "sex chromatin" (Moore, Graham, and Barr 1953) has been used for the chromocentres which are presumably formed by the sex chromosomes. But the term "chromatin" refers to chromosome material in general, so that the sex chromatin of the sex chromosomes is present in all the cells both in males and in females. Since the diagnosis of sex is based not on the presence or absence of sex chromatin but on the different abilities of the sex chromosomes to form chromocentres in the non-dividing nuclei of males and females, the use of the term "chromocentre," or possibly the term "sex chromocentre," seems to be more appropriate than the use of the term "sex chromatin."

Discussion

It can be seen from the present data that an accurate prenatal diagnosis of foetal sex can be made by a study of chromocentres in amniotic fluid cells. In all normal cases there have been a sufficient number of diagnosable cells, and it has been shown that a diagnosis can be made in normal cases from the third month, and possibly even earlier.

Since our original report was published (Serr, Sachs, and Danon, 1955; see also Sachs, Serr, and Danon, 1956) we have

been informed by Dr. Landrum B. Shettles (1956) in New York and Drs. Fritz Fuchs and Povl Riis (1956) in Copenhagen, that they have independently found that a diagnosis of foetal sex can be made by an examination of amniotic fluid cells. A report has also appeared from Minneapolis (Makowski, Prem, and Kaiser, 1956), Amsterdam (James, 1956), and Sheffield (Dewhurst, 1956). The diagnosis is therefore well established, and the only possible source of error would seem to be in the rare case of an intersex whose appearance does not correspond to that expected from his or her sex chromosome constitution. Even in cases of twins with different sexes in the same amnion, it should be possible to make a correct diagnosis, since one would expect to find both male and female patches of cells in the amniotic fluid. Regarding the clinical value of a correct prenatal diagnosis of sex, the most obvious application would be in cases of certain sex-linked abnormalities.

Summary

It has been shown in 40 cases in the ninth month, and in 8 cases in the third, sixth, and seventh months of pregnancy, that it is possible to diagnose the sex of the foetus by a study of chromocentres in amniotic fluid cells. It was also possible to make a diagnosis on an 8-weeks-old aborted foetus.

A clear sex difference has been found both when the diagnosis is based on the percentage of cells with a chromocentre and when it is based on the percentage of cells with a chromocentre at the nuclear membrane. The latter determination is to be recommended as a routine procedure, since it is easier to carry out.

In the 47 cases in the sixth, seventh, and ninth months there was a mean of 4% of cells with a chromocentre at the nuclear membrane in males, and a mean of 35% of such cells in females. The chromocentre was also larger when found in cells of a female than when found in cells of a male.

Three main types of epithelial cells—basal, precornified or cornified, and keratinized—were found in the amniotic fluid. Of these, the basal and precornified cells are the most suitable for the sex diagnosis.

Determinations of the percentage of cells in the amniotic fluid that are suitable for the sex diagnosis gave, for the cases in the sixth, seventh, and ninth months, a mean of 12% suitable cells both for males and for females. In the one case in the third month 61% of the cells were suitable for the diagnosis.

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of the sex of the subjects. A 1/12-inch oil-immersion objective was used, as lower magnifications were not satisfactory. Twenty-five suitable cells were counted in each smear, and the incidence of sex chromatin, the first cell in which it was seen, and the degree of bacterial contamination were noted. Only cells which fulfilled the following criteria were included in the counts: (1) they must have large, circular, lightly stained nuclei; (2) there must be absence of crenation of the nuclear membrane and no undue folding of the cell body; (3) there must be no obscuring of the nucleus due to overlapping by adjacent cells; (4) freedom from bacterial contamination in the vicinity of the nucleus is essential; (5) only plano-convex, darkly stained bodies in actual continuity with the nuclear membrane were considered to be sex-chromatin masses. Figs. 1 and 2 on the Special Plate show male and female nuclei typical of those included in the counts, while Figs. 3 and 4 show nuclei of the type which were excluded because of bacterial contamination and folding of the cell body respectively.

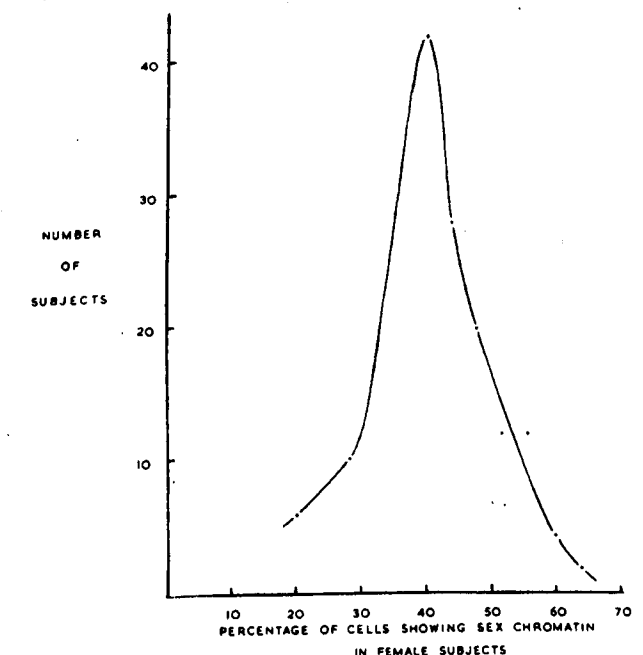
Observations

Three of the 260 smears were unsuitable for examination. In the 162 male smears examined no sex chromatin was seen, whereas, by contrast, in the majority of the 95 female smears between 30% and 50% of the cells counted contained a sex-chromatin mass. The average incidence is shown in the

Incidence of Sex Chromatin in 95 Females

Percentage	20	24	28	32	36	40	44	48	52	56	60	64
No. of subjects	3	4	5	11	12	21	14	10	6	2	1	

Table. The incidence range, which is unaffected by variations in age or race, is more clearly shown in the Graph. Some errors in diagnosis were made, but these were less than 5% of the total and occurred in the initial stages of



Graph showing incidence range in females.

the investigation. As experience in the examination of the smears was gained the accuracy of our estimations improved, in great part owing to the application of the criteria for suitable cells which have been enumerated above. The smears in which errors had been made were re-examined at the end of the investigation, and no difficulty was then experienced in providing a correct diagnosis.

Discussion

It has already been established that there is a well-recognized difference between the nuclei of male and female epithelial cells, and our results fully confirm this finding. Other investigators have given different values for the percentage

of female cells possessing sex chromatin, but this variation in values would appear to be due to differences in the type of cells counted and also to the fact that some estimations have included cells in which the mass of chromatin was not in an absolutely peripheral position in the nucleus. Unless it is in such a position it is partially obscured by the substance of the nucleus and cannot be positively identified. This probably explains why, in a proportion of cells in any smear from females, the sex chromatin is not visible. The limiting criteria we have used tend to give a low percentage incidence, but in our opinion greater accuracy of forecast.

In female smears the sex chromatin was usually first seen in one of the first five cells counted. As this finding occurred with such regularity we decided that a count of 25 cells was quite adequate for sex determination. This fact at first sight may not seem significant, but in the case of children, and more particularly of young infants, we have found great difficulty in obtaining smears in which more than 25 cells fulfilling the above essential criteria can be seen.

Summary

The examination of oral smears from 260 individuals, representative of a wide age and racial variation, has enabled their chromosomal sex to be determined with considerable accuracy. With increasing experience in assessment the diagnosis becomes progressively more accurate. The procedure is simple in its application and if necessary may be readily repeated.

The findings of previous workers have been confirmed, and a number of criteria established the use of which may help to standardize the method and ensure correct diagnosis.

We are indebted to Professor G. A. G. Mitchell, who permitted this investigation to be undertaken in the Department of Anatomy, and to the members of staff, students, and others who so willingly gave their co-operation. Our thanks are also due to Mr. P. Howarth, A.R.P.S., for the photomicrography.

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EFFECT OF CORTISONE ON THE DEFENCE MECHANISMS OF THE BODY

BY

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[WITH SPECIAL PLATE]

Many records have been published showing that cortisone depresses the reaction of the body to all common bacterial infections in both animals and man (Thomas, 1953). In the mouse it was found that cortisone increased the severity of a tuberculous infection (Hart and Rees, 1950), and in the human subject there is evidence that it may cause a quiescent tuberculous lesion to become active. Furthermore, cases of sudden death from acute fulminating pneumonia in patients with rheumatoid arthritis undergoing cortisone therapy have been reported. In a number of animal experiments the doses, weight for weight, exceeded those given

to patients, and it was thought that overdosage might account for some of the unfavourable results. Further clinical trials largely substantiated this view, and it is now accepted that severe intercurrent infection tends to occur only when very large doses are given. Wayne (1955) is of the opinion that the critical dose of cortisone in the human subject is in the region of 75 mg. per day, since nearly all patients receiving more than 100 mg. of the hormone daily develop some adverse side-effect.

Present Investigations

The research now described was designed to investigate the mechanism by which cortisone depresses the defences of the body, and also that by which it brings about improvement in certain diseases. Studies were therefore made of the effect of cortisone on (1) the phagocytic activity of the reticulo-endothelial system; (2) the total and differential leucocyte counts of the blood; and (3) the gamma-globulin level in the serum, which may be taken as the measure of the antibody level present, since most antibodies are found in association with the gamma-globulin fraction of the serum protein. All three are known to be important in defence against infection.

To study the effect of cortisone on the phagocytic activity of the reticulo-endothelial system 79 mature male guinea-pigs were used. Each received one daily subcutaneous injection of trypan blue for the last six days before being killed by chloroform, the dosage of the dye being calculated on the basis of 0.8 ml. of a 1% solution in distilled water for each 100 g. body weight. Seven of the animals were given dye only and used as controls. The remaining 72 were divided into three groups of 24 and given cortisone acetate (Roussel) once daily intramuscularly in addition to the dye. The animals in the first group each received 5 mg. of the hormone daily, those in the second 10 mg. daily, and those in the third 25 mg. daily, and all were killed in batches of six at the end of the first, second, third, and fourth weeks. These doses were planned to be proportionately much higher than those given therapeutically to the human subject. Specimens were taken from the spleen, liver, and lymph nodes and fixed in Heidenhain's "Susa." Sections were cut 10 μ thick and stained with weak eosin, dilute carbol fuchsin, or alum carmine. The degree of phagocytic activity was assessed by studying the intensity of the vital staining as judged by the number of dye granules seen within the cells. Only cells containing dye granules were regarded as belonging to the reticulo-endothelial system.

Twelve male guinea-pigs were used to investigate the effect of cortisone on the total and differential leucocyte counts and the gamma-globulin level in the serum. Each received 10 mg. of cortisone intramuscularly once daily for a period of five weeks. Blood samples were taken from each animal by heart puncture before treatment started and thereafter at weekly intervals, the blood films being stained with Giemsa's stain. The gamma-globulin level in the serum was estimated by first separating the gamma-globulin fraction by electrophoresis, then treating the electrophoretic paper with dye and estimating the optical density of the protein dye complex by means of a photoelectric cell. In this manner the percentage of the gamma globulin in relation to the total protein in the serum could be assessed.

Results

The phagocytic activity of the reticulo-endothelial system was greatly depressed in the animals which received cortisone treatment for one or two weeks, as indicated by reduced concentration of the dye in the macrophages of the spleen, liver, and lymph nodes compared with the appearances in the controls (Special Plate, Figs. 1-5). Moreover, the lymph nodes were atrophied and the mortality rate was high. Post-mortem examination of animals which died showed gross reduction in size of the lymph nodes and a slight reduction

in size of the spleen. No evidence of infection was found and the cause of death could not be determined. In contrast, the intensity of the vital staining in the animals given cortisone for three or four weeks was practically similar to that in the controls, indicating a recovery of the phagocytic activity of the reticulo-endothelial system (Plate, Fig. 6). In addition the lymph nodes showed signs of hypertrophy and the mortality was low.

The total and differential white cell counts were also found to be affected by cortisone. During the first two weeks of cortisone treatment the total leucocyte count fell from 8,700 to 4,200 per c.mm., owing to reduction in number of both lymphocytes and polymorphs. When the cortisone was continued for a further two weeks the total leucocyte count returned to normal, the number of polymorphs having increased, but the lymphocyte count remained at about one-quarter the normal.

The concentration of gamma globulin in the serum was reduced to about half the normal level during the first two weeks of cortisone injections, and remained at this low level during the succeeding three weeks of treatment. These results were obtained by the electrophoresis and scanning of 40 samples of guinea-pig serum.

Discussion

Our investigation has shown that large doses of cortisone greatly depress the phagocytic function of the reticulo-endothelial system during the first two weeks of treatment and that phagocytic activity returns to normal during the third and fourth weeks. The high mortality during the first two weeks of the hormone injections, together with the failure to find a definite cause for death at necropsy, suggest that the animals died of an acute fulminating infection with the minimal inflammatory signs, or more probably from the toxicity of the trypan blue, since the reticulo-endothelial system was depressed and its cells were unable to remove the toxic dye from the circulation. This initial depressive action of cortisone is in accord with the findings of White and Marshall (1951), who reported that cortisone inhibits the clearance of pneumococci from the blood of the rabbit. These findings suggest that it is during the early stages of treatment with cortisone in large daily doses that intercurrent infection is most likely to develop, and that during this time the patient should specially avoid exposure to infection and perhaps also be given antibiotics.

The atrophy of the lymph nodes which occurred during the first two weeks of cortisone treatment in the present animals coincided with the marked reduction in the number of circulating lymphocytes. Dougherty and White (1945) also reported rapid atrophy of lymphoid tissue after cortisone treatment, and believed it to be due to increased destruction and also reduced production of lymphocytes. The return of the lymph nodes to normal or above normal size when cortisone was continued for four weeks indicates that the initial atrophy is followed by rapid recovery. The persistence of the low lymphocyte count may be due to delay in the appearance of new lymphocytes in the general circulation.

The depression of the serum gamma globulin in the present experiments is in agreement with the results of Bjørneboe *et al.* (1951), who showed that in the rabbit cortisone inhibits the production of antibodies during active immunization and also after immunization is well established. Further, the persistence of a low gamma-globulin level in the serum and a low lymphocyte count in the circulating blood during the third and fourth weeks of cortisone treatment in the present researches suggest that in the guinea-pig the lymphocytes are probably important in relation to antibody formation. This is in agreement with Dougherty *et al.* (1944) and Harris *et al.* (1945), who reported that lymphocytes contain antibody protein. On the other hand, in the human subject Larson and Tomlinson (1951) and Havens *et al.* (1952) have shown by immunization experiments that cortisone in therapeutic doses does not inhibit

antibody production. The lowered antibody level in animal experiments is probably due to the very high doses of cortisone administered. The effect of cortisone and corticotrophin on the leucocytes of the blood in animals, healthy human subjects, and patients with diseases not primarily of the haematopoietic system has been described by many workers (Quittner *et al.*, 1951; Hills *et al.*, 1948; Kellgren and Janus, 1951; Rebuck and Mellinger, 1953). It would appear that these hormones are capable of producing a decrease in the number of circulating eosinophils and lymphocytes and an increase in the number of neutrophils. The present results in the guinea-pig show that during the first two weeks of cortisone treatment both lymphocytes and polymorphs become markedly reduced in number, but when the hormone is continued for a further two weeks the lymphocytopenia persists while the polymorph count rises steadily until it exceeds the normal level. The increased number of polymorphs in the blood during the third and fourth weeks of treatment does not, however, necessarily ensure that their defence function is normal, for Crepea *et al.* (1951) found that neutrophils in the blood obtained from patients under cortisone therapy exhibited decreased phagocytic activity for Type I pneumococci. Furthermore, Robinson and Smith (1953) showed in the rabbit that cortisone inhibits the accumulation of polymorphonuclear leucocytes at the site of infection. Cortisone therefore appears to be capable of reducing the defence functions of the polymorphs, not only in the blood stream, but also at the site of inflammation.

Summary and Conclusions

Animal experiments were carried out to investigate the mechanism by which cortisone depresses the defences of the body, and also that by which it brings about improvement in certain diseases. The conclusions drawn indicate that cortisone lowers the body defences by depressing the phagocytic activity of the reticulo-endothelial system, the total and differential white cell counts in the blood, and the gamma-globulin level in the serum. Its beneficial use in certain diseases is probably due to a similar mechanism whereby it depresses the inflammatory reaction of the patient and thus holds in check the cycle of pathological changes. This is well illustrated in cases of tenosynovitis and iridocyclitis, in which the use of cortisone reduces the inflammatory response and prevents the formation of adhesions while the infecting organisms can be attacked therapeutically with antibiotics. It would seem desirable, whenever possible, to give cortisone locally rather than systemically, in order to limit the depression of the defence mechanisms.

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PERIPHERAL NEURITIS IN
MYELOMATOSIS

BY

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[WITH SPECIAL PLATE]

In myelomatosis there is a high incidence of neurological lesions. Neurological abnormalities were reported by Geschickter and Copeland (1928) in 40% of 425 cases, by Batts (1939) in 35% of 40 cases, by Adams *et al.* (1949) in 35% of 61 cases, and by Snapper *et al.* (1953) in 40% of 97 cases. The commonest type of lesion is direct compression of nervous tissue or its blood supply by a pathological fracture or tumour mass (Davison and Balser, 1937; Clarke, 1954). Occasionally vascular thromboses or haemorrhages due to gross abnormality of serum globulin occur (Wintrobe and Buell, 1953; Marshall and Malone, 1954). Rarely the meninges, and with them cranial or peripheral nerves, are infiltrated by direct spread from tumour tissue (Sparling *et al.*, 1947). Extramedullary deposits of myeloma, which have been found in most organs, have not been reported in nervous tissue.

Peripheral neuritis, distinct from these mechanical or vascular lesions, also occurs in myelomatosis. Senator (1899) reported a case with bulbar palsy for which no anatomical cause was found. Scheinker (1938) described the case of a man of 39 with a solitary myeloma of the sternum who had a painful progressive peripheral neuritis. This patient also developed two large patches of thickened, deeply pigmented skin on the anterior chest wall. Scheinker postulated a specific "toxic" metabolite of myelomatous tissue which affected skin and peripheral nerves, and he suggested that in many cases the pain of myelomatosis is due to a "toxic disease" of the nerves. Davison and Balser (1937) reported a case of multiple myelomatosis in a woman of 49 who had a painful peripheral neuritis mainly affecting the arms. There was an iron-deficiency anaemia (haemoglobin 50%), and they attributed the neuropathy to the "severe secondary anaemia" or to "unknown toxic factors." Kurnick and Yohalem (1948) described extensive painful peripheral neuritis in two cases of multiple myelomatosis, and regarded the neuropathy as comparable with that which occurs in "some metabolic diseases such as diabetes and pernicious anaemia." Snapper *et al.* (1953) mention four cases with "glove and stocking" type of peripheral neuritis, and also several cases showing "striking atrophy of the interosseous muscles and the musculature of the arms without other evidence of neurological involvement." One of Brewer's (1948) cases had "some loss of feeling in the hands and feet."

The purpose of this paper is to report two further cases of myelomatosis with peripheral neuritis and other striking features.

Case 1

In May, 1953, a married man aged 54, who worked as a lorry driver, developed sudden pain and limitation of movement in the right shoulder without preceding trauma. These symptoms subsided in a few weeks, but mild intermittent pain persisted. About the end of 1953 a painless swelling

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appeared in the region of the right acromion process and slowly increased in size. During that year his wife was concerned about a darkening of his skin and noted a "shininess" of his finger-nails.

In February, 1955, he first experienced a sensation of coldness and prickling in both feet with pain on walking. Thereafter weakness of the ankles and increasing numbness of the lower legs developed. Pain in the feet occurred even at rest, and there was oedema of the ankles in the evening. During the first half of 1955 he lost 17 lb. (7.7 kg.) in weight. On July 28 he was admitted to the Bristol Royal Infirmary. He complained of rapid increase in weakness, numbness, pain, and hyperaesthesia of the legs, now extending to the knees, and also the recent development of paraesthesiae and weakness of the hands. He had a good appetite and took a normal mixed diet with very little alcohol. There were no gastro-intestinal symptoms. The only previous complaints of note were a carpal tunnel syndrome of the left hand, which was completely relieved in May, 1948, by division of the flexor retinaculum, and an identical syndrome of the right hand early in 1953, which was only partially relieved by operation in March of that year.

The salient findings were as follows. General wasting; diffuse skin pigmentation of a dark grey-brown colour, most marked distally on the limbs, on the neck, and in the axillae; moderate clubbing of fingers and toes; increased opacity and pallor of the proximal three-quarters of all the finger-nails with loss of normal lunulae (Special Plate, Fig. 1); hyperhidrosis of palms and soles; soft oedema of legs. There was a painless, soft, fluctuant swelling over the right acromion process, over which the skin was hot, red, and shiny. In the right supraclavicular fossa were several enlarged, rubbery, discrete lymph nodes, and there was one smaller similar node in the left supraclavicular fossa. There was a severe peripheral neuritis with marked wasting and weakness of all the small muscles in both hands and of the finger flexors and anterior tibial muscles. Foot-drop was complete. In the upper limbs the only sensory change was loss of vibration sense in the hands, but in the lower limbs there was impairment of all sensation below the ankle-joints with extreme hyperaesthesia of the soles and calves. Deep reflexes could just be elicited in the arms, but were absent in the legs. The gait was "stepping" with sensory ataxia.

After his admission the peripheral neuritis progressed rapidly. Spontaneous pain and hyperaesthesiae were severe. Both sensory loss and weakness increased in severity, and extended proximally so that after three weeks he was unable to stand unsupported and had difficulty in shaving. Radiographs of the right shoulder were reported on as follows: "There is a multiloculated lesion involving the outer two-thirds of the spine of the right scapula and extending into the acromion process. It shows expansion of the bone and sclerosis at the margins of the translucent areas. There is a pathological fracture in the region of the base of the acromion process." (Plate, Fig. 2.) Radiographs of the rest of the skeleton revealed small, well-defined translucencies with sclerotic margins in the right ischium and left ilium. The chest was normal. There was no abnormality of the blood count, serum calcium or phosphorus, blood urea, fractional test meal, or five-day fat balance, and there was no proteinuria at any time. The E.S.R. was 11 mm. in one hour (Wintrobe). The serum proteins were 6.3 g. per 100 ml. (albumin 4.2 g., globulin 2.1 g.) with a normal electrophoretic pattern. In the cerebrospinal fluid there was increased protein, 264 mg. per 100 ml. on July 9 and 400 mg. per 100 ml. on September 10. The sternal marrow was normal, but that from the iliac crest contained 7% plasma cells.

A lymph node from the right supraclavicular fossa and a solid soft-tissue tumour arising from the right scapular spine were removed for histological examination. The tumour was a plasma cell myeloma, and in the node there was complete replacement of normal lymphatic tissue by myeloma cells.

Intensive parenteral vitamin therapy had no effect. At the end of September, 5 millicuries of radioactive phosphorus was given followed by radiotherapy, 500 r $\times$ 2 to each supraclavicular fossa and 300 r $\times$ 5 to the right scapula. During radiotherapy the neuropathy continued to extend, but the pain and hyperaesthesiae of the extremities were a little improved. Within a few weeks of his discharge from hospital on October 5, however, spontaneous pain recurred.

On December 14, 1955, he was readmitted. Pain in the limbs was now very severe, consisting of a constant painful tingling, with frequent exacerbations which occurred spontaneously or in response to minor external stimuli. There was no change in the physical signs apart from slight progression of the neuropathy. Blood count, E.S.R., and levels of serum calcium and phosphorus, plasma proteins, and blood urea were unchanged and there was no Bence Jones proteinuria. Hepatic function tests showed no abnormality. The C.S.F. protein was 150 mg. per 100 ml. with only slight increase in globulin. Radiographs showed the scapular fracture to be united and consolidated with some new bone formation. There were two small osteolytic lesions in the ribs and an increase in size of the pelvic lesions. Biopsy of skin, muscle, and sensory cutaneous (sural) nerve from the calf showed no significant abnormality.

The patient was given a course of injections, by slow intravenous drip, of 2-hydroxystilbamidine di-esethionate, totalling 2.8 g., in three weeks. The pain in the limbs was dramatically and completely relieved, improvement beginning within 48 hours of the first dose. Coincident with the relief of pain there was a considerable improvement in his general well-being but no significant change in the neurological signs. At the time of writing he is still free from pain and claims to be much better, but there is no objective improvement.

Case 2

A widow of 67 lost over 2 stones (12.7 kg.) in weight in the early months of 1954, but she felt well until May, when she began to have a sensation of coldness and tingling in both hands. Shortly afterwards painful paraesthesiae, hyperaesthesiae, and numbness of the feet with sensory ataxia developed. Towards the end of 1954 she became aware of dusky discoloration of the hands and feet and had paraesthesiae of the lips, while her hands and feet became weak and more painful and her gait more ataxic. Oedema of the ankles also developed. Her diet was normal, she had no gastro-intestinal symptoms, and never took alcohol. When first seen in December, 1954, there was pigmentation of the limbs. All modalities of sensation were impaired peripherally in the limbs and all the deep reflexes were absent, but there was no demonstrable weakness. Radiography of the chest revealed a well-circumscribed soft tissue shadow anteriorly in the upper mediastinum, and bone destruction of the lower two-thirds of the sternum with new bone formation on the anterior surface. The appearances were thought to indicate an osteogenic sarcoma of the sternum with a secondary lesion in the mediastinum.

She was admitted to the Bristol Royal Infirmary on February 24, 1955. She had been given intensive therapy with aneurin hydrochloride during the previous eight weeks, but there was no change in her neurological state apart from the development of weakness of the small muscles of the hands. The pigmentation of the skin, a dusky greyish-brown, was more marked and was most prominent distally on the limbs. There was oedema of the ankles. Apart from a slight prominence of the sternum at the level of the third costal cartilage there was no clinical evidence of the sternal or mediastinal tumour. The sternum was not tender. The relevant investigations were as follows. Blood count normal; E.S.R. (Wintrobe) 6 mm.; blood Wassermann negative; fractional test meal normal; serum proteins 7.4 g. per 100 ml. (albumin 3.9 g., globulin 3.5 g.). There was a trace of protein in the urine but no Bence Jones proteinuria. The C.S.F. protein was 80 mg. per 100 ml. Radiographs showed no change in the mediastinal or sternal lesions and no abnormality in the rest of the skeleton. A

pyruvate tolerance test gave normal results. Biopsy specimens from the sternal tumour showed it to be a highly cellular plasma-cell myeloma.

In April, 1955, the patient was treated with radiotherapy, 2,500 r $\times$ 10 to the sternum, and vitamin therapy was continued. There was no change in her symptoms or signs until six months after radiotherapy, when her symptoms began to improve, although no change in the objective signs took place. At the same time enlarged discrete rubbery glands became palpable in the axillae and the lateral chest wall, the serum proteins were abnormal (albumin 3.5 g., globulin 4.0 g. per 100 ml.), and there was increasing albuminuria with casts in the urine. From this time she refused further treatment and all investigations except blood examination.

In February, 1956, she was almost symptom-free and her general condition was maintained, but there was no objective change in the neuropathy or the pigmentation.

Review of Earlier Cases

Prompted by the unusual features of these cases, the records of 14 other consecutive cases of myelomatosis admitted to the Bristol Royal Infirmary between 1950 and 1955 were reviewed. Two of these had features suggesting peripheral neuritis. One patient, a woman of 62, had complained of tingling of the fingers, numbness below the knees, and painful feet for one year before admission. The other, a man of 58, was found to have "particularly noticeable" wasting of the small muscles of both hands, although no reflex or sensory abnormality was noted. There is a close resemblance between the latter case and those mentioned by Snapper *et al.* (1953). Skin pigmentation and clubbing were not found in any of these patients.

Comment

The initial radiological appearances were not characteristic of myelomatosis in either Case 1 or Case 2, and a diagnosis was reached only after biopsy. The high incidence of atypical radiological findings has been stressed in recent reviews of this disease (Bayrd and Heck, 1947, and others), and the diagnostic difficulties encountered have been well reviewed by Heiser and Schwartzman (1952).

In both cases there was lymph-node involvement. This occurrence in myelomatosis, though infrequently mentioned in the literature, is not rare. Churg and Gordon (1950) found such involvement in 18 of 28 consecutive necropsies, and in five of these cases superficial lymph nodes were affected.

Pigmentation was striking in both cases. It was a uniform greyish-brown most marked on the extremities and neck and in the axillae. It is interesting that in Scheinker's case with peripheral neuritis there were localized patches of thickened, deeply pigmented skin. The only other writers to comment on pigmentation in myelomatosis are Adams *et al.* (1949), who describe a "peculiar dusky sallow" coloration associated with the pallor of anaemic cases, but pigmentation is noted without comment in a number of case reports (Geschickter and Copeland, 1928: Case 3; Stewart and Parkes Weber, 1938: Case 3). This pigmentation is probably akin to that seen in malignant disease, which in spite of advances in our understanding of abnormal pigmentation is still unexplained (Lerner, 1955).

Mendlowitz (1942) in his exhaustive review of finger-clubbing did not mention myelomatosis as a cause, but Snapper *et al.* (1953) noted the presence of clubbing of the fingers in a few cases in their large series. In Case 1 clubbing developed before the onset of symptoms. There was no accompanying pulmonary, mediastinal, hepatic, or intestinal disease. The curious "white nails" seen in this case were also reported in myelomatosis by Snapper *et al.*, and have been described by Terry (1954) as occurring in hepatic and other diseases, including malignant states.

Discussion

From the scanty references in the literature and the present two cases there can be no doubt that peripheral neuritis occurs in association with myelomatosis. The finding of two

suggestive cases in a retrospective survey of 14 others may indicate that the occurrence is not very uncommon. There is nothing distinctive about the nature of the neuropathy. In the present cases, as in most of those previously reported, spontaneous painful paraesthesiae and cutaneous and muscular hyperaesthesiae were prominent features. But in Case 1 the condition was predominantly motor, while in Case 2 it was almost entirely sensory. In Case 1 it advanced steadily, whereas Case 2 improved spontaneously even though the myelomatosis was progressing. In neither case was there any response to treatment with vitamins or radiotherapy, nor in Case 1 with radioactive phosphorus.

The pain of the peripheral neuritis in Case 1 was dramatically relieved by stilbamidine. A similar effect is recorded in two cases by Kurnick and Yohalem (1948). This lends some support to Scheinker's suggestion that the pain of myelomatosis may be neurogenic, for stilbamidine frequently relieves the pain, which is the commonest symptom of this disease.

Both cases showed an increase of protein in the C.S.F. In the cases with peripheral neuritis reported by others the C.S.F. protein has been recorded as normal in two (Davison and Balser, 1937; Kurnick and Yohalem, 1948) and raised (200 mg. per 100 ml.) in one (Scheinker, 1938). In myelomatosis, however, an elevated C.S.F. protein, unrelated to neurological or vertebral involvement, is not an uncommon finding (Degenhardt and Sheehan, 1949) and is probably often a general manifestation of the disease (Madonick and Solomon, 1953).

Little is known of the pathological changes. Scheinker (1938) described an unusual proliferation of connective tissue in the peripheral nerves of his case, and a similar proliferation in the affected areas of skin. Davison and Balser (1937) found degeneration of anterior horn cells and patchy demyelination and axon degeneration in peripheral nerves. The biopsy specimen in Case 1 revealed no abnormality of skin or sensory nerve.

Abnormal protein metabolism was considered as a possible cause of this neuropathy, since amyloidosis of the "primary" type is a not uncommon complication of myelomatosis (Lichtenstein and Jaffe, 1947; Kolff and Dhont, 1948) and "primary" amyloidosis can cause peripheral neuritis (Navasquez and Treble, 1938; Kernohan and Woltman, 1942). In neither case, however, was there any clinical evidence of amyloidosis, and in Case 1 biopsy revealed no amyloid in skin, muscle, peripheral nerve, or their blood vessels. The Congo-red absorption test was not carried out, as it is not applicable to this pathological type of amyloidosis (Snapper *et al.*, 1953).

It is tempting to relate this neuropathy to that occurring in bronchogenic carcinoma (Lennox and Prichard, 1950; Henson *et al.*, 1954). Such "carcinomatous neuropathies" have shown very similar features and they often run a course unrelated to the course of the underlying disease, a peculiarity observed in Case 2. But the only apparent common factor in the two diseases is that both are neoplastic. It is true that both Bence Jones proteinuria and plasmocytosis have been reported in bronchogenic carcinoma (Hughes, 1954), but such occurrences are very rare and appear to bear no relation to carcinomatous neuropathy.

Although no explanation can be offered to account for the neuropathy nor for the pigmentation and clubbing in these patients, it is hoped that this account of such an unusual association may lead to the recognition and study of further cases.

Summary

The types of neurological involvement in myelomatosis are briefly surveyed and the literature concerning peripheral neuritis in myelomatosis is reviewed. Two cases are described in which myelomatosis (proved by biopsy) was associated with peripheral neuritis and diffuse pigmentation of the skin. One case had in addition clubbing of the fingers and toes and increased opacity of the finger-nails.

A retrospective survey of 14 other cases of myelomatosis revealed two cases with features of peripheral neuritis. It is suggested that this complication of myelomatosis may not be rare.

The clinical and pathological features of this type of peripheral neuritis are considered, but no distinctive characteristics can be ascribed to it. Similarities to reported cases of peripheral neuropathy complicating bronchial carcinoma are pointed out.

The pigmentation and "white nails" are regarded as being features of the underlying malignant disease, although the mechanism of their production is unknown.

The dramatic relief of neuritic pain by treatment with stilbamidine in one case supports the theory that the pain of myelomatosis is neurogenic.

I am indebted to Dr. J. A. Cosh for permission to follow up and to publish Case 2; to Dr. R. M. Norman for special studies of the nerve biopsy in Case 1; to Dr. F. G. M. Ross for radiological reports on Case 1; and to the Medical Photographic Department, University of Bristol, for the photographs. My thanks are especially due to Dr. A. M. G. Campbell for permission to publish Case 1 and for much help and advice.

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"Francis Galton once showed that, in the British peerage, wealth in women was correlated with infertility. An heiress by definition comes of an infertile family, for otherwise there would be many to share her wealth, and many noble families have become extinct through the love of heiresses whose riches were matched by their infertility. We may now put forward another rule, that not only wealth but also nobility in women is likely to be associated with infecundity. Attractive girls will usually marry, and the fecund will have large families while the less fecund will do their best and will certainly leave some descendants in future generations. Unattractive but highly fecund girls will be less likely to marry; but those that do will have plenty of children so that, as a group, the unattractive but fecund will also leave descendants. However, the group that is both unattractive and infecund will be at a double disadvantage and so will tend to be under-represented in future generations. Consequently, in each generation, owing to the elimination of this last group, we would expect to find that the mean fertility of nubile and attractive mothers should be below that of the less attractive."—C. B. GOODHART, *Nature*, September 15, 1956.

RENAL TUBULAR OSTEOMALACIA TREATMENT OF A CASE WITH DIHYDROTACHY- STEROL AND MANAGEMENT OF A SUBSEQUENT PREGNANCY

BY

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[WITH SPECIAL PLATE]

In the first careful metabolic study of so-called resistant rickets Albright *et al.* (1937) described the case of a 16-year-old boy who was known to have had rickets for 14 years despite repeated therapy with what had been considered adequate doses of vitamin D. The metabolic abnormalities—inability to absorb normal quantities of calcium and phosphorus from the diet, hypophosphataemia, and a high plasma alkaline phosphatase content—as well as the radiological signs were characteristic of long-standing classical rickets. However, the abnormalities could be reversed only by increasing the daily dose of vitamin D to 450,000 i.u. (11.25 mg.). Since then sensitivity to vitamin D has also been reported in increasing numbers of cases of a somewhat different syndrome in which renal damage was accompanied by an osteodystrophy. Thus Liu and Chu (1943) reported five cases of renal failure with uraemia in which osteodystrophy ("osteomalacia") was accompanied by lack of response to calciferol in a daily dosage of up to 60,000 i.u. (1.5 mg.), whereas "A.T.10" (dihydrotachysterol), 3 ml. a day (containing presumably 3.75 mg.), was markedly effective in promoting a positive calcium balance in both of the patients given this therapy.

Albright and Reifenstein (1948) recognized another renal osteodystrophy in which the renal tubules were damaged more than the glomeruli ("renal tubular insufficiency without glomerular insufficiency"). Failure of renal tubular action in such cases is shown by impaired ability to produce an acid urine or ammonia. This leads to acidosis and hypercalciuria, which in turn causes subsequent development of osteomalacia, without, however, conspicuous signs of nitrogen retention or other signs of chronic renal failure. Dent (1952) presented a new classification of the various types of renal rickets (or osteomalacia) (see also Jackson and Linder, 1953), according to which the renal damage is either mainly glomerular or else mainly or purely tubular. The tubular conditions are then subdivided into six types, which are similar to each other in showing a high renal clearance for phosphate, but differ in the extent of further renal tubular damage. Thus Type 2 shows glycosuria and Type 3 glycosuria and aminoaciduria, and Types 4-6 show an inability to acidify urine.

Recently an opportunity occurred of studying in detail a case which could be described as one of Dent's Type 1 renal tubular osteomalacia. The case was of particular interest in several respects. The patient presented at the age of 19 in an early stage of the disease, and the diagnosis was made elsewhere before any marked bony deformities had occurred. Within a year after treatment was instituted at University College Hospital her symptoms and signs had been completely relieved, she had married, carried a pregnancy to full term, and been delivered normally of a healthy son.

A search of the literature reveals few other cases of this disease. McCance (1947) described a girl with a

similar condition, which he attributed to raised resistance to vitamin D acquired at about the age of 15 years. He considered that cases described by Leedham-Green and Golding (1937-8), Michaelis (1932), and Monier-Vinard (1940) were probably similar, although proof by calcium-balance studies or cure with massive doses of vitamin D was never demonstrated.

Dent and Harris (1956) have extended and reconsidered the classification of the various hereditary forms of rickets and osteomalacia. The patient whose case is now reported has the disease which they briefly describe under the heading "Severe osteomalacia presenting in early adolescence or adult life and very closely mimicking deficiency of vitamin D," and is included among the four cases they quote as having studied personally. They note that this clinical variety is conspicuous for the severity of the signs and symptoms and for its usual intractability to treatment.

Case History

A 19-year-old girl clerk was referred to Dr. Dent at the Metabolic Ward of University College Hospital by Dr. T. D. Kellock, of the Connaught Hospital, Walthamstow. During her school life she had been healthy, she had been athletically inclined, played tennis and swam, and competed well with others in her class. She left school at 16. Three months later she began to experience dull aching pains in both hips. At first this was no more than a "stiffness" which would wear off with exercise, and she was able to carry on with her work for another two years, during which, however, the pains became much more severe. At 18 she fell down the stairs, but suffered no ill effects other than mild concussion. Two months later her lower ribs began to ache and were tender on palpation, this being especially noticeable on turning over in bed. She also developed a low backache which was worse after walking or stooping; it did not radiate. She sought advice for these symptoms and was seen at the Connaught Hospital at 18½, when she was found to have osteomalacia with "typical Looser's zones in several ribs and in the pelvis." She was treated with calciferol, 10,000 units (0.25 mg.) intramuscularly per day and calcium lactate, 30 g. orally per day, and after six weeks on this regimen she was a little better, but her symptoms recurred when treatment was stopped.

At the age of 19, in December, 1954, she was admitted to the Metabolic Ward at University College Hospital. She then had all the symptoms described above. Her activities were severely restricted by the pains in her hips and she had developed a waddling gait. On rising to walk she was obliged to wait a few minutes before setting off, as she felt unsteady on her feet. She had not actually been subject to falls, however. Her description suggested that some muscular weakness was present, but it was difficult to decide whether the waddling gait was due to this or to the associated pain on walking. Her appetite had been a little diminished in the previous year and her weight had fallen from 9 st. 10 lb. (61.688 kg.) to 8 st. 6 lb. (53.524 kg.). She had no particular food fads. There were no abnormalities of urinary, bowel, or menstrual function. She had noticed no loss of height. Her other past history was non-contributory. She had four older siblings; all were healthy, and there was no family history of bone disease.

Clinical Examination

She was a healthy-looking young woman with no abnormalities in the cardiovascular, respiratory, or alimentary system. Her height was 63½ in. (1.613 m.); crown to pubis, 30½ in. (0.744 m.); pubis to heel, 32½ in. (0.825 m.); span, 65½ in. (1.663 m.). These body proportions suggest some recent loss of trunk length. There were no stigmata of old rickets and no bone deformities. The sternum, lower ribs, and vertebrae were tender to palpation. External rotation

and abduction of the right hip were slightly limited by pain, but there was no limitation of movement of other joints. A sustained ankle clonus could always be elicited on each side, but no other abnormalities were found in the central nervous system. Muscular power was good and there was no wasting.

Investigations

Plasma sodium 140, potassium 5.4, chloride 102, and bicarbonate 22.8 mEq per litre; calcium 10.4 and phosphorus 2.1 mg. per 100 ml.; alkaline phosphatase 22.5 King-Armstrong units.

On routine urine examination no abnormalities and no reducing substances were found. A standard amino-acid chromatogram revealed a marked excess of glycine but no generalized aminoaciduria. The pH of an early morning urine sample was 5.16. Blood urea, 33 mg. per 100 ml.; standard urea clearance, 91% and 70%. Urine concentration and dilution tests gave specific gravities of 1024 and 1002 respectively. Maximum urea concentration, 3.8%. The phosphate clearance was persistently high for the plasma level, and the phosphate T_m (maximal tubular excretory rate) low. The measurements of phosphate excretion before and after dihydrotachysterol treatment will be reported elsewhere (Anderson, Dent, and Senior: in preparation).

A six-day fat-balance study showed 97% absorption on a diet containing 68 g. of fat per day.

Radiological examination showed well-formed bones with a very slight degree of decalcification of the central bones. Looser's zones were present in the ischial rami and in ribs R 2, 10, and 11 and L 11 (Special Plate, Figs. 1 and 2). The renal outlines were normal and there was no nephrocalcinosis. There were no signs of hyperparathyroidism.

Course and Treatment

A diagnosis of renal tubular osteomalacia (Dent, Type 1) of recent acute onset was decided upon and confirmation of this was sought by calcium-balance studies. Full details of the results will be published later, when it is hoped to review this particular syndrome more fully, but may conveniently be summarized here. During two six-day control periods the faecal calcium was high and urine calcium low, and there was a very slightly positive balance. Treatment with pure dihydrotachysterol, 5 mg. a day for 13 days, then 2.5 mg. a day for 10 days, was given, followed by a maintenance dose of 1.5 mg. a day. The faecal calcium rapidly fell to very low levels, the urine calcium rose to high-normal levels, and the positive calcium balance increased to about 600 mg. a day. The plasma phosphorus level rose from 2 to over 3 mg. per 100 ml. There were no marked changes in levels of plasma urea, bicarbonate, or calcium.

During the first two weeks of treatment she experienced some curious feelings of stiffness in various parts of the body. These then disappeared, and on February 8, 1955, after 31 days of treatment, she was discharged on a daily maintenance dose equivalent to 1.25 mg. of dihydrotachysterol taken in the form of two capsules of crude A.T.10. She was then in much better clinical condition; the waddle in her gait had greatly diminished and her aches and pains almost completely gone. Radiographs showed the formation of callus around the pseudo-fractures (Special Plate, Figs. 3 and 4). She married the following month, having been told there was now no clear contraindication to such a step. She has remained to date (January, 1956) on the same maintenance dose of A.T.10, and has been virtually symptom-free since her discharge. Her gait has become normal and x-ray examination has shown progressive healing of the pseudo-fractures.

Pregnancy and Puerperium

In April, 1955, she became pregnant; the pregnancy was uneventful, and no symptoms developed other than occasional "heartburn" in the last month. It was decided

that she should be allowed to have a natural labour in the Obstetric Hospital under the care of Professor Nixon. On December 28, two weeks before the expected date of delivery, she gave birth per vaginam to a 7½-lb. (3.4 kg.) boy, after an uneventful labour. At the time of delivery blood was obtained from the mother and from the umbilical cord of the infant. Plasma values were as follows:

	Calcium (mg. per 100 ml.)	Phosphorus (mg. per 100 ml.)	Alkaline Phosphatase (King-Armstrong Units)
Mother	10.0	3.2	22.5
Infant	11.7	4.9	11.9

The puerperium was uneventful. On January 5 the infant's plasma was found to contain 10.0 mg. of calcium and 7.3 mg. of phosphorus per 100 ml., and 12 K.-A. units of alkaline phosphatase. Mother and infant were discharged on January 7, the former still continuing on the same maintenance dose (1.25 mg. per day) of A.T.10. Lactation was suppressed by stilboestrol, starting with a dose of 18 mg. a day on the day of delivery and being steadily reduced to nil during the next 16 days.

Discussion

This case presents several features of particular interest. It fits in very well with Type I renal tubular osteomalacia of Dent (1952) in that it had clinical, biochemical, and radiological evidence of osteomalacia with a renal-tubular loss of phosphate ion. The production of an acid urine was possible, but there was no glycosuria or general aminoaciduria apart from an excessive excretion of glycine. The amino-acid excretion is considered by Dent and Harris (1956) to be characteristic of the condition. The patient's athletic record, as well as her build and radiological appearances, leave little doubt that she was a normal, healthy adolescent until the age of 16, when her calcium and phosphorus metabolism must have undergone a sudden change. The onset of symptoms was gradual but characteristic. Vague pains in the thighs, hips, and back were first attributed to "rheumatism." Later the lower ribs became tender and she developed a waddling gait. The latter symptom is frequently seen in any form of osteomalacia; it was also described by McCance (1947) and by Leedham-Green and Golding (1937-8) when reporting cases clinically resembling the present one. The latter authors also referred to hesitation before walking, as was present in this case. The cause of these two symptoms remains obscure, but they may be the earliest signs of the muscular weakness which is usually a more marked feature of the condition.

That the patient fell down the stairs was fortunate in leading to x-ray examination of her bones; pseudo-fractures were found in otherwise comparatively normal bones, enabling an early diagnosis to be made. These pseudo-fractures are the zones of reconstruction (Umbauzonen) described by Looser (1920), and considered by Dent and Hodson (1954) to be signs of any relatively acute form of osteomalacia. There is as yet no accepted explanation of why and where the zones appear, although recently Le May and Blunt (1949) and Steinbach *et al.* (1954) claim to have shown that they are caused by the pulsations of arteries which they have demonstrated to be overlying them.

The nature of the disease was confirmed by the calcium-balance and other biochemical investigations. A plasma alkaline phosphatase definitely higher than normal was found on admission and taken to suggest biochemical disease of bone. No renal glomerular damage could be detected, and a mild metabolic acidosis was accompanied by a low plasma phosphate level, presumed to be due to a low renal threshold for phosphate ion, a low urine calcium, and a high faecal calcium. These findings are also characteristic of the other forms of rickets and osteomalacia which mimic vitamin-D deficiency without being caused by it, and are

therefore often called "resistant rickets or osteomalacia." Treatment, first in the form of pure dihydrotachysterol and then of A.T.10, cured the symptoms, raised the plasma phosphorus level (and presumably the renal threshold for phosphate ion), established a large positive calcium balance, and led to calcification of the Looser zones. With treatment the plasma alkaline phosphatase value also fell to normal, to rise again only during pregnancy; even then it did not rise above the level considered normal for pregnancy by Beck and Clark (1950). It had returned almost to normal a week after delivery. The excellent clinical response occurred in spite of the customary statement on the bottle of A.T.10 that "this substance has no antirachitic action." The current view in this laboratory is that dihydrotachysterol has excellent antirachitic action in the human subject and can be considered in every way as a form of vitamin D. No alkali was given and the degree of acidosis remained unchanged throughout, indicating that the acidosis is not the cause of the bone changes.

The diagnosis was made by Dr. Kellock and the patient subsequently treated by us before any significant deformities had occurred, so that after treatment she had no residual disability. Her pelvis was obstetrically satisfactory and her labour uneventful.

Early diagnosis and treatment can hardly be more rewarding, and their advantages need no further stressing. Failure to diagnose and treat this condition, however, results in rapid progression with development of deformities which are crippling (Dent and Harris, 1956) and irreversible.

It is not yet clear whether this type of adolescent osteomalacia is inherited. There was certainly no family history in this case. Even if the infant of an affected mother should develop the same disease in adolescent life, it would still probably be normal at birth and for the first few years of life. In the present case there was the further danger, however, that the treatment of the mother with dihydrotachysterol might affect the infant by causing a hypercalcaemia. The first analyses of the plasma of the infant were therefore awaited with some anxiety, and the cord blood, when obtained, showed a high calcium and low alkaline phosphatase content, suggesting a degree of vitamin-D intoxication. Hallman and Salmi (1953) have, however, shown that blood plasma travelling from the placenta to the foetus has a calcium content of 11-13 mg. per 100 ml. Clinically the infant thrived, and a week later its plasma values were normal. Its progress will now be followed with great interest and less anxiety.

It was considered highly undesirable that the mother should breast-feed the infant, since this would presumably greatly alter the calcium metabolism and consequently affect the requirement of A.T.10. Lactation was therefore suppressed by the method in routine use at the Obstetric Hospital.

The basic aetiology of this condition remains obscure, and no new suggestions are put forward here. The object of this paper is to describe the condition and to indicate how beneficial are the results of early diagnosis and therapy, even when there is the added strain of pregnancy.

Summary

A case is described in which a healthy adolescent girl suddenly developed renal tubular osteomalacia. She also showed some of the metabolic features of vitamin-D deficiency. These were reversed by oral administration of pure dihydrotachysterol and later A.T.10, resulting in rapid clinical and radiological improvement. Early therapy, before the development of deformities, resulted in complete functional cure, and she was able to sustain a normal pregnancy, labour, and delivery within 12 months of her first admission to hospital.

I wish to thank Dr. C. E. Dent for permission to publish this case and for his encouragement in the preparation of this paper.

My thanks are also due to Professor W. C. W. Nixon for supervising the patient's pregnancy and delivery, and to Messrs. Merck (Darmstadt) for a gift of pure crystalline dihydrotachysterol.

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Medical Memoranda

Acute Haemorrhagic Leuco-encephalitis

Few cases of this condition have been reported since Weston Hurst (1941) described two cases of fatal encephalitis with specific macroscopic and microscopical appearances of the brain, which he named "acute haemorrhagic leuco-encephalitis." The disease consists of an encephalitis of acute onset, which is usually but not necessarily preceded by a prodromal upper respiratory infection. This is followed in some cases by a period of apparent recovery, before the onset of neurological symptoms leading to coma. In the cases reported the prodromal period had varied from 0 to 15 days, the intervening period from 0 to 11 days, and the neurological stage from 2 to 6 days, terminating fatally.

Post-mortem examination of the brain shows lesions confined almost entirely to the white matter of one or both cerebral hemispheres, but these may extend to the white matter of other parts of the brain. Some parts show only microscopical involvement. Macroscopically there are haemorrhages varying in size from pin-point up to a few millimetres in diameter. They are confined almost solely to the white matter and are associated with oedematous swelling of the adjacent tissues. Microscopically there are characteristic lesions: (1) perivascular ring and ball haemorrhages; (2) serous exudates; (3) perivascular polymorphonuclear exudates; (4) focal and perivascular demyelination; and (5) vascular degeneration with replacement of the wall by fibrinoid material, fibrinoid material in the lumen, and perivascular tissues.

Detailed descriptions of both macroscopic and microscopical lesions are given by Hurst (1941), and by Crawford (1954) in a paper reviewing the cases published to date. The aetiology is unknown.

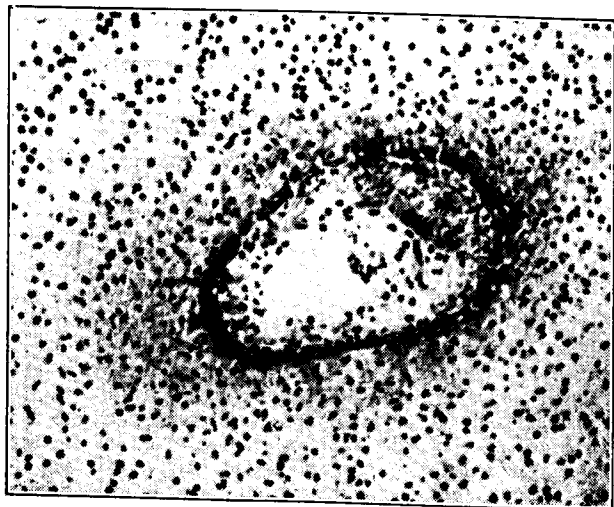
CASE REPORT

A shop assistant aged 19 was admitted unconscious into hospital on February 9, 1955. The clinical history was taken from the parents and the general practitioner's letter. This girl developed acute glomerulonephritis at the age of 16. She was investigated and treated at the London Hospital. The nephritis became chronic. At the follow-up attendances albumin in the urine, moderate oedema of the ankles and legs, and a normal blood pressure were found.

About the middle of January, 1955, she developed a simple cold and a loose cough with moderate amounts of white sputum. Her condition improved, but nine days before admission she developed a temperature and left-sided

pleuritic pain, which subsided in two days with chlortetracycline (1 g. daily for four days). Three days before admission she felt less well and in the evening developed intense headache, nausea, and vomiting, which persisted until the onset of coma. The doctor examined her the following morning. Her temperature was 103° F. (39.4° C.) and pulse 100. She had mild photophobia, but no neck stiffness was present. Chlortetracycline was recommenced. On the morning of admission she was semiconscious and very restless and had been incontinent of urine.

On admission the patient, a well-built girl, was unconscious and extremely restless. She was picking at her lips and nose. Her temperature was 98.4° F. (36.9° C.), pulse 80, and respirations 20. She was incontinent of urine. There was no skin rash. She had conjugate deviation of the eyes to the left. The pupils were dilated and did not react to light. Nothing abnormal was seen in the optic fundi. There was trismus. The teeth appeared to be normal. The



Photograph of section taken from white matter of right occipital lobe. Stained with haematoxylin and eosin.

tongue, so far as could be seen, was coated and moist. There were sordes on her lips. Both eardrums appeared normal. The lungs were clinically normal. The pulse was regular and the blood pressure 160/90. A soft mitral systolic murmur was heard. There was no sacral or ankle oedema and the jugular venous pressure was not raised. A corneal reflex was present on both sides. The reflexes and tone in both arms were normal. The abdominal reflexes were absent. The reflexes and tone in both legs were increased. There was ankle clonus. The left plantar response was extensor. Neck rigidity, mild opisthotonos, and a positive Kernig's sign were present. The patient failed to respond to nociceptive stimuli on the left side of the body. A provisional diagnosis of pneumococcal meningitis was made.

Lumbar puncture showed a pressure of over 300 mm. and 5 ml. of slightly yellow opalescent fluid was removed, crystalline penicillin (20,000 units) was injected into the theca and 2 g. of sulphadiazine was given intravenously, followed by 2 g. intramuscularly every four hours.

Despite treatment she lapsed into deeper coma. The corneal reflexes were unobtainable and the arms and legs became flaccid. A gallop rhythm was heard over the praecordium. The patient died 17 hours after admission.

Investigations.—C.S.F.: pressure, 300+ mm.; cells, 2,000 (polymorphs 90%); protein, 620 mg./100 ml.; chlorides, 720 mg./100 ml.; sugar, 80 mg./100 ml.; no organisms seen on direct examination. The 24-hour culture was sterile. Post-mortem blood urea, 124 mg./100 ml. The urine contained albumin.

Post-mortem Examination.—Apart from the kidneys and brain, nothing abnormal was found. The kidneys were enlarged one and a half times by thickening of the cortex,

which was a pale yellow colour with some red streaking. There was a thin layer of subarachnoid haemorrhage round the mid-brain, especially in the cerebro-pontine angles. The vessels of the circle of Willis and its branches were not obstructed. There was a large area of ischaemic softening involving almost the whole of the right occipital lobe. Finger-like processes of a similar nature extended along the wall of the lateral ventricle on both sides, especially at the junction of the lateral, posterior, and inferior horns, and the hippocampus. The right basal ganglia were similarly softened and there were isolated zones in the right parietal white matter and in the mid-brain.

Histological examination of the white matter of the right occipital lobe beyond the edge of an area of softening showed lesions of a patchy nature separated by brain tissue which was apparently normal. The affected parts were centred on blood vessels, particularly the small venules. These showed a curious loss of structure of the vessel wall which was converted into the structureless eosinophilic material usually described as "fibrinoid," and, although the endothelium was absent and the fibrinoid material somewhat fragmented, there was no effusion of red corpuscles through the wall. Polymorphs, however, were present in large numbers in the lumen, in the wall, and in the tissue surrounding the vessels. Capillaries were hardly affected, but small flame-shaped and ring-shaped haemorrhages were seen (see Fig.), the latter surrounding small areas of necrotic brain tissue. Serous exudate was not found in the sections examined, but fibrinoid material appeared to have diffused out of most of the damaged vessels in the surrounding tissue.

I wish to thank Dr. G. R. Steed for advice and permission to publish this case, and Dr. M. R. Thomas for performing the necropsy and preparing the histological sections.

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Case of Acute Haemorrhagic Leuco-encephalitis

Acute haemorrhagic leuco-encephalitis is a rapidly fatal disease of the central nervous system in which haemorrhagic lesions are found in the white matter of the brain. Crawford (1954) described three cases and found a further seven in the literature up to that time. Adams, Cammermeyer, and Denny-Brown (1949) described four similar cases under the name of acute necrotizing haemorrhagic encephalopathy.

Clinical Description.—The condition is commonest in young adults, but the youngest in Crawford's series was aged 2 years 10 months, and the oldest reported case was aged 51. It is commoner in males than in females. In most cases an acute upper respiratory infection precedes the neurological signs by a few days. The latter are acute in onset, with high fever, neck rigidity, sometimes convulsions, and paralyses with no characteristic distribution. The onset of coma is early and death follows in a few days. The cerebrospinal fluid usually shows an increase in cells, the maximum in Crawford's series being 220 per c.mm., but Adams *et al.* reported up to 5,000 per c.mm. Most of the cells are polymorphs. The protein is slightly increased in about half the cases; it was 140 mg. per 100 ml. in one of Crawford's. The sugar and chlorides were normal in three cases. Those cases in which the blood count was recorded showed a polymorphonuclear leucocytosis.

Pathology.—The meninges may appear normal or congested. The convolutions are flattened. The cut surface of the brain shows one or more pinkish oedematous areas, with numerous small haemorrhages of varying size, not more than a few millimetres in diameter, scattered through the white matter. The distribution is usually mainly in the cerebral white matter of either or both sides, often asym-

metrical, and may extend down into the cerebral peduncles, pons, and, less commonly, into the white matter of the cerebellum. The microscopical findings are described in detail by Crawford and are a combination of haemorrhage, vascular lesions, demyelination, and neurofibril degeneration. Fibrin impregnation of the walls of small vessels, and often the surrounding tissue, is characteristic. Perivascular collections of cells, especially polymorphs, are also seen. Adams *et al.* describe similar lesions.

CASE REPORT

A carpenter aged 50 was admitted to hospital on December 12, 1952, complaining of vomiting blood. He had had two episodes of gastro-intestinal haemorrhage, in 1945 and 1951, and pneumonia in 1951. He was treated by blood transfusion, and his condition on December 29 was satisfactory. On January 7, 1953, he had seven septic tooth stumps removed under penicillin cover. On January 10 he complained of headache and cough, his temperature rose to 101° F. (38.3° C.), and there were signs of bronchitis. Penicillin, 500,000 units twice daily, was prescribed. Next day the headache was worse; he complained of slight neck stiffness and was coughing up a little blood-stained sputum. A few rales were heard at the base of the right lung. Lumbar puncture gave a turbid cerebrospinal fluid at a pressure of 110 mm. with 1,400 cells (almost all polymorphs) per c.mm.; no organisms were seen or cultured. Penicillin, 500,000 units four-hourly, and sulphadiazine, 1 g. four-hourly, were prescribed.

On the 12th he was semiconscious, neck rigidity had increased, but there were no other neurological signs; he was incontinent of urine. Lumbar puncture gave a turbid C.S.F. at a pressure of 100 mm. The treatment was changed to intravenous chlortetracycline, 300 mg. twice daily, intrathecal streptomycin, 100 mg., and intramuscular streptomycin, 1 g. twice daily. Later in the day he was unable to swallow, and at 7 p.m. he suddenly became very pale, sweated profusely, and died within a few minutes. A tentative diagnosis of septicaemia and meningitis following the dental extractions was made.

Necropsy was carried out 16 hours after death; the body was that of a thin middle-aged man. The meninges over the brain and spinal cord were congested; no pus was found. The cut surface of the brain showed large numbers of small haemorrhages throughout the white matter of both cerebral hemispheres, extending down into the cerebral peduncles and in the white matter of the cerebellum. The spinal cord appeared normal. Thick mucus was present in the larynx, trachea, and bronchi; there was almost confluent bronchopneumonia at the base of the left lung, with patchy bronchopneumonia at the base of the right lung.



Section from the cerebral white matter, stained by phosphotungstic acid haematoxylin, showing exudate of fibrin and red cells in a perivascular space.

The stomach was congested, but no gastric or duodenal ulcer was found. There were no gross lesions in the other organs.

Microscopically the cerebral white matter showed extensive demyelination, haemorrhages round capillaries, and small arterioles, and marked perivascular infiltration, mainly with polymorphs. A few polymorphs were also scattered diffusely through the white matter. Fibrin impregnation was especially noticeable round capillaries, but also as fibrin plugs, and in the walls of some arterioles. Section of the left lung showed bronchopneumonia. The spinal cord was normal.

COMMENT

Diagnosis.—Clinically the present case resembled meningitis, and the failure to culture any organisms from the C.S.F. would not exclude it. In other cases an intracranial abscess or thrombophlebitis might be suspected, and middle-ear and other local infections would have to be excluded. The course of the disease is more rapid than in most cases of brain abscess. Adams *et al.* mention a similarity to epidemic equine encephalitis, which can be excluded in this country. Post-vaccinal and post-infective encephalitis usually run a milder course, polymorphs are not found in the cerebrospinal fluid, and there is a history of vaccination or an acute exanthem.

Necropsy.—Severe equine encephalitis and purpura can be excluded, as they are not confined to the white matter. Fat embolism may present a similar picture, but can be excluded histologically. Haemorrhages are not seen in other forms of encephalitis. There is no difficulty in excluding meningitis, brain abscess, or thrombophlebitis. In polyarteritis lesions will be found in other organs.

The aetiology has not been established; the following points, however, must be considered. (1) Bacterial: no organisms were isolated from the C.S.F. in the present case or any of Crawford's series. (2) Virus: Adams *et al.* were unable to transmit the disease to mice; Crawford could not transmit the disease from one case to a monkey. (3) Sensitivity to drugs is unlikely, as most of the cases occurred in previously healthy patients; the use of sulphonamides has been mentioned in only one case (Adams *et al.*); penicillin has been given only to the more recent cases. (4) The direct action of circulating toxins cannot be excluded. (5) Acquired hypersensitivity to an unknown antigen seems the most likely in view of the resemblance of the vascular lesions to those of polyarteritis and experimental hypersensitivity reactions (Crawford, 1954).

We wish to thank Dr. E. N. Davey and Dr. R. F. Jarrett for permission to publish the pathological and clinical details of this case, and Mr F. G. Warburton for the photomicrograph.

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"Cruel Parents" is the title of a 25-page pamphlet written by two of the staff of the Institute of Psychiatry, London University—Dr. T. C. N. GIBBENS, senior lecturer in forensic medicine, and Mrs. A. WALKER, a psychiatric social worker. The pamphlet reviews the results of interviewing and examining clinically 32 men and 7 women sentenced to prison for cruelty to children which involved violence. As much information as possible about these offenders was also obtained from other sources such as the N.S.P.C.C. The pamphlet is published by the Institute for the Study and Treatment of Delinquency, 8, Bourdon Street, Davies Street, London, W.1, price 1s. 6d.

Reviews

BREAD THROUGH THE AGES

Breads White and Brown: Their Place in Thought and Social History. By R. A. McCance, C.B.E., F.R.S., M.A., Ph.D., M.D., F.R.C.P., and E. M. Widdowson, D.Sc., Ph.D. (Pp. 174+xi, 30s.) London: Pitman Medical Publishing Co. Ltd. 1956.

Since the beginning of this month the composition of the nation's flour, except for whole meal, has been left to the discretion of the millers, subject only to its containing stipulated quantities of vitamin B₁, nicotinic acid, iron, and chalk, and to an agreement that the improver agene will not be used. The appearance of this book by two eminent authorities on bread, therefore, has been nicely timed to attract widespread interest. If the nature of our daily bread is to be decided by a policy of *laissez-faire*, after a period of sixteen years of benevolent bureaucracy, it may be instructive to know what has happened in the past and to surmise what may happen in the future.

The period covered by McCance and Widdowson dates from 430 B.C. to A.D. 1955. A bibliography covers writers so diverse as Hippocrates, Plato, Virgil, Chaucer, Shakespeare, George III and V, Alphonse Daudet, Lloyd George, J. H. Plumb, and Mother Goose. Classical allusions abound, and for the full appreciation of the first chapter, on bread in early Mediterranean civilization, a knowledge of Greek and Latin will be helpful. The hours spent by the authors in libraries, and in consultations with colleagues well versed in the humanities, have borne fruit in a history of bread which is not only instructive but easy and fascinating to read. The eye is charmed by a richly coloured picture, supplied by the British Museum, which depicts the Duke of Lancaster entertaining the King of Portugal, together with several mitred bishops, to a fifteenth-century dinner, which seems to consist mainly of manchets of white bread.

After perusing chapters on mediaeval and modern England, the eighteenth century, peace and plenty (1820-1914), shortages and war (1914-21), return to plenty (1921-9), and the second war (1939-45), the thoughtful reader is left with the impression that the problems by which we are confronted to-day have been faced repeatedly before. Without going into ancient history we may note that brown or brownish bread was advocated in 1840 by Graham, in 1885 by Allinson, and in 1909 by a Bread and Food Reform League, which recommended a "standard bread" containing the wheat germ. The first two of these campaigns were prompted by a general assumption of the health-giving properties of whole meal, and by a religious belief that God had intended the wheat berry as the ideal food for man. During the third campaign, however, knowledge of the distribution of vitamins in the outer layers of the berry had begun to dawn. Advocates of fine flour countered the reports of higher contents of vitamins and minerals in the brown by claiming higher digestibility for the white. Throughout the years the weight of medical opinion has alternated between preference for brown or white, according to such new evidence as the protagonists of each colour have produced. During the first and second world wars, of course, shipping considerations favoured brownish flour, which enabled an increased yield to be obtained from each ton of wheat which was imported. Until recently, however, white flour has always been more popular with the public than brown flour. We are told by the millers that the same preference for the greatest possible whiteness is also shown between flour of 70% extraction and slightly off-white flour of 80% extraction, whenever these two types can be bought for the same price.

In their extensive experiments in German orphanages, which are briefly recapitulated in the present book, Widdowson and McCance were unable to demonstrate any differences between the nutritive values of various brown

and white flours, fortified or not with vitamins and minerals, as measured by their powers to promote growth and maintain health. Since children grew well on diets containing large amounts of bread, either white or brown, the conclusion was drawn that bread is a much more nutritious food than had previously been supposed. Except when the diet is otherwise lacking in B vitamins and iron, however, the importance of the superiority of brown bread in these nutrients is considered to have been overemphasized. The reader is left, therefore, with the impression that the star of white bread, made from 70% flour, is in the ascendant.

A semi-popular book obviously cannot deal with the statistical treatment of the complicated mass of scientific evidence which was obtained in the German experiments, nor would the review of such a book be a fitting place for a detailed discussion of this evidence. We may perhaps question the authors, however, on their stressing of all sorts of psychological and social motives for preferring white or brown bread, to the virtual exclusion of the simple question of taste. Thus we are told of doddering old men who have nostalgic memories of the kind of bread which they ate during their youth. Their recollected preference is apparently regarded by our authors as nothing more than "a psychological escape from the present to which a man has failed to adapt himself, or with which he cannot keep pace." If our bread follows the American pattern, we may well become familiar during the next few months with a material which has the consistency of sponge rubber and the insipidity of cotton-wool. It will be a poor consolation, if we dislike it, to be told that our objections are due not to the normal discriminating powers of our palate but merely to advancing senility.

T. MOORE.

FOOD

Hutchison's Food and the Principles of Dietetics. Revised by V. H. Mottram, M.A., and George Graham, M.A., M.D., F.R.C.P. Eleventh edition. (Pp. 630+xviii, 40s.) London: Edward Arnold (Publishers) Ltd. 1956.

Fresh air and adequate housing, proper rest and exercise, and good food are a great trinity of factors in the preservation of health; but the greatest of these is good food. Perhaps more than anything else the impact of two world wars has made us realize how far-reaching are the applications of the study of nutrition. They concern not only the sick but public health, agriculture, domestic politics, and world politics. While, therefore, the importance of nutritional science can hardly be overestimated, yet medical dietetics—a term which now tends to have the restricted connotation of the treatment of disease by specific diets—occupies a less important position than it used to do. Twenty years ago many of us were in the habit of prescribing the most complicated diets for a great variety of disorders. In these diets simple scientific principles were often forgotten and fashion and tradition made many impositions, but particularly restrictions, which were almost always inconvenient to the patient and often actually detrimental. Nowadays we recognize relatively few indications for the prescription of specific diets as opposed to simple nutritional advice. Diabetes, obesity, certain renal and hepatic diseases, the steatorrheas, oedematous states, and possibly gout probably complete the list.

Though the distinguished authors of the 11th edition of this well-known and excellent book continue to call it *The Principles of Dietetics*, yet they use the word "dietetics" in the sense given it by Sir Robert Hutchison when he published the first edition 56 years ago—namely, the study of food in relation to human need. Thus only about one-sixth of the work is devoted to the dietetic treatment of disease, and even this might be curtailed with advantage. It seems unnecessary, for instance, to describe a raw vegetable and fruit diet for the treatment of rheumatism. The scrupulous dietetic instructions for the treatment of peptic ulcer could be shortened, since few authorities now believe that the great problem of peptic ulceration is a dietetic one at all. The dietetic advice given for the treatment of achlorhydria

and flatulent dyspepsia is superfluous. With modern replacement therapy low-potassium diets in the management of Addison's disease are undesirable. And why on page 560 are mutton, venison, grouse, partridge, pheasant, whiting, sole, and turbot considered to be more "easily digested" than beef, snipe, woodcock, haddock, and plaice? Apart from these trivial criticisms, the book provides a store of useful and interesting information on food in which the practical aspects of nutrition take precedence over what is more severely scientific. The chapter on beverages has a peculiar charm.

D. M. DUNLOP.

HEART FAILURE

Advances in Cardiology. Edited by R. Heggin. With seven contributors. (Pp. 296+viii; illustrated. Sw. Fr. 39.50.) Basle and New York: S. Karger A.G. 1956.

This volume, which is partly in German and partly in English, forms the first of a series of monographs which will deal with various aspects of cardiological problems. Several authors contribute to it. The themes are most interesting and very important, for the disturbances of cardiac metabolism that underlie heart failure are particularly considered. First of all Szent-Györgyi writes on the chemistry of muscle contraction. The histological structures are beautifully illustrated and their interpretation is given in terms of function. This is all extremely interesting. The practical application or explanation of digitalis therapy is given, and the author concludes that one should not hesitate to administer digitalis even for mild degrees of weakness. The next article, by R. Bing, is on disturbances in myocardial metabolism—again most stimulating. Raab discusses adrenergic-cholinergic control; here there are nearly 600 references. Lenzi, of Siena, writes on electrolyte balance. In the German part of the book there is a chapter by Rothlin and Taeschles on the action of cardiac glycosides on the metabolism of the myocardium.

This book is an excellent survey of the latest views on how the heart-muscle fibre works, sickens, and dies, and how it may be revived to continue its work. Much has already been known darkly by the clinicians, but now it is getting clearer and we are coming face to face with reality.

TERENCE EAST.

ADVICE TO THE ORTHOPAEDIC SURGEON

Clinical Orthopaedics—No. 6. Editor-in-chief: Anthony F. DePalma. With the assistance of the Associate Editors, the Board of Advisory Editors, and the Board of Corresponding Editors. (Pp. 219+viii; illustrated. Subscription price 40s. Single copies 60s.) Philadelphia and Montreal: J. B. Lippincott Company. London: Pitman Medical Publishing Co. Ltd. 1956.

The publishers have announced the subject-matter for the subsequent six numbers of this series on clinical orthopaedics, which will become available during the next two and a half years. In this volume one section is devoted to endoprostheses and another contains a series of essays of general orthopaedic interest. Frederick Thompson writes a historical account of Barton and his work, and then makes his own observations on the indications and contraindications for a prosthesis. He considers that the outstanding indication is for salvage of a fractured femoral neck when treatment has failed, but he does consider there are other justifiable indications for the introduction of a prosthesis. Each chapter is written by a surgeon who has not lacked experience of arthroplasty, and there is no hesitation in revealing the difficulties and disasters that may have to be experienced by a patient. Thompson's criteria for operation are not accepted by other authors. Macfarland is enthusiastic and writes a helpful review of the use of prostheses in the joints of the upper limb. Robert O'Brien describes the operative details, the complications of operation, and the post-operative care when the Hueter approach is used. McKeever gives reasons why stainless steel and vitallium are suitable for a prosthesis, and suggests

that acrylic plastics and nylon are unsuitable; he describes how he lines the acetabulum with bone from the great trochanter when its base requires repair. Compere discusses the type of prosthesis suitable for the treatment of osteoarthritis of the hip-joint.

In the second section of the book is a variety of subject-matter all of interest to the orthopaedic surgeon, including essays on decubitus ulcers in a paraplegic and on the treatment of the foot of a diabetic patient. Charles Goff provides information on growth acceleration in Legg-Calvé-Perthes's syndrome from a study of 25 children treated by complementary feedings of aureomycin. He concludes that the growth acceleration was accompanied by an accelerated reossification of the femoral head, or of other growth centre which may have comparable pathological changes. Those studying the purely mechanical aspect of fracture treatment will be interested in articles by Hipps, Burke, and Bear and Johnson. Garrett Pipkin provides original illustrations to his article on infections subsequent to arthroplasty of the hip. To the last section of the book, headed "Items," John Charnley, with characteristic humour, has contributed an open letter written at a time when he was thinking of fibrositis, neurosis, and the shortcomings of other specialists. The concise nature of the articles and the good print and illustrations are helpful to readers, and the book deserves a wide circulation.

ST. J. D. BUXTON.

BRITISH PAEDIATRIC ASSOCIATION

The British Paediatric Association, 1928-1952. By H. C. Cameron. (Pp. 107; illustrated. 12s. 6d.) London: The British Paediatric Association. 1955.

This wholly delightful little book will bring back happy memories to all those who have been in any way linked with the British Paediatric Association during the last quarter of a century. It may well astound readers who have not followed and appreciated the rise of paediatrics in this country during this period, and it should certainly stimulate the younger paediatricians, who may learn what has been accomplished by a comparative handful of enthusiasts. There were not many people who could, from first-hand knowledge, set down the story of the association, and the choice of Dr. Hector Cameron, himself an original member, as archivist was singularly fortunate, for he has presented a concise and well-written "Part I" of the history of the association. There are eight excellent photographs of past and present worthies—more could have been included with advantage—and the book ends, rather sadly, with obituaries of the 21 members who died between 1940 and 1952. There is an appendix, contributed by Professor Moncrieff, which describes the history of the association's journal—*The Archives of Disease in Childhood*. It is inevitable that some highlights have been glossed over or omitted, but no one will cavil at the contents. The omissions may be remedied in the next instalment if, in perspective, it still appears in 1980 that they were in fact of outstanding significance either in the history of the association or in the advancement of paediatrics.

WILFRID GAISFORD.

In the eighth edition of *A Handbook of Ophthalmology*, by H. Neame and F. A. Williamson-Noble, three-colour plates have been replaced by improved versions, and the total of 13 such plates for a small book is very generous indeed. In the text, note has been taken of the newer developments in antibiotic treatment and on the use of cortisone, whilst on the surgical aspects descriptions of intracapsular extraction and the use of orbital implants have been amplified. Accounts of ocular toxoplasmosis and of retrolental fibroplasia appear for the first time. The book has retained its individuality and its character as a balanced exposition of the subject for the undergraduate. That no drastic revision was needed to keep this book up to date speaks for the soundness of the text; that some fifteen pages of extra text were incorporated is testimony to the thoroughness of the revision. The book is published by J. and A. Churchill Ltd., price 30s.

BRITISH MEDICAL JOURNAL

LONDON

SATURDAY OCTOBER 6 1956

METABOLIC UPSETS AND MIGRAINE

The signs and symptoms of migraine have become so familiar that even such bizarre features as sudden gains or losses in weight are accepted without comment. It is one of the complaints from which the patient always recovers, and in which there are interim periods of good health. Nevertheless, the life of the migrainous subject is spoilt by apprehension of an attack and by the uncertainty of being able to fulfil his engagements. He inevitably becomes nervous; his diet and sleep may become erratic, and by the time he seeks medical advice the prescription of remedies to be taken during an attack is usually insufficient to bring about a cure. His state of tension¹ is not always recognized, but long-term therapy has been advocated, for this will help him to understand "the basis of his tension, the factors which aggravate it and to aid him in resolving his conflicts."² While appreciating these psychological factors it is equally important to recognize that certain well-marked physiological changes occur in some of the sufferers. Not only does general oedema appear, which is responsible for the gain in body weight, but local oedema is found in the areas affected by headache. Further, the continuation of an irregular and inadequate diet may in some instances lead to a transient state of hypoglycaemia, which acts as the instigating factor for a migrainoid headache.³⁻⁵ Evidence has also been found in some cases of a deficiency of vitamin B₁, as shown by an abnormally high level of bisulphite-binding compounds in the blood.⁶

Of these phenomena the generalized oedema is the most interesting—and significant. It occurs in the prodromal phase of an attack of migraine and is associated with oliguria and salt retention.⁷⁻⁸ It disappears as the attack diminishes, usually with a coincident diuresis. Patients complain of being unable to fasten their skirts, to remove their rings, and even of an inability to wear their false teeth. Women are more often affected than men, and apparently accept these discomforts without complaint. These signs usually coincide with a premenstrual attack of migraine. Such cases may be a severe form of the premenstrual

syndrome,⁹ in which headache and tension regularly occur, especially in subjects who have a strong family history of migraine. Before menstruation there is a similar retention of water and sodium in the body,¹⁰ and a peak of oestradiol secretion.⁹ The same phenomena may occur in the middle of the menstrual cycle. Oliguria and water retention have also been observed as prodromal features of migraine in male patients. In a few cases of both sexes the reduction of salt in the diet and the prolonged administration of a mild diuretic such as urea¹¹⁻¹² have proved successful in preventing attacks. The part played by the sex hormones is still obscure. An attack of migraine can be induced by oestrin,¹³ and oestradiol will cause retention of sodium and chloride in dogs.¹⁰ Oestrogens, androgens, and progestogens¹⁴⁻¹⁵ can all cause retention of water, yet a high proportion of patients with premenstrual syndrome, and some of those suffering from migraine, respond favourably to treatment with a progestogen⁹ (in the form of ethisterone or progesterone). It is doubtful whether general retention of water plays any part in the production of headache, since this has been shown to be due primarily to vasodilatation² and to local oedema in the brain.¹⁶ Headache cannot in fact be promoted by inducing a state of overhydration,¹⁷ and recent experiments have shown that in migrainous subjects neither the imbibition of water alone or with an injection of pitressin, nor the administration of a large dose of salt together with an injection of D.C.A., will provoke an attack. Again, it has been reported from a limited series of experiments on individual subjects¹⁷ that the frequency and severity of a migrainous headache were unaffected by the removal of body fluid by a mercurial diuretic or by diamox, by the administration of a low-salt diet, or by the use of sodium-removing carbo-resins, although these measures reduced the fluctuation in weight to a minimum.

It is more probable that retention of sodium is the dominant factor which leads to retention of water.

OCT. 6, 1956

So far as the premenstrual syndrome is concerned it has been suggested that "the best working hypothesis is that which postulates a cyclical change in sodium⁹ (and therefore in water) metabolism, which occurs to a slight extent in sufferers from the premenstrual syndrome." Independent observations on migrainous patients of either sex have shown that a cyclical variation of sodium may actually take place.¹² Thus, in the successive phase of prodrome, attack, recovery, and interim, the level of serum sodium has been found to vary in an individual patient from 352 to 357 to 336 and to 332 mg. per 100 ml. respectively.¹² High levels of blood sodium are repeatedly found in association with headache, and are often accompanied by abnormally low levels of plasma proteins.⁶ Some interesting abnormalities have also been observed in headache-free migrainous subjects of either sex subjected to a water imbibition test.¹² Whereas in the control period preceding the test the excretion of sodium, chloride, and water was the same as in normal control subjects, after the imbibition of 1,500 ml. of water migrainous subjects showed a considerable increase in the amount of sodium and chloride excreted, although the water output was virtually the same as in normal subjects. But in the latter there was only a slight increase in the output of chlorides and an actual decrease in the excretion of sodium. These facts suggest that the imbibition of water provides the migraine subject with an opportunity of excreting an excess of sodium, but how the latter comes to be accumulated in the body is still unknown. These patients are characterized by a mental and physical hyperactivity which may well include an overaction of the adrenocortical and anti-diuretic hormones; these together are said to control the concentration of sodium and chloride in the extracellular fluid.¹⁸

The phenomenon of local oedema is of different origin. It occurs as a painful swelling in the area of the scalp or face affected by migrainous headache, and in the brain tissue. The local dilatation of the arterioles is said to be accompanied by a rise in intracapillary hydrostatic pressure, which favours the transudation of water and of certain chemical constituents of the plasma into the surrounding tissues.¹⁷ Vasodilatation has also been observed in the capillaries of the conjunctiva of the eye on the side affected by headache, and these vessels are found to be abnormally resistant to the application of vasoconstrictor agents. Vascular changes of a different character have also been observed in the nail-bed capillaries,¹⁹ which have been seen to dilate during an attack and to become blurred by a transudate. These phenomena

can be reproduced by inducing overhydration, and may be a visible symbol of the abnormal fluid exchanges which occur throughout the body during an attack of migraine. In conclusion it would appear that the knowledge of these physiological changes might be usefully applied in the diagnosis and treatment of migraine—particularly of the "classical" or premenstrual type.

SUICIDE AND ATTEMPTED SUICIDE

Since 1945 the suicide rate in England and Wales has fluctuated, with no clear upward or downward trend. Recent advances in psychiatric care and treatment, particularly the use of electric convulsion therapy in depressive states, has probably favourably affected it; but its expected wartime fall, coinciding with the development of these new methods of treatment, has made their impact difficult to gauge. Increased efficiency in the treatment of barbiturate poisoning has undoubtedly saved the lives of many potential suicides. But even so the present rate is still high enough to cause concern. In 1954 in England and Wales 5,043 people (11.3 per 100,000 of the population) took their own lives. In his annual report for 1954 the M.O.H. of Middlesex stated that in the economically important group of people aged 25-44 suicide was the second most frequent cause of death in Middlesex, the number exceeding that due to motor vehicles. Since in western civilization suicide is now relatively more common among older people, the suicide rate may also be expected to rise as the proportion of old people in our community becomes larger.

The methods of suicide adopted have altered over the years. Recently there has been a notable increase in suicides due to poisoning by drugs or gas; and, as E. M. Brooke¹ has shown, particularly since the end of the war, the taking of barbiturates has risen rapidly. Depressed patients are too often prescribed lethal doses of barbiturates, and these drugs are now

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- ¹⁵ Batchelor, I. R. C., *ibid.*, 1955, 1, 595.

chosen agents in the great majority of cases of attempted suicide which are admitted to general hospitals.

Recent work in Britain, the U.S.A., and Scandinavia has added to our knowledge of suicidal acts, hitherto rather neglected by psychiatrists in their researches. P. Sainsbury² has made an important ecological study of suicide in London. He has shown that the London boroughs differ in their suicide rates, and that these differences correlate with the social characteristics of the localities; with their social isolation, mobility (whether of class, occupation, or neighbourhood), and disorganization (as evident in rates for divorce and illegitimacy). Sainsbury believes that social isolation provides a consistent explanation of the high incidence of suicide found in a wide variety of immigrants. This agrees with the experience recorded by Dr. E. B. Strauss at p. 818 of the *Journal* this week—"an appreciable proportion of the patients admitted into my observation wards after a serious suicidal attempt are old people who regard themselves as 'useless mouths' and who have lost all sense of honourable group-identity."

The relationship between attempted suicide and suicide is not straightforward. The former is much commoner. D. Swinscow³ has shown that under the age of 50 the majority of suicidal attempts are made by women, while after 50 the majority are made by men. But of those who commit suicide at any age the majority are men, and acts usually described as attempted suicides are not all suicides which have failed; some were never intended to succeed, in the sense of causing death. E. Stengel⁴ has drawn attention to the social element in the pattern of suicidal attempts, and has suggested that in most of these acts there is an appeal to others for help and intervention. He has further advanced the hypothesis that those who commit suicide and those who attempt it form two populations which overlap, but which differ in the representation of the sexes, in age, and in methods.

The later histories of those who attempt suicide lend some support to Stengel's hypothesis, which requires further detailed testing. From a one-year follow-up of 200 consecutive cases of attempted suicide I. R. C. Batchelor and M. B. Napier⁵ reported a subsequent suicide rate of 2%; R. W. Ettlinger and P. Flordh⁶ 3.6% in 500 cases. Similar or lower rates have been reported by E. H. Schmidt and his colleagues⁷ and Stengel⁴ in follow-ups over periods of eight months and five years. People who have

attempted suicide may of course continue to present social and medical problems, and further suicidal attempts, mental breakdown, delinquency, and disruption of the emotional lives of others may mark their subsequent careers. Furthermore, it certainly cannot be concluded in the individual case that someone who has attempted suicide is not very likely to commit it. American and Scottish studies report in old age completion of the suicidal act in 11-12% of cases^{8,9} within two years. In old age those who attempt suicide and those who commit it seem to come from very closely allied, if not identical, clinical groups.

Detailed clinical studies of some hundreds of consecutive cases of attempted suicide admitted to general hospitals have recently been made by Batchelor and Napier in Edinburgh, by Ettlinger and Flordh in Stockholm, and by Schmidt, O'Neal, and Robins in St. Louis, U.S.A. It is clear that suicidal acts form a continuous series, running from the superficial gesture intended to manipulate the environment to the determinedly fatal injury. Among younger people a heterogeneous collection of reaction types is found. Many of these patients are temperamentally unstable individuals, unable to solve conflicts in their personal relationships. Batchelor¹⁰ has studied those suffering from psychopathic states, who constitute probably at least one-fifth of those who attempt suicide, and has drawn attention to the repetitiveness and explosiveness of these acts, describing them as suicidal fits. Few of these acts can be forestalled, but more attention should be given, he suggests, to such traumatic factors as a broken home in childhood¹¹ and alcoholism.¹² H. Pozner¹³ has given an interesting description of the influence of the military environment on suicidal incidents. Detailed studies of cases of attempted suicide after the age of 60 have been made,^{9,14} which, though from different countries, give results that are strikingly in agreement. The attempts were usually serious, all the patients had a clinically diagnosable illness, the large majority were psychotic, and most were suffering from depressions. Once again the truth of the maxim is seen that in every depressive illness, at every age, there is a risk of suicide.

The assessment and immediate management of suicidal attempts has been the subject of a recent article in this *Journal*.¹⁵ Their prophylaxis now requires much more emphasis. We could make a beginning with an attack on the causes of social isolation in our cities, with its attendant loneliness.

But further research is required. Sainsbury² has suggested that comparative studies of attempted suicides should be made from selected districts with high and low suicide rates. Clinical, psychological, and social data should be sought together, and wherever possible control groups should be investigated.

SEX OF HUMAN NUCLEI

Until a few years ago observation of the sex chromosomes in man had been confined almost entirely to cells in mitosis, but the techniques were so specialized that they could rarely be applied to clinical problems. Nevertheless an immense amount of valuable knowledge accumulated, and the presence of the XX chromosomes in the female and the XY in the male was well established.¹ This enabled M. L. Barr to consider, with some certainty, that a mass of chromatin found in a high proportion of resting (intermitotic) nuclei of the neurons of female cats represented chromatin associated with the XX chromosome pair.² He later showed that a nuclear sex difference was present in almost all tissues of many species of mammal including man,^{3,4} and this work has been amply confirmed.⁵⁻⁷ W. M. Davidson and D. R. Smith^{8,9} showed a comparable morphological sex difference in the polymorphonuclear leucocytes in stained blood films. This has now been confirmed by many haematologists.¹⁰⁻¹⁴ Barr's method is usually applied to skin biopsy, but it has also been shown that smears of buccal or vaginal mucosal cells¹⁵⁻¹⁷ show the characteristic sex difference found in the tissues and like blood films can be obtained easily without inconvenience to the patient.

Mr. A. D. Dixon and Dr. J. B. D. Torr report in the *Journal* this week (p. 799) a study of oral smears; they found the procedure simple, but that accuracy of diagnosis increased with experience. There is no doubt that sex can be determined accurately by any of these methods, but the microscopist must have considerable special experience, and the preparations used must be of the highest quality technically or errors will occur. As there are no reports of discrepancies between the techniques, the particular one adopted will depend on the circumstances and personal preference.

The method of nuclear sexing has been fairly widely applied to the study of hermaphrodites; B. Lennox¹⁸ has recently reviewed the literature and examined the evidence in favour of the belief that the nuclear sex represents the genetic sex. As there is not always agreement between the genetic sex and the development of the external genitals and psychological outlook, it is often unwise to make known the genetic sex to the patient. For this reason Barr¹⁹ has recommended that female nuclei should be reported as "chromatin positive" and male nuclei as "chromatin negative." The male pseudo-hermaphrodite has testicular tissue and chromatin-negative nuclei, the female pseudo-hermaphrodite has ovarian tissue and chromatin-positive nuclei, while the true hermaphrodites have both testicular and ovarian tissues and may be either chromatin positive or negative. A case of true hermaphroditism is reported by Dr. J. D. Arneaud and colleagues at p. 792 of the *Journal* this week. Although the genetic sex was female, and female secondary sex characters developed, the patient was psychically male; surgical removal of the female components of the patient's body converted him into "a cheerful, normal young man." The independent observations of L. Décourt *et al.*²⁰ and P. E. Polani *et al.*²¹ have demonstrated the interesting fact that many apparently female cases of Turner's syndrome are genetically male, confirming the prediction of A. Jost made from experimental destruction of the gonads in the foetal animal.²² The determination of the genetic sex is therefore an important investigation in the classification of hermaphrodites. This applies particularly to the recognition of congenital adrenal virilism in infancy, when estimation of the 17-ketosteroid excretion may give equivocal results and early treatment with cortisone must be considered. In the management of cases of hermaphroditism seen in older children and adults L. Wilkins and colleagues have emphasized rightly the overriding importance of psychological, social, and anatomical factors.²³ Among other anomalies is the recently reported finding of chromatin-positive nuclei in association with testicular hypoplasia, which is of great theoretical interest.²⁴ Again, a discrepancy between the nuclear sex of the host and teratomata has been noticed and has stimulated discussion on the origin of these tumours.²⁵

L. Sachs and colleagues,^{26,27} as well as other workers,²⁸⁻³⁰ have shown that it is possible to predict the sex of the unborn child by examination of the desquamated epithelial cells in a specimen of amniotic fluid, and a further paper from Sachs's team appears this week in the *Journal* at p. 795. They now report the accurate pre-

- ¹ Evans, H. M., and Swezy, O., *Memoirs of the University of California*, 1929, Vol. 9, No. 1.
- ² Barr, M. L., and Bertram, E. G., *Nature (Lond.)*, 1949, 163, 676.
- ³ Moore, K. L., and Barr, M. L., *Acta anat. (Basel)*, 1954, 21, 197.
- ⁴ ———, Graham, M. A., and Barr, M. L., *Surg. Gynec. Obstet.*, 1953, 96, 641.
- ⁵ ———, Hunter, W. F., Lennox, B., and Pearson, M. G., *Lancet*, 1954, 1, 372.
- ⁶ Hunter, W. F., Lennox, B., and Pearson, M. G., *Lancet*, 1954, 68, 17.
- ⁷ Emery, J. L., and McMillan, M., *J. Path. Bact.*, 1954, 39, 362.
- ⁸ Pedlar, C., and Ashton, N., *Brit. J. Ophthalmol.*, 1955, 38, 362.
- ⁹ Davidson, W. M., and Smith, D. R., *British Medical Journal*, 1954, 2, 6.
- ¹⁰ ———, *Postgrad. med. J.*, 1956 (in press).
- ¹¹ Lüters, T., *Blut*, 1956, 2, 81.
- ¹² Tolksdorf, M., Romatowski, H., Saille, M., and Weidemann, H.-R., *Arzt. Wschr.*, 1955, 10, 1029.
- ¹³ Riis, P., *Dan. med. Bull.*, 1955, 2, 190.
- ¹⁴ György, L., and Sarolta, K., *Orr. Hetil.*, 1955, 98, 1096.
- ¹⁵ Tenczar, F. J., and Streitmatter, D. E., *Amer. J. clin. Path.*, 1956, 26, 384.
- ¹⁶ Moore, K. L., and Barr, M. L., *Lancet*, 1955, 2, 57.
- ¹⁷ Moore, K. L., and Barr, M. L., *Lancet*, 1955, 2, 874.
- ¹⁸ Carpentier, P. J., Stolte, L. A. M., and Visschers, G. P., *ibid.*, 1955, 2, 874.
- ¹⁹ Greenblatt, R. B., de Acosta, O. M., Vázquez, E., and Mullins, D. F., *J. Amer. med. Ass.*, 1956, 161, 683.
- ²⁰ Lennox, B., *Scot. med. J.*, 1956, 1, 97.
- ²¹ Barr, M. L., *Lancet*, 1956, 1, 47.
- ²² Décourt, L., Sasso, W. da S., Chiorboli, E., and Fernandes, J. M., *Rev. Ass. med. brasil.*, 1954, 1, 203.
- ²³ Polani, P. E., Hunter, W. F., and Lennox, B., *Lancet*, 1954, 2, 120.
- ²⁴ Jost, A., *Gynec. et Obstet.*, 1950, 49, 44.
- ²⁵ Wilkins, L., Grumbach, M. M., Van Wyk, J. J., Shepard, T. H., and Papadatos, C., *Pediatrics*, 1955, 16, 287.
- ²⁶ Plunkett, E. R., and Barr, M. L., *Anat. Rec.*, 1956, 124, 348.
- ²⁷ Hunter, W. F., and Lennox, B., *Lancet*, 1954, 2, 633.
- ²⁸ Serr, D. M., Sachs, L., and Danon, M., *Bull. Res. Council. Israel*, 1955, 3B, 137.
- ²⁹ Sachs, L., Serr, D. M., and Danon, M., *Science*, 1956, 123, 548.
- ³⁰ Makowski, L., Prem, K. A., and Kaiser, I. H., *ibid.*, 1956, 123, 543.
- ³¹ James, F., *Lancet*, 1956, 1, 202.
- ³² Dewhurst, C. J., *ibid.*, 1956, 1, 471.

natal diagnosis of the sex in 40 cases in the ninth month of pregnancy, and 8 cases in the third, sixth, and seventh months, as well as on an 8-weeks-old aborted foetus. There seems no doubt about the technical accuracy of this test, but the advisability of carrying it out has been questioned.³⁰

HEALTH SERVICE PRIORITIES

With its usual striking array of statistics the Ministry of Health has reported on the Health Service in England and Wales for the year 1955,¹ and in the preface Mr. R. H. Turton, the Minister, sets out his view of the three main priorities to-day. These are: "First, to bring existing hospitals to a satisfactory standard and to provide, as far as possible, new accommodation as and where it is needed; second, to ensure that the mental health services, with their high proportion of out-of-date buildings, receive a proper share of the new construction and the resources available; finally, to tackle the problem of making adequate provision for the care of old people." All three of these objectives will be achieved the more quickly in consequence of the revolution in the treatment of tuberculosis brought about by the newest methods. The long waiting-lists for beds of only a few years ago have so dramatically shortened that nearly everywhere they have disappeared, and in some areas beds are redundant.

The total number of consultants increased by 140 during the year to 6,650, while the number of senior registrars declined by 26 to 1,094. At December 31, 1955, 266 consultants were receiving "A" distinction awards (£2,500 p.a.), 665 "B" awards (£1,500 p.a.), and 1,330 "C" awards (£500 p.a.).

The number of principals in general practice at the end of the year was 19,756, of whom 18,978 were providing unrestricted services; 6,715 of these were single-handed, a decrease of 184 from the previous year's figure. "A gradual movement away from single-handed practice" is reported. Last year's report, as this one recalls, drew attention to the Minister's advice that the young doctor wishing to start in general practice should consider the north in preference to other parts of the country because the opportunities were better there. Whatever the opportunities may be, it seems that doctors on the average still prefer the south, though not so strikingly as to make the north an easy place to start in, if we may judge by the numbers of applicants for advertised vacancies. In the north in 1955 the average number of applicants for each of the 34 vacancies was 36; in the midlands for 16 vacancies it was 38; in the south for 28 vacancies it was 58; and in Wales for 6 vacancies it was 20. Comparing these averages with those for 1954 (north 31, midlands 35, south 46, Wales 20), the report comments that "so far it cannot be said that there has been a response to the Minister's advice." Possibly the advice did not appeal to young doctors because competition in the north, though less than in the south, is yet notably keen.

The drive for economy in prescribing goes on in odd contrast to the spate of political promises with which the Service was presented to voters a few years ago. During the year, says the report, the Pricing Offices supplied statistics to executive councils for transmission to general practitioners showing the average cost of a doctor's prescribing compared with the average for the area in which he practised. These statistics, the report adds, "were welcomed in most areas." As a result of the investigations into prescribing costs visits were paid by regional medical officers to 543 doctors and letters were sent to 1,225. The recipients of these attentions fell into line, for this was the first year in which no case of excessive prescribing had been referred to a local medical committee for investigation. In spite of all, however, the average cost of a prescription continued to rise—from 4s. 2½d. in 1954 to 4s. 4d. in 1955. But the Ministry does not compare these figures with the costs of many other articles which conspired to increase the general cost of living, so that their significance is more problematical than a casual reader of the report might suppose.

The Ministry has carried out much useful propaganda to diminish the number of accidents in the home, especially accidents to young children. A leaflet "to make parents more aware of their responsibility and stimulate action" is reported to have been favourably received, and the press and the B.B.C. were helpful in publicizing some of the quite simple ways in which these tragedies can be averted by a little foresight. As a corollary the Ministry might well encourage wage-earning children to look after their aged parents, and issue a leaflet "to make children more aware of their responsibility," for it is too often set aside.

HISTOPLASMOSIS IN BRITAIN

Since 1940 about a dozen cases of histoplasmosis have been recognized in Britain, all but two in the last five years. The causative fungus, *Histoplasma capsulatum*, was claimed to have been cultured from only half of these; diagnosis of the remainder was presumptive and based either on the association between radiological changes and results of histoplasmin skin tests, or on histopathological studies.

Infection by *H. capsulatum* may manifest itself in several ways. The initial infection after inhalation of spores may be inapparent clinically or radiologically. When pneumonitis is produced complete resolution often follows, but fibrosis or calcification, sometimes of typical distribution, may result. In such patients a positive skin reaction to histoplasmin, or possibly an anamnestic serological response, suggests the possible aetiological agent.¹ The cause of pulmonary calcification in patients who fail to react to either tuberculin or histoplasmin nevertheless frequently remains undetermined. In a

¹ Leigh, R., and Thomas, H. E., *Thorax*, 1955, 10, 253.

² Israel, H. L., DeLamater, E., Sones, M., Willis, W. D., and Mirmelstein, A., *Amer. J. Med.*, 1952, 12, 252.

³ Hutchison, H. E., *J. Path. Bact.*, 1952, 64, 309.

⁴ Johnson, J. E., and MacCurdy, J. M., *Amer. Rev. Tuberc.*, 1952, 66, 497.

⁵ Poles, F. C., and Lavertine, J. D. O'D., *Thorax*, 1954, 9, 233.

⁶ Dowling, G. B., and Elworthy, R. R., *Proc. roy. Soc. Med.*, 1925, 19, 4.

⁷ Mochi, A., and Edwards, P. Q., *Bull. Wld Hlth Org.*, 1952, 5, 259.

very small minority of cases infection may become generalized. All organs can be attacked, particularly lymph nodes, spleen, suprarenal glands, and the lungs; indolent ulcers of the upper respiratory and gastro-intestinal tracts commonly occur. Generalized disease is often rapidly fatal, and three such cases have been reported in Britain. Systemic histoplasmosis may also run a chronic course, sometimes with apparent arrest of the disease,² the larynx, lungs, lymph nodes, and oral structures being most commonly affected. It is possible that isolated lesions are sequelae to these chronic infections, possibly exemplified by the laryngeal lesion reported by H. E. Hutchison³ and various cases of cutaneous histoplasmosis, such as the two reported by Professor W. St. Symmers at p. 790 of the *Journal* this week. Yet another example may be the case of "histoplasmic lymphadenitis" reported by Symmers at p. 786, but the case history described is a complicated one. It recalls the successful isolation of *H. capsulatum* by J. E. Johnson and J. M. MacCurdy⁴ from a scalene lymph node of a patient with benign pulmonary histoplasmosis.

Symmers reports the first apparently unequivocal instance of histoplasmosis contracted in Britain; F. C. Poles and J. D. O'D. Lavertine,⁵ too, have suggested that a case of disseminated disease was acquired in this country, but their patient had travelled abroad. Dr. R. W. Riddell states in an article at p. 783 of this issue that there is no reason for supposing that the fungi responsible for histoplasmosis and similar systemic mycoses occur naturally in Britain. But these concepts are not necessarily incompatible. While it is tempting to postulate that further British cases will now come to light, it is sobering to recall that no further case of North American blastomycosis acquired in Britain has been recorded since G. B. Dowling and R. R. Elworthy's report in 1925.⁶

Histoplasmosis is contracted from infected soil or dust and not by contagion. The occurrence of *H. capsulatum* in the soil seems to be patchy in the United States, and, though this disease occurs throughout the world,⁷ prevalent skin sensitivity to histoplasmin has an irregular and limited geographical distribution. Many problems therefore require elucidation in the future, and critical laboratory standards are needed for this. The fallibility of histopathological diagnosis, except possibly in typical disseminated histoplasmosis, requires emphasis. The histoplasmin skin test, though non-specific, is informative in Britain, where the population is predominantly histoplasmin-negative, though its limitations are obvious for patients who have travelled overseas. Above all, critical identification and full description of fungi grown from pathological material are the only certain diagnostic criteria of infection.

NUFFIELD FOUNDATION

Many medical men have reason to be thankful to Lord Nuffield for financial assistance in some way or other, and the latest report of the Nuffield Foundation¹ shows how exceedingly varied are the researches being carried

¹ Nuffield Foundation Eleventh Report for the Year Ended March 31, 1956, 1956, Oxford.

out under its patronage. Started by Lord Nuffield with £10m., the Foundation has since 1949 devoted much attention to research in biology, and in view of the present interest in the possibility of genetic damage from radiation it is appropriate that grants should have been made towards the study of population genetics. In Northern Ireland, in a community of about half a million people, an attempt has been made to obtain reliable data on the frequency and distribution of specific genes, on consanguinity, and on inherited anomalies such as deaf mutism, dystrophia myotonica, arachnodactyly, and achondroplastic dwarfism. This work on human beings has been supplemented by studies at the University of Cambridge on plant mutation, with special emphasis on the modification of the effects of radiation by means of chemical agents, and on micro-organisms with a view to finding a chemical basis for genetical phenomena.

At the Anthropological Blood Group Centre information on the frequency of abnormalities of haemoglobin is being assembled, and at the Lister Institute of Preventive Medicine a long-term investigation into the relations between certain mucopolysaccharides and the serological specificity of human blood groups will also have a bearing on the problem of the so-called collagen diseases. Special attention has been paid to research on chronic rheumatic diseases, "which have till recently been somewhat neglected."

In the department of neuropathology at the Radcliffe Infirmary, Oxford, a new method of studying the after-effects of tuberculous meningitis has been developed with a view to explaining the nature of the mental changes and spasticity resulting from this disease. This investigation will probably add greatly to medical knowledge of degenerative processes in the nervous system as a whole. The use of plastics for splinting and prosthesis generally has been extended to the more intricate problems of bone replacement, and a biomechanical unit has been established at the Institute of Orthopaedics and King's College in order to apply the methods of mechanics to the study of forces and actions in the living body, with a prospect of future work on the flow of fluids and gases in the whole living organism.

Among social investigations being financed is a plan of research drawn up by the London School of Economics into the use of prison sentences by magistrates' courts; in view of the overcrowding in local prisons and the high average annual cost for each prison inmate, possible alternatives to short prison sentences are to be specially studied. The problem of the West Indian and other immigrants in the Brixton area forms one of a series of surveys being undertaken by the department of social anthropology in the University of Edinburgh. Among the projects for which grants have been made to countries of the British Commonwealth are studies of the enzymes of the endocrine glands, cosmic ray particles, and the chemistry of inositols in Australia; mediaeval manuscripts in Canada; the Christian Medical College and Hospital at Vellore, India; geochemical and cardiosurgical research in Africa; and family life studies in Jamaica.

SUICIDE*

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A surgeon, I suppose, is more upset by a death on the table than by anything else. Most psychiatrists feel the loss of a patient by suicide as the most distressing professional accident, although in so many instances, even if a suicidal attempt ("successful" or otherwise) is predictable, we know it to be unavoidable.

Suicide can be studied from a great number of aspects: clinical, statistical, historical, psycho-analytical, social-psychological, forensic, ecological, moral, and anthropological.

I would like briefly to discuss suicide as an anthropological problem, using the word anthropology in a very wide sense, so as to include ecology, social psychology, religion, and ethics.

Although a great deal has been written on the subject of suicide, two works stand out as being of special importance: (1) *Le Suicide* by the late Professor Durkheim, published as long ago as 1897, and (2) *Suicide in London, An Ecological Study*, by Peter Sainsbury, published in 1955. The interesting feature, to my mind, about Dr. Sainsbury's valuable Maudsley monograph is that it so amply confirms the views of the well-known professor of sociology at the Sorbonne.

Before getting down to my main thesis, it would be as well, perhaps, to get the clinical aspects of suicide out of the way in as few words as possible by briefly considering suicide and attempted suicide from the strictly psychiatric point of view.

I shall precede these clinical remarks by trying to dispel a false impression which is almost superstitiously held by so many doctors and laymen alike: if a patient "talks" suicide, he is unlikely to attempt it. Nothing could be further from the truth.

Associated Mental Disorders

The mental disorders which stand out as being especially associated with a suicidal risk are: (1) cyclophrenia, as I prefer to call manic-depressive psychosis; (2) involutional depression, particularly the agitated form; (3) schizophrenia; (4) paraphrenia; (5) inadequate psychopathy; and (6) reactive and post-infective depressive states.

Anorexia nervosa, about which condition I have very individual views, is, of course, a slow attempt at suicide, but it is outside the scope of this paper.

Patients exhibiting the depressive syndrome of whatever origin are such obvious suicidal risks that if properly diagnosed they are for all practical purposes less of a risk than might be supposed. The trouble is that the diagnosis is so often missed, not only by general physicians but also by many (especially, perhaps, psycho-analytically trained) psychiatrists. Even in correctly diagnosed cases the suicidal risk is nowadays somewhat raised, in view of the fact that so many depressives—to my mind, rightly and properly—are given electroplexy under out-patient conditions. Every psychiatrist knows that the danger-point is reached when the treatment is beginning to abolish the inhibition and retardation which are so frequently cardinal features of the depressive syndrome; in other words, when the patient is starting

to show signs of satisfactory recovery. If I may be excused for stating the obvious: general practitioners should never provide such patients with large supplies of barbiturate or other possibly lethal drugs, and should in all cases make a relative responsible for doling them out at the correct times. Further, a general practitioner should make a point of seeing a depressed patient, even if he is receiving treatment from a psychiatrist, at least once a week. This alone renders suicide much more unlikely in depressive cases.

Schizophrenia and paraphrenia again offer such an obvious warning that the risk of suicide is thereby reduced, although such patients are often a source of anxiety to mental hospital doctors and nurses.

The suicidal methods of straightforward depressives are usually clear-cut and practical—precipitation from a height, shooting, poison, stepping on to a railway line under an in-coming train, and the like. Those of schizophrenic and paraphrenic patients are apt to be more bizarre, dictated, as they so often are, by hallucinated voices. The following suicidal attempt by a young male schizophrenic stands out in my mind as being by no means atypical: he procured a couple of pounds of meat, which he allowed to decay for a fortnight. He extracted the juice in a press and injected it from a large syringe with a rusty needle directly into his liver. Strangely enough, he survived.

Professor Stengel (1955) sets great store in differentiating between "successful" suicide (if the somewhat cynical use of the word successful be excused) and attempted suicide. To quote Professor Stengel, "... often the experience of the suicidal attempt signifies to the patient death, survival, and a new beginning." This interesting and important point of view is dealt with more fully under "anthropology of suicide."

Psycho-analysts' Explanation

At this stage it would be as well, I think, to consider the psycho-analytical contribution to the psychology and psychopathology of suicide: the psycho-analysts explain suicide in accordance with two main theories, which are not mutually exclusive. At one point in his quasi-philosophical speculations Freud posited the existence of a death instinct in man. It might happen, for one reason or another, that the death instinct would overpower the various ego instincts, in which case death might be sought for its own sake. There has never seemed much point to me in translating the Second Law of Thermodynamics into psychological terms and making use of the analogy to explain something like suicide in pseudo-causal terms.

However, the psycho-analysts themselves have never been very happy about the death instinct, and often prefer to explain suicide in terms of aggression: suicide is the final act of aggression directed against the self rather than against elements in the outside world. This act of self-aggression covers three main wish-derived impulses—the wish to die (this is the link with Freud's death instinct), the wish to be killed, and finally the wish to kill. The psychopathology of suicide in these terms is carefully elaborated by Karl Menninger in his book, *Man Against Himself*.

In general terms, however, I would say that, as is the case with so much psycho-analytical teaching, what purports to be an explanation in causal terms is really an account of a phenomenon in descriptive terms, based on analogy. According to Freudian natural history, we all have a death instinct; and all of us harbour aggressive impulses, consciously or unconsciously. Why is it, then, that so few of us, numerically speaking, commit suicide, in spite of the fact that so many of us suffer severe reverses of fortune in the course of our lives and are called upon at various times to put up with almost intolerable pain? A simple interpretation in such psycho-analytical terms does not seem to cover all the facts. Nor does it altogether account for the type of suicide which is sanctioned, or even demanded, by the prevailing pattern of culture, although the three

components of the suicidal impulse mentioned above can often be seen to enter into socially conditioned suicides and killings of that nature.

"Biological Suicide"

Ellenberger (1953), in a most interesting article entitled "Suicide in the Light of Ethnological Psychiatry," gives examples of the three types of suicide occurring in various parts of the world.

As an example of what he calls "biological suicide," suicide determined by the "wish to die," he instances both African and Melanesian cultures, in which death appears to follow automatically the violation of religious taboos or as the result of magical practices. In the same way, primitive folk seem to die naturally enough from simple home-sickness.

As examples of suicide as the wish to be killed, Ellenberger mentions the Tschuktschi tribes in North Siberia, amongst whom two kinds of socially accepted suicide were found: (a) suicide proper, occurring only amongst boys, who were not permitted to meet death at the hands of others after the manner of (b) "allowing oneself to be killed." Death sought and found in either of these two ways was regarded as very honourable and assured one of special privileges in the after-life. The grounds for death of that sort were various—for example, painful or chronic illness occurring in old men, or following a fit of temper arising out of a domestic quarrel, or grief over the death of a friend.

The candidates for death enjoyed every honour and consideration. Three methods were available for the loving executioners: strangling, stabbing, or—much more rarely—shooting.

Ceremonial Suicide

As examples of suicide as a wish to kill traditionally forming part of the culture-pattern we have, according to Clark Wissler, the Blackfoot Indians of North America and amok in Malaya. It used to be the case among the Blackfoot Indians that if a man believed himself to be suffering from an incurable illness he would take up his arms and try to kill as many people as possible in his environment before he himself was killed by one of them. It would also seem that amok is not so much to be regarded as an acute homicidal mental illness as a ceremonial rite connected with wounded honour, loss of face, and a desire for revenge. This would bring amok much more into line with other well-recognized forms of ceremonial suicide, such as harakiri in Japan and the self-sacrificing types of suicide, such as suttee, in India.

It is interesting to note that a case of amok was recently reported in the newspapers as occurring at an American Air Force Camp in this country, when an American airman shot as many of his fellows as he could before committing suicide; but I do not remember the full details.

There is a form of ceremonial suicide in Melanesia which is the exact opposite of harakiri and suttee, in that the suicide is directed by the individual against the community. This is described by the late Professor Seligman in his book, *The Melanesians of British New Guinea*.

Space does not allow of further consideration of ceremonial suicide of all kinds or even from mentioning the kind of suicide permitted at various times and in various cultures to members of the upper classes as an alternative to trial and execution: the bowstring in Persia and the old Turkish Empire, the severing of a vein in a hot bath in Imperial Rome, the high-ranking officer in Germany being left alone for a moment in a room with a loaded revolver, and the like.

Nevertheless, all these considerations lead up, naturally enough, to my main "anthropological" thesis, if it can be called a thesis.

Anthropology of Suicide

The late Alfred Adler established at least one very important psychological principle, although he did not, to my mind, always express himself very clearly: man, being a herd-animal, in addition to existing in time and space, requires, as it were, another dimension, the social dimension, which may be called "community," in which to live.

It is my belief that Durkheim's sociological study and Sainsbury's "ecological" survey, already mentioned, clearly point to the following broad generalization: *the most important stimulus for suicide is the loss of the inner feeling of identity with any of the social groupings implicitly or explicitly recognized by the culture-pattern and society in which a person lives*—if you like, the subjective experience of "excommunication." I believe that most attempted suicides even can fit into that formula; but I will deal later with attempted suicide, in the light of Stengel's research.

"Subjective Excommunication"

Let us consider some of the more usual motives for and circumstances connected with suicide.

1. Before the very recent advent in this country of the modern Welfare State, it was a proud working-class sentiment that one should go through one's life without ever being a burden to other people. When one was unable to support and care for oneself the signal for suicide might be sounded. It is for that reason, I think, that until quite recently the Fifth Commandment given on Sinai was burned into the collective unconscious in these islands. The grown-up children therefore automatically and lovingly looked after their ageing parents to the best of their ability; and old folk with near relatives to look after them formed an acceptable, recognized, and honourable social group. When this device broke down, the workhouse ward—with all its horrors, real and alleged—provided a social setting, where the inmates, although *déclassés*, were not pariahs.

Nowadays, an appreciable portion of the patients admitted into my observation wards after a serious suicidal attempt are old people who regard themselves as "useless mouths" and who have lost all sense of honourable group-identity.

2. Other examples of "subjective excommunication" are obvious enough.

(a) A man who has, let us suppose, devoted all his efforts to the identification of himself at all levels with the wealthy, privileged classes suddenly finds his position jeopardized by threatened bankruptcy proceedings, imprisonment, an ugly divorce, or what have you, and converts social death into the real thing.

(b) Sensitive, civilized homosexuals who are "found out" after many years of successful identification with "respectable" social groupings find themselves in a very similar position: they see themselves from now onwards forced to live in a social vacuum, which spells death. That is the reason, I think, why blackmail in this context is so frequently a cause of suicide.

In a sense, I suppose, I am merely giving the idea of loneliness a special kind of connotation. Anyhow, group (c) would include culturally isolated people such as refugees who have not yet had time to put down new roots. I have been told that in large camps for displaced persons suicide is a comparatively rare occurrence: for the inmates very soon form a cohesive group and evolve a group *ethos*. When individuals, however, leave camp and migrate to strange lands, the experience of loneliness, not "belonging" and not even being allowed to "belong" can become almost intolerable. This, of course, links up with the idea of spontaneous death from nostalgia mentioned earlier.

(d) Cultural isolation can work in other ways too: in Esther Warner's (1955) remarkable book, *Trial by Sasswood*, which deals with life in tribal Liberia, there is only one mention of attempted suicide. It was that of a young man who, instead of being properly initiated into his tribe, had been to a mission school and wished to become a doctor. He was the son of the head of the local Poro cult and had been rejected by his father. After he had failed to kill himself by drowning, he gave up the unequal struggle to be identified with two different culture-patterns at one time and returned to his tribe.

*Paper read to the Medical Society of London on March 12, 1956.

It would seem, then, that a simple homogeneous culture, involving community of belief, customs, and *mores*, with which a man identifies himself, at the deepest levels of his being, is the best safeguard against that dreadful isolation which may lead to self-destruction.

The Catholic Culture Pattern

When as a boy I used to travel on the Continent I remember being very impressed by the half-starved, often deformed, repulsive-looking beggars whom one used to see congregated outside churches in Latin countries; and I recollect expressing surprise that they did not commit suicide. What had they got to live for? I think that I found the answer many years later when I read Durkheim's book. Durkheim compared the suicide rate in Catholic and non-Catholic communities and found that the suicide rate amongst Protestants and non-Catholics in general was six, seven, or eight times higher than amongst Catholics.

It is true that a Catholic is brought up to regard despair as one of the most heinous of mortal sins and hence looks on suicide with abhorrence; but I think that one must interpret this differential suicide rate in sociological rather than theological terms: the Catholic culture-pattern is much more compact, communal, and cohesive than the more individualistic Protestant pattern. A Catholic in a predominantly Catholic country like Ireland, Southern Italy, or Spain is always "doing something," which gives him a sense of belonging to the 430-million-strong Catholic family in this world and all the others who are dead—making the sign of the cross, dressing up and walking in processions, taking holy water, saying his rosary, and the like. The Protestant has none of these aids and traditions to come to his support. Fromm (1942), commenting on the burden that freedom of thought and action imposes on the individual, says that the price that has to be paid for these liberties is "isolation and moral aloneness."

One would expect that the suicide rate would for the same reason be low in Communist Russia, but I have not been able to get hold of any statistics.

The trouble about Western (non-Catholic) patterns of culture is, of course, the ever-increasing loosening of all the factors that go to make up natural social and cultural units.

Modern Western man for the most part has few beliefs and practically no convictions; nor has he got a mythology to add meaning to and sustain his psychic life. There are no birth and initiation ceremonies or really stable marriage customs to prepare the way for death occurring at its allotted time. Truly, as Fromm says, the price of "freedom" is high indeed when it is the kind of freedom that leads to nihilism.

American sociologists have shown that the suicide rate was highest in those cities and in those districts where the population was most shifting and the social organization least cohesive.

Economic Factors

The way that economic factors affect the suicide rate is interesting and somewhat unexpected. According to Durkheim, during a period of economic disturbance—unusual prosperity or the reverse—an individual's material ambitions, owing to the consequent relaxation of social control, are apt to become so exaggerated as to be unrealizable, with the result that feelings of frustration lead to an enormous increase in suicide. The period of inflation through which we are passing now is particularly dangerous from that point of view. I well remember the staggering suicide rate in Austria and Germany during the inflationary period in the early nineteen-twenties. Conversely, the feeling of social solidarity and group-identity associated with war and clear-cut national disaster leads to a fall in the suicide rate.

Dr. Sainsbury was well aware of all the factors responsible for suicide that I have mentioned and decided to study the problem from the point of view of locality, taking as his

field five London boroughs representing a total population of some 825,000. His book is, I think, wholly admirable, and his study methodologically as sound as any statistical survey can be.

His work confirms the point of view that I have been trying to put before you—namely, that although suicide is, of course, a psychiatric problem, it is perhaps even more a sociological, cultural, or anthropological (if you prefer the term, as I do) phenomenon.

Suicidal Attempts—A Hysterical Reaction

Let me conclude with a few observations on suicidal attempts, as opposed to suicide proper. If we regard the presence of secondary gain—that is, the advantages accruing from symptom-formation in relation to the external world—as one of the important factors differentiating the hysterics from other psychoneurotic reaction-types, we find that attempted suicide is in many cases almost a pure hysterical reaction. It is as though the patient were saying in so many words: "I am lonely; I am ill; I am ill-treated; my married life is impossible; you must do something about it." The suicidal attempt sounds the alarm bell; and somebody is bound to take note of it, for it always occurs in a place from which help is almost certain to come.

Even the inadequate psychopath who makes repeated attempts at suicide is behaving hysterically, for he is in effect saying: "I am only a poor, helpless creature: please look after and cherish me." In Stengel's (1955) words: "The most important difference between suicide and attempted suicide seems to have been overlooked—that is, that the person who has attempted suicide lives on, and that the attempt becomes a meaningful event in the course of his life and is bound to call forth reactions from the group he belongs to."

With regard to the psychological and social sequelae of the suicidal attempt for the individual and his group, Stengel quotes from a recent article by Seigal and Friedman: "The threat of suicide forces persons to marry, prevents marriage dissolutions, coerces companionship between persons despite their mutual infidelity, prevents marriages, forces parents to acquiesce in their offspring's vicious habits, precludes institutionalization, is rewarded by escape from military duty, is used to obtain favoured treatment over siblings, is employed as a device to avoid military induction, etc."

In my view, however, this rather crude summing-up of the kind of secondary gain attaching to suicidal attempts is a little too harsh and over-simple; for the sequelae of attempted suicide, short-lived though they may be, are as often as not much more "moral" and socially constructive.

I am only too aware that these remarks on suicide and attempted suicide are scrappy, ill-coordinated, and inconclusive. In my defence, I may be allowed to say that it would be quite impossible in so short a space to do anything more than just touch the fringes of so vast a problem.

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The Medical Section of the Library Association held a week-end conference in Manchester on September 21-24. Members were the guests at dinner of the University, when they were welcomed by Sir GEOFFREY JEFFERSON and Dr. WILLIAM BROCKBANK. The programme included visits to the John Rylands Library, Manchester City Library, the University Library (including the library of the Manchester Medical Society), Chetham's Library, and the libraries of I.C.I. (Pharmaceuticals) Ltd.

NEW ACADEMIC YEAR

KING'S COLLEGE HOSPITAL MEDICAL SCHOOL

Lord Justice Denning's Address

Lord Justice DENNING analysed the Hippocratic Oath and discussed moral problems facing doctors when he delivered the inaugural address at King's College Hospital Medical School. Referring to recent court decisions, he said that he thought that the balance had now been restored, and medicine and the law could have mutual confidence.

The Hippocratic Oath would not solve all the problems which a doctor had to face in his everyday practice. It was easy to enunciate that a doctor must be upright and honourable in the practice of his art, but problems arose from it. Was a doctor ever permitted to tell a lie to his patient? If a person was suffering from cancer, it was expected that he should not be told about it. Was that right? Was it permissible to tell a lie for the good of the patient? His lordship suggested that it was never permissible to seek a good end by bad means, to do a little wrong to get a great right. Indeed, if it were generally known that doctors did not tell the whole truth to their patients, the confidence which should exist between doctor and patient would be seriously undermined.

The Oath stated that the doctor should, to the utmost of his power, seek to cure. It might be argued that in the case of a long illness with great pain an overdose of a drug might be justified. Plato and Æsculapius said that the interests of the community at large were paramount. So a good case could be made by the Devil's advocate—but an entirely wrong case. The basis was the Christian ethic. A doctor must keep his patient alive as long as ever he might, for every fraction of a second that nature would permit.

Lawyers had the same problem. Strachen murdered a child and was found insane. He escaped and killed another child. He was sentenced to death. No doubt the jury thought that he would be better out of the way. Was not the Home Secretary right in reprieving him? The son of an under-sheriff of one of the western counties murdered his parents, put their bodies in a wheelbarrow, and threw them over the cliff. Although there was insanity in the family he was hanged, and it was said that he went to death in peace with his Maker. Whether in law or medicine the principle was right which placed the sanctity of human life above all else.

Law and medicine went hand in hand when the Oath stipulated that the doctor should in no way misuse his art or skill. The law in regard to abortion would, his lordship was sure, permit the practice in regard to German measles. The law in England, he hoped, was in complete accord with common sense in this matter.

Lord Justice Denning suggested that it was not right for a doctor to lend himself to any operation for sterilization unless there was just cause, such as a transmissible heritable disease, and it was not just for that individual's own gratification. It might well be that artificial insemination with the husband's seed was well and good. Outside that the medical profession would be justified in denouncing it. A doctor must do everything to cure a patient but do nothing contrary to the public interest of the community at large.

The Oath stated that the doctor must respect the confidence of his patients. It might happen that justice required disclosure, but as his lordship understood the Oath it did not say that a doctor must never divulge information; he must be a judge of the land said so.

Some people suggested that the freedom of the doctor had been impaired under the National Health Service. His lordship suggested that it was not. It was true that by decisions of the courts hospitals had been made responsible for the way they had been inexcusable conduct on the part of the staff. But that was the extent of the matter. He thought that the decision in St. Bartholomew's Hospital's case in 1911

was influenced by the fact that St. Bartholomew's was a charitable institution. It was an illogical decision which rendered the hospital not liable when a professional person made a mistake, but liable when a non-professional one did so.

The medical profession had been disturbed, but he thought that the balance had been restored as a result of the indulgent decision of the court in a recent case. His lordship concluded by stressing that moral problems could not be solved on material lines alone.

In his annual report the dean, Dr. VERNON F. HALL, said that the first stage of the extension to the buildings would be completed by next year. He announced that the University of London had included the full cost of the second stage in their building programme for 1957. The first stage includes student accommodation, a new practical pathology classroom, and a floor to accommodate the new medical professorial unit. The second stage will contain research accommodation for the department of chemical pathology, a clinical lecture theatre, a clinico-pathological demonstration room, and a suite of rooms for the student health service, as well as teaching and research accommodation for the department of surgery comparable with that of the medical unit. The whole of the available site will then be occupied and the accommodation of the school will be increased by 60%. For the next quinquennium (1957-62) a proposal has been made for the building of an entirely new dental school to accommodate nearly twice as many students as at present.

Dr. TERENCE EAST, director of studies of the medical school, presided at the opening of session ceremony which was held on September 28.

The annual dinner was held at the Savoy Hotel on September 29, with Dr. R. D. LAWRENCE in the chair. Dr. C. RICKWORD LANE, proposing the toast to the medical school, spoke of Dr. V. F. Hall as a very popular and successful dean. In reply Dr. HALL described the school as a friendly corporate institution and an excellent training-ground for the young. Quoting J. S. Mill's aphorism, "Genius can only breathe freely in an atmosphere of freedom," Dr. Hall said that what was taught at King's was a system of medicine designed for the treatment of the individual by the individual. The health of the chairman was proposed by Mr. J. H. PEEL, who said that when the subject of diabetes was discussed in any part of the world the name of R. D. Lawrence was bound to be mentioned with admiration and affection. Dr. Lawrence had had the unique opportunity of showing diabetics how to live full and complete lives by his own example. Replying to the toast, Dr. LAWRENCE first welcomed the guests, and then, having spoken feelingly of his impending retirement, gave some fascinating glimpses of his own early career as a young doctor in London and in Italy.

CHARING CROSS HOSPITAL

Future Site of Medical School

The presentation of prizes and certificates to the students of Charing Cross Hospital Medical School took place at the Mansion House on September 28, with the Lord Mayor of London, Alderman Sir CUTHBERT ACKROYD, presiding. This was said to be the first occasion on which any medical school has had the privilege of using the Mansion House for this ceremony. The presentations were made by Viscountess KILMUIR, and were followed by a brief address by Viscount KILMUIR, the Lord Chancellor.

The new dean of the school (Professor W. J. HAMILTON) began with a tribute to his predecessor, Dr. E. C. WARNER, who recently retired from the deanship after serving for six years. He said that the school council and the academic staff desired to place on record their appreciation of the work done under Dr. Warner's tenure. Many major projects designed to improve the facilities and accommodation of the several departments and to meet the ever-increasing demands upon the school buildings as a whole had been successfully

carried through, and it was entirely due to Dr. Warner's efforts that they were one of the first medical schools in the country to introduce the general-practitioner firm—the "G.P. firm," as it had come to be known—which afforded each senior student a short period of tuition and experience in general practice.

Professor Hamilton went on to say that since 1944 it had been the intention to move the medical school, with the hospital, to Northwick Park. In his report last year Dr. Warner had informed them that the Minister of Health, in February, 1955, had notified Parliament that Charing Cross Hospital was designated as one of the first hospitals to be rebuilt and had subsequently announced that funds would be available for rebuilding at Northwick Park in the financial year 1957-8. While these developments were taking place, however, it had become increasingly apparent to the medical school that neither the University nor the University Grants Committee were in favour of any proposal for the removal and rebuilding of the school at Northwick Park, and that the University did not consider that there was any possibility of their meeting the cost of such a scheme. This was very disappointing news to many of them who had hoped to see a new school erected on a fine site adjacent to the hospital. A joint consultative committee with representatives of the Ministry of Health, the University Grants Committee, and the committee of vice-chancellors and principals had been set up to discuss general problems affecting both Charing Cross and other hospitals and schools in a similar predicament, and he was confident that a solution to the problem would be found. They felt that the closest association between the school and the hospital must be maintained, not only in regard to their respective policies and staff but also to their function as a teaching unit. Therefore the school and hospital must remain in close proximity, and any plans for the development of the school must be integrated in all respects with those of the hospital. It would be fatal to the present efficient and harmonious relationship existing between both institutions if the hospital were to be rebuilt at Northwick Park and the school remained at Charing Cross.

School Successes

Speaking of school successes during the year, the dean said that at the first M.B. examination in July all but one student passed; only two students failed to complete the preclinical course successfully. In the final examination the pass lists varied between 79 and 100% in the different subjects, and 72% of the students passed in every subject. Further, the students of the school claimed half the places in the honours list of the combined 12 medical schools of the University.

Viscountess KILMUIR then presented the prizes. The outstanding prizewinner was Dr. JOHN ROBERT CURTIS, who carried off an exceptionally large number of awards, including the Llewellyn Prize, the Governors' Clinical Gold Medal, and eight other prizes and two certificates of merit. The trophy for the athlete of the year was presented to J. D. WRIGHTON, who recently ran for Great Britain in the 4 x 400 metres relay against the German Olympic team at the White City and won his lap.

The LORD CHANCELLOR said that it was a very great pleasure to hear of the vitality and progress of the school now approaching the end of the first quarter of its second century. When the school was founded in 1834 the hospital had already been in existence for 15 years, and it must have been a great joy to the founder of both institutions, Dr. Benjamin Golding, to have seen them established. It was good also to know that Golding lived for 20 years longer to see the two institutions flourish and complement each other. The audience did not need to be reminded that among the early students (1842-5) was Thomas Henry Huxley.

This was an occasion, however, for looking forward to what remained to be achieved. He himself, although his

life's work had been in another direction, could not be ignorant of the great advances of scientific medicine which institutions like Charing Cross had made possible. He was for some years senior counsel to the Royal College of Physicians of London. He knew that scientific achievement never stood still, and he had every hope and expectation that the great wave of research to which Charing Cross itself had notably contributed would continue. The scholarships, exhibitions, and prizes presented that day were a sign of the awareness of the coming generation of the great opportunities which spread before them. But a hospital was more than a home of science. The hospital movement in this country had been started by a sense of voluntary service, and despite many changes that feeling of voluntary service still remained. He wished Charing Cross godspeed for another year of achievement.

Mr. JOHN ADAMSON, a member of the school council, said that the present occasion coincided with the 35th year of Lord INMAN's devoted service to the hospital and to the medical school. In gratitude and commemoration the governors and staff and his many friends in connexion with Charing Cross were presenting him with his portrait, to be painted by an artist of his choice. He spoke of Lord Inman as the ideal chairman who had shown that the wellbeing of the hospital and school were, of all his interests, the nearest to his heart.

Lord INMAN, in accepting the gift, said that in the boardroom of the hospital there was a bust of Benjamin Golding, the founder, and many visitors asked who he was. If in time a portrait of himself also found a place there and any should ask the same question he would be well content if it were answered, "He was one of many who loved and tried to serve Charing Cross Hospital."

Sir NORMAN BIRKETT supported a vote of thanks to Lord and Lady Kilmuir at the close of the proceedings.

MIDDLESEX HOSPITAL MEDICAL SCHOOL

At the annual dinner of the Middlesex Hospital Medical School held at the Savoy Hotel on September 28, under the chairmanship of Mr. F. W. ROQUES, it was announced that it was hoped that the building of the new medical school would start early in the new year. This had become possible as a result of the great generosity of the chairman of the hospital, Lord ASTOR OF HEVER, who last year had opened the building fund with a gift of £400,000; the grant of £124,000 from the University Grants Committee for the purchase of the site; and a new covenanted benefaction, amounting to £122,000, from Mr. EDWARD LEWIS, a director of the Decca Company, a "friend of the school and hospital for many years." To Mr. ROQUES fell the task of proposing the toast of "The Hospital and the Medical School," and he was the first gynaecologist to do so since Victor Bonney 30 years before. Overshadowing the dinner, he said, was the tragic loss the previous night of Sir WILLIAM GILLIATT, one of the school's most distinguished sons. Two honours during the year had particularly delighted Middlesex men, continued Mr. Roques: the barony conferred on Colonel J. J. Astor, their chairman since 1938, whose personal interest in the hospital matched his generosity towards it; and the award of the gold medal of the Royal Society of Medicine to Sir Gordon Gordon-Taylor. The dean, Professor B. W. WINDEYER, and the senior Broderip scholar, Dr. L. G. WHITBY, a son of Sir Lionel Whitby, replied. After referring to the successful experiment of exchange visits of clinical, and now preclinical, staff with Toronto, Professor WINDEYER described the building programme. The first phase, due to begin in the new year, would comprise the preclinical school and a residential hostel for 150 students, on a site bounded by Howland Street, Cleveland Street, and Charlotte Street. The cost was estimated at one and a quarter million pounds. At this point Professor Windeyer announced Mr. Lewis's benefaction. Later the clinical departments would be added.

Dr. WHITBY, as tradition demanded, reported on the student affairs. The final speaker was Mr. E. W. RICHES, who had the rewarding task of exposing the life history of the evening's chairman. Over 350 past and present members of the school attended the dinner.

MEDICAL STATISTICS

[FROM A SPECIAL CORRESPONDENT]

"Facts, not opinions" was one of the watchwords of the Royal Statistical Society when it was founded in 1834. Professor A. BRADFORD HILL showed how this austere aim proved hard to live up to when he reviewed the history of the Society's interest in medicine from its foundation, with three medical men on the council, until to-day, when it had an active section devoted to the study of the statistical aspects of medicine. Professor Hill was opening the first conference of the Society's medical section, which was held at County Hall, London, on September 28.

Reproductive Efficiency

Professor DUGALD BAIRD's paper, on the use of statistics in clinical obstetrics, was indeed an admirable illustration of the virtue of facts in a field where unsupported opinions have held sway for too long. His department in Aberdeen had been studying the influence of social and environmental factors on child-bearing for the past eight years, he said, and had built up a picture which not only provided a background for further clinical and laboratory research but also revealed many new facts. It was not generally realized that a woman's reproductive efficiency began to deteriorate even from the age of 20. A convenient yardstick was the proportion of all deliveries which were spontaneous and which followed a labour of 24 hours or less. In his series this figure ranged from 80% among primigravidae of less than 20 years to 30% in those of 35 or more. As well as age the most important factors were height, shape of pelvis, and general health; these were closely related to one another and also to social grade. In the study of lactation facts were particularly hard to come by. Hytten, working in the same department, had broken fresh ground in his surveys. His finding that as many as one-third of women may be physically incapable of maintaining adequate breast-feeding for more than a few weeks should be given more attention by those who hold, as an article of faith, that "it is all a matter of will-power."

The most interesting demonstration of the use of statistics in Professor Baird's department was his description of the effects of his policy of inducing labour, and, if necessary, performing caesarean section, in women over the age of 25 if pregnancy reached the 42nd week. The figures suggested that the policy had brought about a considerable reduction in the perinatal mortality rate due to "unexplained" causes, but they also suggested to Professor Baird that the pendulum had swung too far, that too many caesarean sections were being done. To at least one listener the analogy between his methods and the industrial use of statistical "quality control" was most striking.

Mutation Rates

Professor L. S. PENROSE spoke about the genetical effects of radiation on human populations, a subject in which, as the speaker would be the first to admit, the ratio of opinions to facts is regrettably high. He considered the first problem here was to determine the rate at which genetical mutations occurred in the presence of normal background radiation. There were two ways in which the problem might be tackled: one might study the family trees of people suffering from certain clearly defined conditions (often skeletal deformities); or one might, assuming the population to have reached a state of genetical equilibrium, equate the mutation rate with the rate at which bearers of unfavourable genes, such as haemophiliacs, were bred out as a result

of their unfitness as reproducers. When the base-line had been fixed there remained the problem of determining the sensitivity of various genes to increases in the level of radiation. At present, in order to make any progress at all, it was necessary to adopt the working hypothesis that the doubling dose was the same for all genes. This might be very far from the truth. All this was difficult enough; but these methods applied only to the very rare, and therefore not vitally important, single-gene conditions. What happened when we turned to the multiple-gene effects—stature, intelligence, and the like? Here the chief problem was that the effect of doubling the mutation rate was likely to be slight, because only a very small part of the total variation could usually be attributed to fresh mutation.

Professor Penrose described some of the ways in which more exact information could be obtained on the effects of radiation on human genes. Studies making use of the ages of parents should prove fruitful; it would be a useful start if the national vital statistics included information of the ages of fathers as well as of mothers.

Cancer and Leukaemia

After an entertaining film, in which Dr. A. L. COCHRANE showed how the Medical Research Council's Pneumoconiosis Research Unit carries out its well-known x-ray surveys in South Wales, Dr. PERCY STOCKS read a paper on statistical studies in relation to environment. Much of this paper was taken up with a discussion of the reliability of answers given by patients and their relatives to specific questions. Is the wife of a man who dies from stomach cancer likely to over- or under-estimate her husband's average weekly consumption of tea? Dr. Stocks gave the preliminary answers to such questions as this in describing his investigation into the environmental histories of people with and without cancer, which he has been directing for the British Empire Cancer Campaign. Discussing the investigation of soil samples taken from gardens of houses where people with and without cancer had lived for long and short periods, he showed how the statistics suggested that some, at least, of the regional variation in the incidence of stomach cancer might be attributable to differences in soil composition.

In the final paper Dr. W. M. COURT BROWN described one particular investigation—that into the association between leukaemia and therapeutic x rays. This was a good example of the value of a statistical inquiry based on existing records. The survey was concerned with the fate of some 13,000 patients treated for spondylitis at 79 radiotherapy centres during a 20-year period, and showed that in these patients the mortality from leukaemia was at least nine times the normal expectancy. Subsequent work had shown no such association with patients with spondylitis not treated with x rays. It is therefore reasonable to conclude that the increased mortality from leukaemia was the direct result of exposure to therapeutic x rays.

Professor BAIRD expressed the opinion that the practice of obstetrics would suffer no immeasurable loss if the use of x-ray pelvimetry was drastically curtailed.

The need for more rapid progress in the regrouping of water undertakings into units adequate to meet modern demands was stressed by Mr. J. ENOCH POWELL, Parliamentary Secretary to the Ministry of Housing and Local Government, when he opened Friar's Wash pumping-station, between St. Albans and Luton, on September 27. In the next 12 months, Mr. Powell said, the Government hoped to see substantial progress in various parts of the country, and the Minister's decision on schemes submitted to him would be influenced by this consideration. The small water undertaker had in the past done pioneer and excellent work, but without large financial resources, full-time qualified supervision, and adequate staff it was difficult for water undertakers to-day either to maintain the highest standards or to secure the economic and timely utilization of water resources.

Correspondence

Because of heavy pressure on our space, correspondents are asked to keep their letters short.

Christmas Gifts Fund Appeal

SIR,—I shall be very grateful if you will spare room for me to remind your readers that Christmas will be coming round again soon, and to ask them to give a kind thought and a generous gift to the beneficiaries of the Royal Medical Benevolent Fund.

To those of our colleagues who have fallen by the way-side, and to the widows and children of those who have passed away, a little cheer at Christmas-time means much more than the gift itself. It is especially heart-warming for them to be remembered by members of the profession who are in a position to help them. I earnestly beg all your readers to send contributions marked "Christmas Gifts" to the Secretary, Royal Medical Benevolent Fund, 1, Balliol House, Manor Fields, Putney, London, S.W.15.—I am, etc.,

WEBB-JOHNSON,
President,
Royal Medical Benevolent Fund.
London, S.W.15.

Purpose of Medical Education

SIR,—The *B.M.J.* has published many searching papers on this topic, but none has revealed the sense of desperation implicit in the excellent address of Professor G. W. Pickering (*Journal*, July 21, p. 113). After many years devoted to the aim which he underlines—i.e., that of training the mind of the medical student—I must say that I approach the end of my teaching life with a sense of despair.

The answers to Professor Pickering's questions which deal with the "three great obstacles"—namely, the enormous body of "so-called facts," the rigidity of the curriculum, and its disorder—are in their simplest form the domination of examinations, the oppressive influence of the General Medical Council, and the vested interests of the teachers.

For more years than I care to enumerate I have sat on a committee the object of which is to achieve some degree of evolution in the curriculum. Inevitably any real reform is frustrated by these three Norns. As Professor Pickering rightly says, "Readiness by teachers and taught to admit and remedy ignorance . . . will not be easy, since most teachers mould themselves on those who taught them." So it emerges that the examination is the aim, and to such an extent has this become the dominating factor in the school in which I teach that no supplementary examinations are now permitted, with the avowed object of "weeding out" the less intelligent—this in face of the fact that past experience provides many examples of final-year prizemen who stumbled more than once. So long as this attitude is dominant, no education in the university sense is possible. It is to be noted that the examination is greatly overrated because of the manner in which postgraduate students prepare for and are sorted out by the two Royal Colleges.

As for the influence of rigidity, one has merely to raise the question of reduction of courses or the incidence of examinations to be faced by a colleague with a *non possumus* resulting from his interpretation of the General Medical Council's recommendations. It is idle to emphasize the fact that the Council does not, in so many words, define hard limits. It does not indicate clearly enough that it is for a university faculty of medicine to act in an enlightened manner to achieve educational objectives as it sees fit. The disorder arises from failure of the educational aim. Obviously there can be little discrimination as to the importance of this or that subject or part of a subject if there is a technological aim only. What saddens me most is the fact that the study of medicine, from the basic sciences up, should provide one of the most exciting educational

adventures open to a university student, whereas, as countless graduates have come and told me, they have all their enthusiasm and even their interest reduced to the point where they long for the final examination as a release.

Professor Pickering's most trenchant question is: "Will the medical course be arranged primarily in the interests of educating the student, or primarily in the interests of the prestige of the teachers?" My answer is that, unless some august body like the General Medical Council actually states in words that education does not mean training, and that examinations are not to be made the aim or the simple test of intelligent capacity, and that there is no need to include certain specialties in the undergraduate course, we can expect the situation to remain as at present.—I am, etc.,

Adelaide.

C. STANTON HICKS.

The Discipline of Learning

SIR,—It is more than 25 years since I learned anatomy in detail, and admittedly at that time "without understanding its place and purpose in the knowledge of the modern doctor" as Dr. A. Morgan Jones writes in your issue of September 1 (p. 494). Now—after a number of years in a coal-mining practice where the amount of work to be done has to be experienced to be believed—I am of the opinion that the discipline of learning anatomy is the most important single factor in preparation for the rigours of general practice. When doing anatomy most students feel that the detail is such that they can never hope to learn it all, but they do. In general practice on most days one feels the work cannot possibly be done, but it is done, and this largely I am sure because one is conditioned to hard work by the severe training in anatomy imposed upon us in our pre-clinical days.—I am, etc.,

Cymmer, Glam.

E. W. KINSEY.

Adrenal Cortical Function

SIR,—In his extremely able review of "Chemical and Clinical Problems of the Adrenal Cortex" (*Journal*, September 22, p. 673) Professor F. T. G. Prunty kindly refers to my studies of adipose children (adipose gynandrm and gynism) under the heading "Adiposity Resembling Cushing's Syndrome," and concludes, "We are inclined to agree with Simpson that there is an underlying abnormality of adrenal cortical function in these individuals which by present methods fails to be demonstrated." In this connexion may I mention a very recent and overlapping publication,¹ in which, using chromatographic methods of hormone assay, it was concluded from the data that "in adipose gynism and in adipose gynandrm the excretion of compound F was significantly increased above that of normal children. In children with adipose gynandrm the excretion of an unknown Δ^4 -3-ketosteroid, X_4 , was also significantly increased"?

Professor Prunty also has a very interesting paragraph on the "Time of Adrenarche," in which he states, in relation to a child who developed hirsutism at 8 and puberty at 13, "It is suggested that she had an early adrenarche as mentioned by Talbot, Sobel, McArthur, and Crawford (1952), but which is poorly documented." Professor Prunty further gives an interesting example of delayed adrenarche in a male of 18.

My studies of groups of fat children (given the name of adipose gynandrm for males and adipose gynism for females) over the last decade led me to a similar conclusion, which I recorded in 1951 in a lecture² to the Endocrine Section of the New York Academy of Medicine as follows:

"In speaking of puberty, we think of chronological puberty—for example, 13+ or —, with sex maturation. Fuller Albright has reminded us that the adrenals as well as the gonads come into play at that time, a thought propounded by Bulloch and Sequeira in 1905—'The adrenal cortex is connected with the growth of the body and the development of puberty.' Albright has coined the term adrenarche as supplementary to menarche. He appears to have limited this conception to androgens and to chronological

puberty. I would extend the conception to the adrenal glucocorticoids and recognize that there may be, and often is, a pre-adrenarche at the age of 7+ or —; and that the adrenarche, like the climacteric, may precede chronological puberty by several years and persist after it by an equally long period. My views are based on clinical considerations, but are supported by some hormone assays."

I am, etc.,

London, W.1.

S. LEONARD SIMPSON.

REFERENCES

- Gray, C. H., Lunnon, J. B., Pond, M. H., and Simpson, S. L., *J. clin. Endocr.*, 1956, 16, 473.
- Bull. N.Y. Acad. Med.*, 1951, 27, 723.

Intracranial Aneurysm

SIR,—Mr. I. R. H. Kramer (*Journal*, September 22, p. 711) raises certain queries in relation to the material described in my preliminary note (September 8, p. 585), in which detail was omitted for the sake of brevity.

The material used is a self-curing acrylic (a self-explanatory name) for the repair of dentures, curing being achieved by tertiary amine in the monomer and benzoyl peroxide in the polymer. The manufacturers' stated time for "completion" of polymerization is twenty minutes. Smith and Bains¹ state that incomplete polymerization is the rule with cold-curing materials, that the residual free monomer is 1%, and that 0.5% is relatively stable and inextractable except with great difficulty.

Shrinkage is proportional to the amount of monomer used. In a three-to-one mix, and allowing for partial evaporation of the monomer, shrinkage is about 6%. These statements refer to the use of acrylic compounds in dental conservation. Initial work, discovering the properties of the material used, was done on glass rods, and collars were run around these. Cracking of the polymerized collar was never observed, and it was always possible to slide the collar off the rod, even after several weeks. Thus it was in its use around a vessel that the phrase "no shrinkage" was intended.

All the cases treated by this method were under hypothermia, with the blood pressure lower than normal, so that the sac was not tense when invested. Arterial spasm of the parent artery in the cases so far dealt with has not been noted, but it would seem an obvious step to apply papaverine sulphate solution to the artery bearing the sac, so that it would be at maximal calibre when encased.

The phrase "neither clinical nor experimental evidence" was intended by me only to refer to personal findings. The use of the material in experimental cavities has revealed its tendency to result in odontoblast damage, or necrosis, and the toxicity of free monomer has been stated to be approximately that of acetone.—I am, etc.,

JOHN DUTTON.

Bristol.

REFERENCE

- Smith, D. C., and Bains, M. E. D., *Brit. dent. J.*, 1955, 98, 55.

Adrenalectomy for Intracranial Metastases

SIR,—I was very interested to read the article by Mr. Allan Clain and Mr. Alan H. Hunt on "Adrenalectomy for Intracranial Metastases from Carcinoma of the Breast" (*Journal*, September 15, p. 627), as I have under my care a patient with an intracranial metastasis who has had a good remission following adrenalectomy.

A single woman, then aged 43, had a radical mastectomy performed for carcinoma of the right breast in 1953. In August, 1954, x-ray therapy was given to the right cerebral hemisphere for a presumed metastasis. The headache re-emerged with increasing intensity until she was admitted to St. Leonard's Hospital on March 5, 1955, in semicomatose with gross papilloedema and a left hemiparesis. She responded to dehydration therapy and was given testosterone propionate, 100 mg. thrice weekly, pending her decision regarding operation. She was readmitted on April 24, again in semicomatose, and once more responded to dehydration. On May 5, 1955, bilateral oophorectomy and left adrenalectomy were performed, with removal of the right adrenal a fortnight later. She responded very well: her headache

went, she became alert, the fundi returned to normal, and the hemiparesis improved. She returned to full duties as a clerk and remained well until two months ago, when morning headache recurred. Although the patient is still at work there is now early papilloedema to be seen.—I am, etc.,

London, W.1.

G. M. LUNN.

Statistics of Therapeutic Trials

SIR,—My attention has been drawn to Dr. I. Sutherland's review of my book *Statistics of Therapeutic Trials* (*Journal*, December 10, 1955, p. 1433). It is not for the author to question the reviewer's opinion, but if the review contains misstatements or distortions of facts the author is entitled to a correction. After careful consideration of Dr. Sutherland's statements, I must ask you to oblige me by publishing this letter in your *Journal*.

The reviewer blames the author for "a tendency to oversimplify medical situations, exemplified by the dichotomy of diseases into acute and chronic. . . ." He does not mention that it is repeatedly emphasized in the book that the dichotomy of diseases into acute and chronic is only a first approximation. The first time this is stressed is on page 9 of the book with these words: "Considering that the dichotomy of diseases into acute and chronic is only a first approximation to nosological classification . . . it follows that the allocation of statistical methods given above is also to be regarded as a first approximation and will have to undergo modifications as the nosological description becomes more detailed."

The reviewer is opposed to "the author's advocacy [sic] of alternate allocation of cases to treated and control groups to the virtual exclusion of other methods. . . ." The reviewer cannot have overlooked the fact that throughout the book the reader's attention is always drawn to the need for modifying the simple alternate allocation of cases in such a way as to ensure due consideration of possibly concurring causes. Contrary to the reviewer's statement, I have hardly anywhere recommended the method of simple alternates. Moreover, it is inconceivable how the reviewer could make a statement of this sort in view of the fact that the sampling methods advocated in the whole of Part 3, and most of Part 4, and thus in little less than 200 pages, have *nothing whatsoever* to do with sampling by alternates.

The reviewer states: "There are careless statements like 'the coefficient of contingency . . . is a correlation coefficient.' " If the reviewer has never heard of the Bernoullian correlation coefficient or the tetrachoric correlation coefficient, this is his fault, and it is, therefore, the reviewer's statement which is "careless," not mine.

The reviewer blames the author for conveying "the impression that the statistician and the clinician are each to be encouraged to plan trials without reference to each other," and that "close co-operation between clinician and statistician appears to be nowhere stressed in the book." How, in the face of the second paragraph, page viii, the reviewer could make this statement is difficult to understand, since what I say there is the precise opposite of what the reviewer imputes to be my intention. The passage runs: "But there is yet another aspect of therapeutic trials on which the medical statistician should be able to comment and advise, and that is the suitability of a criterion for the therapeutic trial in question. As a rule, there are a number of criteria available, and, perhaps, equally important ones from the clinician's point of view, and it is now for the statistician to say which of them is most suitable from the statistical angle."

What I have said in the preface seems to have made the reviewer apprehensive of the consequences for statisticians, as a professional class, should physicians ever master the rudiments of their craft. But it is just this tendency of pretending that this would be a hopeless undertaking which I wanted to counteract and disprove. This does not mean, as the reviewer fears, that physicians might cease to consult statisticians altogether, but only that they could acquire such knowledge of statistics as is required for carrying out simple significance tests, and forming their own conclusions instead of following blindly the statistician's conclusions. I cannot help Dr. Sutherland: statistics as applied in medical significance testing is not so difficult that a physician could never hope to master the craft.—I am, etc.,

Bristol, 8.

G. HERDAN.

Shoe-fitting

SIR,—I have read the letter from Mr. C. A. Pratt (*Journal*, September 22, p. 714), and I think that most people would agree with this. With many others, of course, I deplore the use of shoe-fitting fluoroscopes, since they are undoubtedly dangerous and are of little value. In 1949 I had a conversation with a leading Swedish shoe importer and retailer, and we discussed the question of shoe-fitting fluoroscopes. These are illegal in Sweden, and he much regretted his inability to use these machines—he recognized the fluoroscope as being of little value, but he appreciated it as a publicity agent. He informed me that he overcame this difficulty, at least in the case of children, by having transparent plastic shoes made in the various sizes on the lasts of the different makes and types. This enabled the fitter, the parent, and the child to see clearly just how closely fitting the shoe might be, even in the more rigid types. He considered this method to be good publicity and to obviate difficulties in some cases. I have often thought that this method might be used in this country in preference to the use of x-ray machines.—I am, etc.,

Oxford.

G. M. ARDRAN.

Painless Cardiac Infarction

SIR,—I was very interested to read the annotation on "Painless Cardiac Infarction" (*Journal*, September 22, p. 705), and particularly the theories which have been put forward to explain their occurrence. I am in full agreement with the view expressed by Evans and Sutton that this might be explained on the basis of the efficiency or otherwise of the collateral circulation. Threshold to pain no doubt plays a part in the symptomatology which may result from such infarction, but I would suggest that a high threshold would be the operating mechanism in symptomless cardiac infarction, rather than a low one.—I am, etc.,

Leeds.

T. KRAFT.

SIR,—In your annotation (September 22, p. 705) you write: "However, undoubtedly some cases of cardiac infarction are symptomless. A low threshold to pain . . . have all been suggested as explanations." An obvious error—"low" should be "high." The analgesic effect of morphine and other drugs results from a raising of the pain threshold so that the stimulus which was previously adequate no longer evokes pain. Similarly certain states (e.g., inflammatory) lower the threshold: thus tenderness is elicited by a strength of stimulus which in normal conditions would be ineffective.—I am, etc.,

Dundee.

F. R. BROWN.

Clinical Psychologist in the Mental Hospital

SIR,—In his paper on the work of the clinical psychologist in the mental hospital, Dr. R. Hetherington (*Journal*, September 22, p. 708) states that "the tests he [the clinical psychologist] uses are based on scientific research and depend as little as possible on personal subjective impressions and as much as possible on objective measurement." He then proceeds to state that "the various so-called 'projective techniques,' such as the Rorschach ink-blot test and Murray's thematic apperception test, give valuable information about a patient's personality. The former gives indications of how the patient operates: anxiously, depressively, obsessively, and so on; the latter yields information about his attitude and opinions with regard to his parents, death, violence, sex, and the like."

With respect to the use of the Rorschach, at least, it would be interesting to know how Dr. Hetherington reconciles the first sentence quoted above with the second. It would be a pity if the general practitioner were to conclude from Dr. Hetherington's paper that the Rorschach is "based on scientific research" and depends "as little as possible on subjective measurement." Most of the published work on the Rorschach fails lamentably to reach acceptable

standards of scientific rigour. In recent years, it is true, a fairly large number of carefully controlled studies have tested the various claims embodied in the second quotation from the paper. After a careful review of this evidence carried out in the Institute of Psychiatry's department of psychology it was concluded that these objective studies failed to support any of the claims made on behalf of the Rorschach. The evidence was considered sufficiently conclusive to lead to the abandonment of the use of the Rorschach in clinical work.—I am, etc.,

London, S.E.5.

AUBREY J. YATES.

SIR,—With reference to Dr. R. Hetherington's article (*Journal*, September 22, p. 708) I would like to draw attention to the fact that there exists an official instrument dealing with the functions, status, training, etc., of clinical psychologists on a national basis (within the National Health Service). Dr. Hetherington's account of the working of clinical psychologists, as he himself states, refers to one hospital only—namely, Crichton Royal, Dumfries—and thus represents rather a personal view.

The instrument I am referring to is the agreement reached between a working party, set up in February, 1952, of the Committee of Professional Psychologists (Mental Health), English Division, of the British Psychological Society and the Ministry of Health. This agreement was published by the Whitley Councils for the Health Services in the Circular No. 27 (Professional and Technical A), 1954. This circular, however, does not represent the views of the Scottish Division of the Committee of Professional Psychologists.¹ The Scottish Division of the Committee of Professional Psychologists (Mental Health) expresses a somewhat different view on the question of functions, status, and training of clinical psychologists. Their policy is embodied in a memorandum published in the *Bulletin of the British Psychological Society*.² Since the publication of P.T.A. Circular No. 27 in 1954, two further P.T.A. Circulars have superseded it (No. 30 in 1955 and No. 39 in July, 1956). These latter two deal mostly with training and remuneration of clinical psychologists. The basic functions and status of clinical psychologists, however, have not been altered.

It is therefore of importance that hospital boards, management committees, medical officers, especially in mental hospitals, and clinical psychologists themselves, in case of doubt, or for reference, should consult the Whitley Councils for the Health Services P.T.A. Circular No. 27, 1954.—I am, etc.,

Chester.

LEON J. DRASPA.

REFERENCES

- ¹ *Bull. Brit. psychol. Soc.*, 1955, 25, 1.
- ² *Ibid.*, 1955, 26, 31.

B.C.G. and Vole Bacillus Vaccines

SIR,—The report of the Medical Research Council on vaccination against tuberculosis (*Journal*, February 25, p. 413) has been accepted as evidence in favour of B.C.G. vaccination with such an astonishing lack of critical examination that it seems most important to draw attention to those parts of the report which are in need, at least, of clarification. The first is the method of dealing with the complications of vaccination. The report states (p. 417): "Leaflets describing the normal course of the vaccination reaction were given to the vaccinated children, and they were instructed to report any abnormality to the school medical officer. By these measures a few cases of regional adenitis . . . were brought to the notice of the teams, but there was no evidence that such complications were common." Just how uncommon they were is not mentioned, but, of the complications of which a record was kept, there were two cases of erythema nodosum after B.C.G. vaccination and three cases of tuberculous adenitis caused by vaccination with the vole bacillus. In addition, vole bacillus vaccination resulted in an unspecified number of lesions indistinguishable from lupus vulgaris, of which 22 were severe enough to need treatment.

All these complications were excluded from the calculations from which the incidence of tuberculosis in the vaccinated children was assessed. Only those lesions which appeared to have been caused by the human tubercle bacillus were regarded as "cases of tuberculosis," even if vaccination had caused similar lesions or perhaps worse—and before the days of chemotherapy lupus vulgaris was a very terrible form of tuberculosis. It is scarcely surprising, therefore, that the vaccinated children seemed to have less tuberculosis than the unvaccinated. It does not seem unreasonable to say that the true tuberculosis morbidity in this group consisted of all the patients who had tuberculous lesions whether they were caused by infection with the human tubercle bacillus or by vaccination. If the 27 known cases of complications of vaccination are added to the 20 "cases of tuberculosis" which were found in this group the incidence is little different from that in the unvaccinated children.

The second criticism is of the efficiency of the follow-up. To keep in touch with 56,700 children must have been extremely difficult, and contact was maintained by personal letter, by a visit from a health visitor, and, within each 18-month period, by x-ray examination of the chest. More than 90% of the participants were investigated by one or other of these methods. But, although this would seem to have been an impressive achievement, only the x-ray examination can be regarded as having been of any scientific significance in diagnosing tuberculosis, and here the achievement is not nearly so impressive. From the random sample on which these results are based, 77% of the unvaccinated controls, 74% of the B.C.G. vaccinated, and 70% of the vole bacillus vaccinated had a chest radiograph during the period of the follow-up, and it would seem that 3,036 of the controls and 5,586 of the vaccinated were not x-rayed after admission to the survey.

Finally, it should be remembered that the survey was carried out in three separate centres—London, Birmingham, and Manchester—but the report does not state whether or not the cases of tuberculosis were distributed evenly between the different groups in the different areas. If, for instance, most of the cases amongst the vaccinated occurred in London and most of those amongst the unvaccinated in Birmingham or Manchester, accidental environmental factors or the application of different diagnostic criteria might easily account for an apparent protective effect of vaccination.

There is little in the report, therefore, to suggest that vaccination against tuberculosis is any more effective now than it was in 1927, when the Editor of the *British Medical Journal* exposed Calmette's fallacious claims for B.C.G.¹—I am, etc.,

Dungannon, Co. Tyrone.

E. F. JAMES.

REFERENCE

- ¹ *British Medical Journal*, 1927, 1, 845.

Is Tonsillectomy Necessary?

SIR,—May I trespass once more on your valuable space in order to comment on the letters of Drs. J. C. Ryle (*Journal*, September 8, p. 603) and J. Burkinshaw (*Journal*, September 22, p. 713)? Much as I support their commendable statements on tonsillectomy, yet I cannot let the contention in the M.R.C. Report No. 227¹ go unanswered. This implies that tonsillectomy may render the patient at least as resistant as non-tonsillectomized persons and that the case against operation is statistically unanswerable. Those of us working in infectious diseases hospitals have ample proof (if this be needed) that tonsillectomy *per se* does not influence resistance to infections to any considerable degree. I can provide many instances, including my own personal experience, where the patient has contracted nearly every common infection since operation. Not that this is related in any way to the operation or even to the absence of tonsils themselves.

Immunity is gained by the body's capacity to produce antibody. This, in turn, may be achieved by a single

massive infection or by repeated subclinical exposures. The presence or absence of the tonsils *per se* is immaterial, except in so far as they provide a ready and available source of antibody production, though it has been shown that bulbar poliomyelitis is more likely in tonsillectomized persons, because presumably the virus missed the tonsillar barrier. In other words, unnecessary tonsillectomy removes a valuable link in the immune chain. The operation is only likely to influence subsequent events beneficially when the tonsils themselves are diseased.—I am, etc.,

Romford, Essex.

REFERENCE

- ¹ *Spec. Rep. Ser. med. Res. Coun. (Lond.)*, 1938, No. 227.

I. M. LIBRACH.

The Brown Dog of University College

SIR,—On returning from my summer holiday I was interested to read Dr. Baron's paper (*Journal*, September 1, p. 547) on "The Brown Dog," given before the Osler Club of London on June 16, 1955.

On November 19, 1907, when I was house-surgeon to the late Sir John Bland-Sutton at the Middlesex Hospital, I received a telephone message from the police station at Battersea to say that a medical student who had been taken in charge for damaging the Brown Dog statue wished to speak to me. It was a request that I should stand bail for a notorious character, then a student at Middlesex. He told me on the telephone that he had no time to give me full details of the incident because he was playing an exciting game of snooker with the police. The protest meeting in Trafalgar Square on the night of December 12 was a terrifying affair. Eventually the crowd was dispersed by mounted police, and many were lucky to escape without injury.—I am, etc.,

London, N.W.11.

CLIFFORD MORSON.

Enzyme Tests for Glycosuria

SIR,—The evaluation of the new enzyme test for the detection of glycosuria is of importance not only to the hospital physician but also to the general practitioner. It is important to remember that in using any of the copper-reduction tests (Fehling's, Benedict's, or "clinitest") two distinct tests should be made: (1) Is there a reducing substance in the urine? (2) If there is, is it glucose? The accurate identification of the reducing substance has never been easy, and so in practice we rarely ask ourselves the question. Because the new tests are specific for glucose they resolve this difficulty.

The results published by Dr. J. A. Hunt, Professor C. A. Gray, and Mr. D. E. Thorogood (*Journal*, September 8, p. 586) and Professor R. E. Tunbridge, Dr. R. G. Paley, and Mr. D. Coulson (p. 588), as well as my own tests, have shown that both "test-tape" and "clinitix" are, if anything, over-sensitive, a positive result being obtained when the smallest quantity of glucose is present. False negatives do not occur. Quantitatively they do not fare as well, as the articles have shown. In addition to the difficulties already published, others must be pointed out. The manufacturers of test-tape say that the darkest area on the tape is the one to be compared with the colour scale, and the colour scale varies from batch to batch. The difference in shade (note shade, not colour) between 0.5 g. and 2 g. or more of glucose per 100 ml. is not in my opinion sufficiently great for the average layman to detect without considerable practice—those diabetic patients I have asked to use the test-tape were unable to record such a difference with any degree of accuracy, whereas all have been able to recognize the bright orange that clinitest gives when there is 2 g. or more of glucose per 100 ml. Furthermore, some patients (I have two who do it) after dipping the test-tape into the urine tend to wipe it dry between their thumb and index finger. The galaxy of shades they produce makes any quantitative reading wellnigh impossible, though I stress that this does not affect the qualitative reading—a positive or a negative result is as easy to see as ever. This problem does not arise with clinitix; only one end of the stick is impregnated with the enzyme. All in all, the reticence of the manufacturers of the clinitix—who do not make any claims for the quantitative capabilities of their product—is fully justified.

Another difficulty with the enzyme test is that it takes one minute before the reading can be made—during which time the tape or stick must not come into contact with paper and should therefore be held in the hand. (Actually clinistix with their firm handle will balance nicely on the top of the test-tube or bottle.) Testing large numbers of urines—for example, antenatal clinics or Services recruits—by this method is not as convenient as the clintest “screening” test in which a tablet is dropped into a clintest dropperful of urine (not more than 1 ml.), and if after bubbling has stopped any other colour than blue is observed the test is regarded as positive. On the other hand, at an antenatal clinic, the enzyme test being specific for glucose has the advantage in not responding to lactose. More experience of the two tests under these conditions is undoubtedly called for, and they warrant a full trial.

Translating these findings into daily practice, I suggest that these enzyme tests have a very definite place in the G.P.’s diagnostic kit. Without the use of a test-tube or water—let alone heat—by merely dipping the tape or stick into the urine, we can see if glucose is present or not. If the result is negative a great deal of effort (and perhaps mess) has been saved. If, however, the result is positive, then, because of its excessive sensitivity and its lack of quantitative value, the result should be checked with a copper-sulphate test—preferably clintest, which is easier than Benedict’s (it needs no spirit lamp) and more accurate (what is an inch of urine?). In dealing with the urine of a known diabetic it is perhaps easier to do a clintest estimation straight away. For the patient in his home clintest is the safest and most accurate, unless we are anxious to be told every time there is any glucose present.

Incidentally, I have also been testing a new tablet test for the quantitative estimation of sugar in the blood (albeit within a limited range). I have tried the test on a newly suspect diabetic (found in enzyme test screening), and found his blood sugar two hours after a meal to be over 200 mg.%. If the test proves, after fuller investigation, to be accurate, then G.P.s will be able to diagnose diabetes in the surgery with ease and confidence.

I wish to thank Messrs. Ames Company (London) Limited for supplies of clinistix and the blood-sugar tablet test, and Messrs. Eli Lilly and Co. for supplies of tes-tape.—I am, etc.,

London, N.W.2.

STUART CARNE.

Early Management of Poliomyelitis

SIR,—Dr. E. G. Brewis in his letter (*Journal*, September 15, p. 657) has retreated considerably from the position he took up in his article in your issue of June 30 (p. 1539). There, let us recall, he told us that “hospital admission has nothing to offer the patient [suffering from poliomyelitis] which cannot be done in the ordinary decent home.” Indeed, it might do harm, and the ambulance journey might “be a deciding factor in initiating paralysis.” It should therefore “be firmly resisted.” He now writes, “In advocating the domiciliary management of suspected and early cases in the meningitic phase—and after all only a small proportion ever pass beyond this stage—I did not mention the paralytic patients at all.”

Let us look at his article again. There he conceded that in some circumstances resistance to hospital admission might be abandoned, and he gave a list of cases that might with propriety be allowed to undergo the “risks” involved. Of these, number four reads: “Extensive paralysis of the limbs or back which make home-nursing too difficult under ordinary circumstances.” Surely this unequivocally implies that cases with moderate paralysis, or even with extensive paralysis, might be kept at home provided that the family were able to cope with them?

Dr. Brewis assures us that there are many consultant paediatricians, physicians, and orthopaedic surgeons who have considerable experience in poliomyelitis, and no doubt there are, but when he gives as early signs of spinal and diaphragmatic paralysis without bulbar involvement “restlessness, rapid shallow respirations, increasing cyanosis and

distress” one is bound to question the extent of his own experience. These signs in purely “spinal” cases are not early but terminal. When cyanosis appears the patient has lost some 90% of his vital capacity, and is within measurable distance of his last gasp. When cyanosis appears early in a patient whose respiratory muscles still possess a reasonable reserve of power it is a sign of an obstructed airway with or without collapse, almost invariably due to secretions which he can no longer swallow. In other words the medulla is already involved, and the case is a dreaded “bulbo-spinal.”

Quite clearly Dr. Brewis has recognized (as who has not?) that many cases of poliomyelitis are sent to hospital that could have been nursed at home. Unfortunately we are only wise after the event, and retrospective wisdom is of little use. There is no means whatsoever of telling in the meningitic phase which patient is going to be able to walk out of hospital unscathed a few weeks later, and which is going to die or spend the rest of his life in a respirator. “Only a small proportion,” writes Dr. Brewis, ever progress to paralysis. I invite his attention to the following statistics of admissions to the Blegdams Hospital, Copenhagen, during 1952–3:

Number certified as poliomyelitis	2,830
Number diagnosed poliomyelitis	2,241
Number progressing to paralysis	1,235
Number requiring artificial respiration	345
Number of deaths	144

Dr. Brewis assures us that his policy has not been a factor in the fatality rate which he quoted, but I believe that most of us will accept that assurance with considerable reserve. Everyone is agreed that in cases of life-threatening polio the first essential is to bring the patient under skilled observation and within reach of help at the earliest possible moment—hence the organization of specially equipped teams to go (by air in Denmark and by ambulance in this country) to bring the patient to a special centre. Dr. Brewis’s policy of “wait and see” is clearly incompatible with this principle, and, unless he possesses special divinatory powers, cannot fail to influence the results.—I am, etc.,

Isleworth, Middlesex.

G. E. BREEN.

Congenital Hypoplastic Thrombocytopenia

SIR,—The article by Drs. A. D. Bell, J. W. Mold, R. A. M. Oliver, and S. Shaw (*Journal*, September 22, p. 692) emphasizes both the rarity of this condition and the temporary effect of therapeutic measures. Two identical cases have been observed in the Sheffield hospitals.¹ In one of them the same therapeutic measures were tried as in the quoted article, with an equally unsatisfactory result. Transfusion of platelets direct from donor to patient through silicone syringes in the form of fresh blood seemed to give the best survival. Splenectomy would not appear to hold out any promise unless at least some megakaryocytes are present in the bone-marrow.² This again underlines the importance of obtaining satisfactory marrow samples even at the cost of repeated punctures.

The nosological position of this condition is not absolutely clear yet. While, on the one hand, one might feel justified in seeing in it the infantile equivalent of the Fanconi syndrome, on the other hand, one has to take into consideration at least a relationship to congenital (granulocytic) leukaemia. The peripheral blood count is “leukaemoid,” there is a hyperplasia of the leucon in the bone-marrow, and often some degree of haemopoiesis in lymph glands and liver, too. The association with the described skeletal and other deformities can occur in both conditions.—I am, etc.,

Sheffield.

S. VARADI.

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Obituary

Sir WILLIAM GILLIATT, K.C.V.O., M.D., M.S.
F.R.C.P., F.R.C.S., F.R.C.O.G.

The death of Sir William Gilliatt in a road accident at Chertsey on September 27 deprives obstetrics and gynaecology in this country of one of its outstanding figures. He was 72 years of age. His appointment as surgeon-gynaecologist to H.M. the Queen naturally attracted public attention to him. It was he who acted as obstetrician when Prince Charles was born at Buckingham Palace in 1948 and again at the birth of Princess Anne at Clarence House in 1950. Previously he had attended the Duchess of Kent in all her three confinements. But, apart from the public notice which such a position inevitably attracts, Sir William Gilliatt gained the highest distinction in his profession. He was President of the Royal College of Obstetricians and Gynaecologists in 1946, and in 1954 he became President of the Royal Society of Medicine. At the time of his death he was consulting surgeon to King's College Hospital and to the Samaritan Free Hospital for Women, two hospitals with which he had been associated during most of his professional life.

William Gilliatt was born at Boston, Lincolnshire, in 1884. There, under the shadow of the famous “Stump,” he spent his childhood. He came of Lincolnshire farming stock. His paternal grandparents lived at a village a few miles from Boston, and, although his grandfather died at an early age leaving a large family, his widow carried on the farm, and all but one of their sons also became farmers. The exception was Sir William's father, who opened a chemist's shop in Wide Bargate, Boston. He, too, died while still a young man, but his widow carried on the business and sent her son William to Boston Grammar School and later to Wellingborough College, where he is still remembered as a prefect and a useful half-back. From there he went for his medical studies to Middlesex Hospital, where he seems to have captured all the prizes. He was Hetley Clinical Scholar, Junior Broderip Scholar, and Leopold Hudson Scholar in 1908, and Lyell Gold Medallist and Scholar in 1909. After graduating M.B., B.S. in 1912 he occupied posts of obstetrical surgeon at Queen Charlotte's and gynaecological registrar and tutor at the Middlesex.

Having proceeded M.D., London, with gold medal, in 1910, he gained his M.S. and F.R.C.S. in 1912, established his consulting practice in Wimpole Street, and quickly became known as a brilliant gynaecological surgeon. In 1916 he was appointed assistant obstetric and gynaecological surgeon at King's College Hospital and also lecturer in gynaecology in the medical school. During the first world war he served as a captain in the R.A.M.C. For many years he was on the staff of the Samaritan Free Hospital for Women, and among other hospitals with which he was associated were St. Saviour's Hospital, the Bromley Cottage Hospital,



[Central Press Photos, Ltd.]

and the Maudsley Hospital. In 1925 he succeeded Hugh Playfair as senior obstetric and gynaecological surgeon at King's, a post he held for 21 years. Since 1932 he had been a member of the committee of management of the hospital, being appointed vice-chairman in 1945.

It was in 1946, the year he retired from the active staff of King's, that Gilliatt became President of the Royal College of Obstetricians and Gynaecologists. He had taken a leading part in the affairs of the College, of which he was a Foundation Fellow, having served as a member of its council and as honorary treasurer. During his tenure of the presidential chair the Royal Charter was granted to the College, and in 1949, just before the induction of Professor Hilda Lloyd as the new president, Sir William had the honour of admitting Queen Elizabeth (now the Queen Mother) an Honorary Fellow of the College. Two years later he presented Princess Elizabeth, when she visited the College to be made an honorary Fellow. He was appointed C.V.O. in 1936, knighted in 1948, and promoted K.C.V.O. in 1949.

In 1953 the Honorary Mastery of Midwifery was bestowed upon him by the Society of Apothecaries of London in recognition of his eminence in his chosen field. From 1954 to 1956 he was president of the Royal Society of Medicine, and he filled this office with distinction during a somewhat difficult period of the Society's history.

From time to time Sir William Gilliatt served on special committees of the British Medical Association. He was a member of the Negotiating Committee which preceded the introduction of the National Health Service in 1947 and of the Evidence Committee which was sitting at the same time. In 1949 he was appointed chairman of the Standing Maternity and Midwifery Advisory Committee under the National Health Service.

A busy life did not leave much time for authorship, but he will be remembered as joint author of *Ten Teachers of Midwifery and Diseases of Women*.

Sir William was a commanding figure, and to some who came into only fleeting contact with him he may have appeared dour. That is the last word which those who enjoyed his confidence would apply to him. He was the most approachable of men, with kindness for all who sought his help, and his quiet confidence must often have proved as efficacious as his expert skill in the cases he had under his care. Nurses and midwives will have particular occasion to remember his kindness and help, especially as president of their annual conferences.

Sir William Gilliatt married Anne Louise Kann, herself a member of the medical profession. They had one son and one daughter. The son, Dr. R. W. Gilliatt, follows his father's calling, and is an assistant physician at the National Hospital for Nervous Diseases.

We are indebted to Sir WILLIAM FLETCHER SHAW for the following appreciation:

The tragic death of Sir William Gilliatt, in full vigour of mind and body, when we might anticipate his leadership and friendship for many years to come, is a sad blow to the profession and especially to our special branch of obstetrics and gynaecology. I first met Gilliatt in the early days of

the formation of what is now the Royal College of Obstetricians and Gynaecologists. He was a young man in those days, but sufficiently advanced to be made a Foundation Fellow, though not as yet playing an active part in its administration. It was only when I became President and he a member of council that we were brought into close contact. It was soon obvious that here was a potential leader, clear-headed, reliable, knowledgeable, not given to expressions of opinion until the facts had been studied, but, once that opinion was formed, of inflexible purpose, clear in exposition, and endowed above all with shrewd common sense.

During the first four years of my presidency we were drawn together more and more closely, and at the end of this time the post of honorary secretary unexpectedly became vacant and the council, recognizing the necessity for close integration of these two executive offices, unofficially allowed me to nominate a successor. Without any hesitation I chose Gilliatt, and during my last years we worked in even closer harmony.

In those war years many problems suddenly arose which had to be dealt with by the executive officers without time to place them before the council or executive committee, or at least to be put in train before those bodies could meet. I unhesitatingly chose Gilliatt to work with me, partly for the great qualities I have enumerated, but even more because his independence of mind could be relied upon to express his opinion clearly and forcibly, even if it did not accord with mine, though I knew I could rely upon his loyalty to carry out the ultimate decision, whichever this might be. For a year we worked in the closest co-operation, and I more and more came to appreciate and rely upon his outstanding qualities of mind and spirit and formed a close friendship which was broken only by his untimely death.

It was during his own presidency, three years later, that Gilliatt was chosen to attend the Queen, then Princess Elizabeth, at the birth of Prince Charles, and well-deserved honours now fell to his lot—first a knight bachelor as President of the Royal College of Obstetricians and Gynaecologists, and the following year a K.C.V.O. for his services to the Princess.

Many men would be content to reap personal advantages and others might be too deficient in personality to carry out their own wishes, but Gilliatt saw that his College, whose aims and objects would naturally appeal to the Queen and the Princess, was brought to their notice and shared in his honours. Queen Elizabeth, now the Queen Mother, became an Honorary Fellow of the College and later the first Patron, while the Princess, now Queen Elizabeth, became an Honorary Fellow and, with the Duke of Edinburgh, honoured the President by attending the annual dinner of the College.

After laying down the presidency Gilliatt still laboured hard for the College and could always be counted upon to give of his best. In 1937, at considerable sacrifice, he visited both New Zealand and Australia on behalf of the College. For many years Gilliatt was a member of the honorary staff of King's College Hospital, where his clinical work and teaching in both obstetrics and gynaecology were of the highest order, and to the end one could be sure that his patients, hospital or private, royal or common, received of his best. There was no second best in his work; it was all or nothing, and in this he set a shining example. A Court appointment in the eyes of the general public means leadership in a particular branch of medicine, but it by no means follows that this opinion is endorsed by the profession. In Gilliatt's case there could be no other opinion, and if the choice had been left to those of his profession best fitted to give an opinion he undoubtedly would have been elected.

To those of us privileged to see him in his own home circle comes the full realization of what this tragedy means to his wife, son, and daughter. Our sympathy, which is all we can give, seems very inadequate in the circumstances. He will be greatly missed.

Mr. J. H. PEEL writes:

The sudden death of Sir William Gilliatt has robbed the medical profession of one of its most illustrious contemporary personalities. With a brilliant record behind him as student, resident, and registrar, Gilliatt was appointed to the staff of King's. He soon identified himself with his new hospital, which he was to serve so loyally and faithfully for the rest of his life. King's has never had a more devoted servant, even from its own alumni, and it was here that he showed the first signs of his especial gift as a committee man. In 1932 he was elected to the committee of management, and in 1945 he became vice-chairman of the hospital. When, with the coming of the National Health Service, the new board of governors was formed he was an automatic choice as one of its members, and he was appointed vice-chairman and chairman of the nursing committee. The fact that the King's medical staff has had the happiest possible relationship with its committee of management and later its board of governors has in no small measure been due to Sir William's influence. He continued to exert this influence for good just as much after his retirement from the active consulting staff and medical committee of King's in 1949. The medical committee was also fortunate when after his retirement he agreed to serve as chairman of the medical school council for five years. Equally valuable have been his services to the nursing staff since he became chairman of the nursing committee.

Outside King's his statesmanship has received equal recognition. A foundation member of the Royal College of Obstetricians and Gynaecologists in 1929, he was soon elected to the council and subsequently served on practically every College committee, and was in turn acting secretary, treasurer, and finally President during 1946-9. He filled each office in turn with the highest distinction, and after he retired from the presidential chair his wise counsel and mature judgment were as freely available to the College as they were before. His outstanding gifts and wise statesmanship were recognized by succeeding Ministers of Health, and he served on many ministerial committees which helped to guide the affairs of the profession and the health of the people of this country. The last distinguished office to which he was elected was the presidency of the Royal Society of Medicine in 1954, and he had only very recently completed his term of office.

With such very onerous administrative duties I often wondered how he was able to achieve also such a high degree of eminence in his purely professional work. But it was always his principle to undertake only that which he could do properly according to his own very high standards. He undoubtedly had a great gift for organizing his own life and professional activities so that they never got out of control. He resigned from the staff of Queen Charlotte's after only five years because he felt that he could not devote enough time to the maternity department at King's if he endeavoured to hold both offices. He built up rapidly a very successful obstetric practice, and his patients were utterly devoted to him, for he served them without reservation of any kind.

It is given to few in our profession to receive such a glittering series of distinctions and honours, and so richly to deserve them. That he did richly deserve them those of us who knew all that had gone before were in a position to appreciate. The foundation stone of his success was character. He set himself the highest possible standards of professional conduct, and he lived by them. His patients were his life, and fundamentally it mattered not whether they were from the aristocracy or from the humblest homes—they were all patients requiring whatever service he could render. And, because he gave them so much, they in turn revered him to a degree that was at times remarkable. He inspired in them a confidence that was never false. He was incredibly kind to them. It was as a clinician that he excelled. His diagnostic acumen and sound clinical judgment were the basis of his pre-eminence. No detail in the manage-

ment of his patients in the ward was too trivial to escape his attention. He expected the highest possible standard from his assistants and could, if he thought they had been negligent in the care of a patient, chastise them with a biting phrase which cut to the quick. Praise from him was praise indeed, but it had to be won by diligence and good work. However, having won his trust, he gave his help and encouragement without reservation. No one knows this better than I, and to him I owe a debt that can never be repaid.

As a surgeon Sir William's success was based upon sound principles rather than brilliant and spectacular performance. His judgment of the need for surgery and his choice of operation were usually right, and his patients did extremely well. He was scrupulously careful in technique, especially haemostasis. He was at times perhaps overcautious, particularly in later years, but I think he realized his limitations as a surgical technician. He would never learn to do a vaginal hysterectomy. Having made up his mind early in life that it was a bad operation, he never changed his opinion, and I could never convince him to the contrary.

As a teacher he was didactic, dogmatic, clear, and concise. His logical brain enabled him to reduce the complex to the simple for the sake of the student, who came away from his lectures and ward rounds with clear and concrete ideas. He never wrote a lot. He had very firm views about a good deal of medical literature and he only wrote when he felt that he had something really worth while to contribute.

Sir William had an innate shyness and reserve which was difficult to penetrate, and which some of his friends and admirers found difficult to understand. His stern self-discipline and single-minded determination gave at times the impression of austerity, even ruthlessness. It always seemed a little strange that someone who was at heart so essentially kind should be on occasions aloof. Though his death came as a great shock to all who knew him, there is some consolation to be found in its very suddenness. None of us could ever have imagined him in complete retirement. The gradual deterioration of mental and physical powers which must inevitably come with advancing years would have tried him sorely. This, happily, he has been spared, and for his sake we must be glad. It was fitting that a man who was truly great and who had achieved such eminence in his profession should pass on while still enjoying life to the full.

A happy private life is the only sure foundation for a successful professional one, and in this Sir William was fortunate. Lady Gilliatt, herself a doctor, was throughout the years a great companion and support to him, contributing in no small measure to her husband's success. She and a son, also a member of the medical profession, and a daughter made up his utterly devoted family, and to them we send our heartfelt sympathy.

Dr. DAVID BRAHAM died at his home in Bournemouth on September 20, after a long illness patiently borne. He was born in Leeds on July 18, 1900, and was the second son in a family of four boys, three of whom became doctors. From the Central High School at Leeds he went on to study medicine at Leeds University, graduating M.B., Ch.B. in 1923. After a year spent as house-surgeon in the Hospital for Women and Children in Leeds he started in general practice in Darwen. Here he took a prominent part in local government, becoming a town councillor and serving on the health committee. Ill-health eventually forced him to give up his practice in Darwen, and in 1931 he moved to Bournemouth, where his health soon improved and he built up a thriving practice and made many friendships which lasted for the rest of his life. In 1940 he went to Leicester, where he soon won the affection and esteem of his patients and colleagues. He was a keen bridge player and golfer, and in 1954 he was joint winner of the annual trophy of the Leicester Medical Society. Always interested in the improvement of general practice, he was a founder member of the College of General Practitioners.

Unfortunately in 1955 the state of his health necessitated his retirement, and he went back to live in Bournemouth and await the end which he well knew was inevitable. He bore his illness bravely, and his untimely death will be widely mourned by his colleagues and patients in Leicester and Bournemouth. He was the ideal general practitioner, accurate in diagnosis, skilled in treatment, and always a personal friend of his patients. The sympathy of his friends will be extended to his wife and two married daughters, and particularly to his mother, who in the same week suffered a double bereavement by the sudden death of another son, Dr. Harvey Braham, of Huddersfield.—R. J. D.

Dr. C. F. X. O'SULLIVAN died at his home at Navan, Co. Meath, on August 20 at the age of 70. Born in the city of Galway, Christopher Francis Xavier O'Sullivan was educated at the Jesuit College, Galway, and at Rockwell College, Tipperary. He graduated M.B., B.Ch., B.A.O. at the Royal University of Ireland at the age of 21, and for two years thereafter he took temporary posts in several districts in the west of Ireland. In 1909 he was appointed to the dispensary district of Williamstown, Co. Galway, where he practised for over 40 years. His health began to fail in 1950, and he retired to live in Navan. He is survived by his widow.

We record with regret the death at the age of 29 of Surgeon Captain G. C. E. WILSON, regimental medical officer to the Household Cavalry Regiment. He was murdered in his car in a suburb of Nicosia by E.O.K.A. gunmen on September 26. Gordon Charles Edwyn Wilson was born on November 6, 1926, the son of the late Captain Ian Wilson and of Mrs. Wilson, of St. Andrews, Fife. From Cambridge, where he won a blue for running, he went on to complete his clinical training at St. George's Hospital, graduating M.B., B.Ch. in 1953. After holding resident posts at St. Martin's Hospital, Bath, and the Eastern General Hospital, Edinburgh, he joined the Royal Horse Guards as a surgeon captain—an old-fashioned title held only by those who are directly commissioned in the Household Cavalry without serving in the R.A.M.C. He leaves a widow and two young children, and we sympathize with them and with his mother in the tragic and deplorable loss of this young doctor.

Dr. E. A. GREGG wishes to thank people for their kind letters of sympathy, and regrets that he is unable to answer them all.

The Services

Major-General P. F. Palmer, O.B.E., late R.A.M.C., has been appointed Honorary Surgeon to the Queen, in succession to Major-General R. Murphy, C.B., C.B.E., retired. Lieutenant-Colonel Sir Arthur E. Porritt, K.C.M.G., C.B.E., R.A.M.C., T.A., has relinquished the appointment of Honorary Colonel 57 (Mx) General Hospital, retaining the rank of Honorary Colonel.

A Supplement to the London Gazette has announced the following awards:

Second Clasp to the Territorial Efficiency Decoration.—Major (Lieutenant-Colonel) H. H. Kenshole, D.S.O., T.D. (seconded to University of London, O.T.C.); Majors D. S. Austen, T.D., and H. Dickie, T.D., R.A.M.C.

First Clasp to the Territorial Efficiency Decoration.—Colonel A. McK. Reid, M.C., T.D. (retired), Lieutenant-Colonel (Honorary Colonel) E. M. Elmhirst, T.D. (retired), Major (Lieutenant-Colonel) H. H. Kenshole, D.S.O., T.D. (seconded to University of London, O.T.C.), R.A.M.C.

Territorial Efficiency Decoration.—Majors W. J. Atkinson, G. V. Cole, M.C., J. S. B. Mackay, and D. K. W. Picken, R.A.M.C.

INFECTIOUS DISEASES AND VITAL STATISTICS

Summary for British Isles for week ending September 15 (No. 37) and corresponding week 1955.

Figures of cases are for the countries shown and London administrative county. Figures of deaths and births are for the 160 great towns in England and Wales (London included), London administrative county, the 17 principal towns in Scotland, the 10 principal towns in Northern Ireland, and the 14 principal towns in Eire.

A blank space denotes disease not notifiable or no return available. The table is based on information supplied by the Registrars-General of England and Wales, Scotland, N. Ireland, and Eire, the Ministry of Health and Local Government of N. Ireland, and the Department of Health of Eire.

CASES in Countries and London	1956					1955				
	Eng. & Wales	London	Scot.	N. Ire.	Eire	Eng. & Wales	London	Scot.	N. Ire.	Eire
Diphtheria ..	7		4	0	2	9	2	4	0	2
Dysentery ..	321	40	202	4	1	417	69	267	11	3
Encephalitis, acute	3	0				3	0			1
Enteric fever: Typhoid ..	4	0	1	0	4	4	1	1	0	
Paratyphoid ..	6	1	1	0	1	115	14	2	5	
Food-poisoning ..	254	16		0		490	77		13	
Infective enteritis or diarrhoea under 2 years ..				11	17				32	89
Measles* ..	932	98	68	16	52	1,038	22	24	10	26
Meningococcal in- fection ..	26	3	21	1	1	11	0	21	1	1
Ophthalmia neona- torum ..	34	1	2	0		22	1	7	0	
Pneumonia† ..	205	9	124	3		164	8	100	2	1
Poliomyelitis, acute: Paralytic ..	46	4		0	24	193	29		1	5
Non-paralytic ..	65	3				218	24		64	
Puerperal fever‡ ..	212	33	5	0		213	32	14	2	
Scarlet fever ..	313	18	70	22	15	329	18	54	18	9
Tuberculosis: Respiratory ..	543	57	92	12		590	66	111	15	
Non-respiratory ..	90	5	13	6		74	7	19	2	
Whooping-cough ..	2,271	176	256	31	48	1,142	46	54	45	74

DEATHS in Great Towns	1956					1955				
	Eng. & Wales	London	Scot.	N. Ire.	Eire	Eng. & Wales	London	Scot.	N. Ire.	Eire
Diphtheria ..	0	0	0	0	0	1	0	0	0	0
Dysentery ..	0	0		0		0	0		0	
Encephalitis, acute		0			0		0			0
Enteric fever ..	0	0	0	0		2	0	0	0	
Infective enteritis or diarrhoea under 2 years ..	2	0	2	0	1	6	0	1	0	3
Influenza ..	5	0	0	0	1	2	0	0	0	0
Measles ..		0	0	0	0		0	0	0	0
Meningococcal in- fection ..		0	0				0	1		
Pneumonia ..	161	20	18	7	3	102	16	6	2	2
Poliomyelitis, acute	2	0			0	7	1	1		0
Scarlet fever ..		0	0	0	0		0	0	0	0
Tuberculosis: Respiratory ..	40	5	10	2	1	48	9	8	3	4
Non-respiratory ..		2	0				1	1	0	1
Whooping-cough ..	3	0	0	0	0	4	0	0	0	0
Deaths 0-1 year ..	173	24	22	11	18	180	16	34	4	11
Deaths (excluding stillbirths) ..	4,648	656	527	92	167	4,143	591	471	85	142
LIVE BIRTHS ..	7,552	1,186	845	246	336	6,971	1,043	847	192	406
STILLBIRTHS ..	197	15	18			197	26	17		

* Measles not notifiable in Scotland, whence returns are approximate.
† Includes primary and influenza pneumonia.
‡ Includes puerperal pyrexia.

Vital Statistics

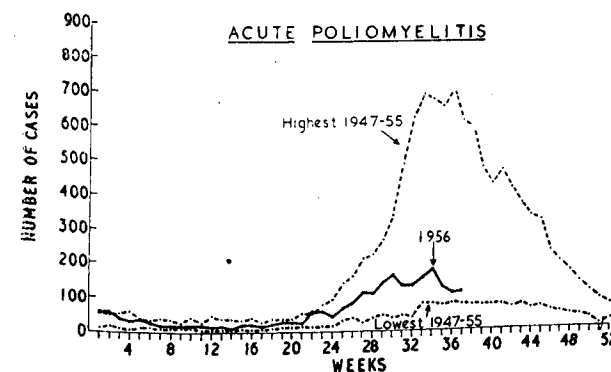
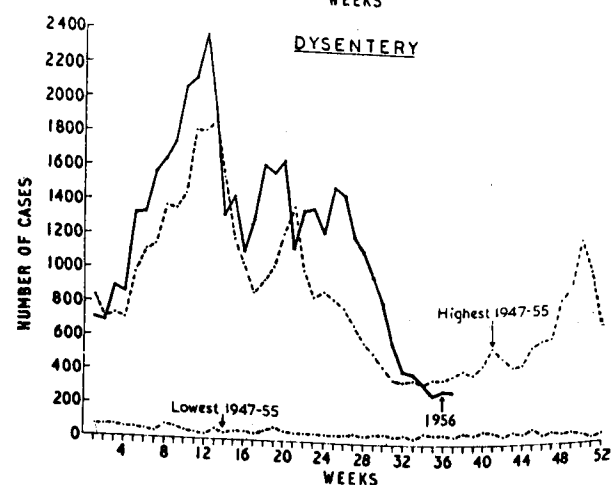
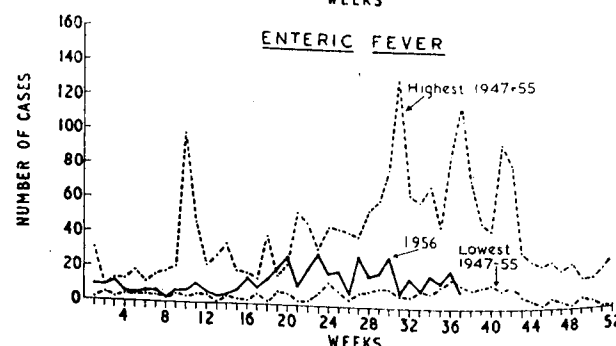
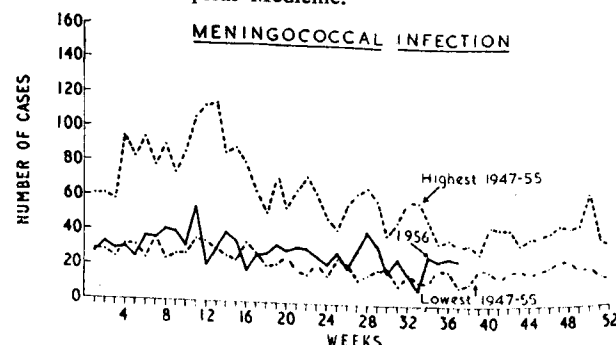
Industrial Accidents and Diseases

The number of workpeople (other than seamen) in the United Kingdom whose deaths from accidents in the course of their employment were reported in August was 86, compared with 127 (revised figure) in the previous month and 111 (revised figure) in August, 1955.

The numbers of cases of industrial disease in the United Kingdom reported during August, 1956, were as follows: lead poisoning 1, aniline poisoning 2, toxic jaundice 2, toxic anaemia 1, epitheliomatous ulceration 17, chrome ulceration 8; total 31. There was one death from toxic anaemia.—*Ministry of Labour Gazette*, September, 1956.

Graphs of Infectious Diseases

The graphs below show the uncorrected numbers of cases of certain diseases notified weekly in England and Wales. Highest and lowest figures reported in each week during the nine years 1947-55 are shown thus -----, the figures for 1956 thus ———. Except for the curves showing notifications in 1956, the graphs were prepared at the Department of Medical Statistics and Epidemiology, London School of Hygiene and Tropical Medicine.



Infectious Diseases

The largest fluctuations in the notifications of infectious diseases in England and Wales during the week ending September 15 were falls of 160 for measles, from 1,092 to 932, and 44 for whooping-cough, from 2,315 to 2,271, and rises of 65 for food-poisoning, from 189 to 254, and 60 for scarlet fever, from 253 to 313.

Small falls in the incidence of measles were recorded throughout the country, but no large local fluctuations were reported. The largest variation in the trends of whooping-cough was a rise of 50 in Yorkshire West Riding, from 166 to 216, and in most of the other areas a small decline in incidence was reported. 7 cases of diphtheria were notified, being 3 more than in the preceding week. Only small changes occurred in the local returns of scarlet fever.

111 cases of acute poliomyelitis were notified during the week. These cases were 9 more for paralytic and 3 fewer for non-paralytic cases than in the preceding week. The largest centres of infection were Lancashire 29 (Manchester C.B. 14, Heywood M.B. 4, Liverpool C.B. 3), Cheshire 9 (Stockport C.B. 5), and Surrey 9 (Banstead U.D. 2, Reigate M.B. 2).

321 cases of dysentery were notified, being 9 fewer than in the preceding week. The largest returns were Yorkshire West Riding 73 (Leeds C.B. 49), London 40 (Southwark 12), Lancashire 30, and Warwickshire 27 (Coventry C.B. 19).

In Scotland the number of notifications of dysentery rose from 146 to 202. The largest returns were Glasgow 85, Edinburgh 44, Midlothian county 24, and Dundee 11.

Week Ending September 22

The notifications of infectious diseases in England and Wales during the week included: scarlet fever 376, whooping-cough 1,848, diphtheria 6, measles 1,082, acute pneumonia 195, acute poliomyelitis 111, dysentery 390, paratyphoid fever 7, typhoid fever 9.

Medical News

Calling the Resident.—St. Thomas's Hospital has now had three months' experience of a new magnetic system for quickly summoning residents from anywhere in the hospital. It replaces the bells, supplemented by the leg-work of two porters, which was the former method. Because the system has proved a success at St. Thomas's, the Governors have arranged a demonstration of it on September 26 to an invited audience of doctors and hospital administrators from all over the country. The object, said the Treasurer, Sir ARTHUR HOWARD, was simply to let others decide whether the St. Thomas's system would be useful in their own hospitals, where conditions might be different. The capital cost and maintenance of the system were less, he added, than those of any comparable system he knew of. The system, which is based on that used at the Palais de Chaillot in Paris for transmitting simultaneous translations of speeches at international congresses, has been developed as a result of research by Mr. STYLES at St. Thomas's in conjunc-

tion with Multitone Electric Company, Ltd., the producers. The hospital buildings are enclosed in a loop of magnetized wire about 2,500 yards (2,286 m.) in length. Each member of the staff on call is provided with a receiver, looking rather like the handle of a small ophthalmoscope, 13.7 cm. long and 2.9 cm. in diameter, which is clipped into a pocket. Each receiver—up to 56 can be run on one circuit—responds only to a signal from the controlling transmitter given at its own frequency. The response is a low-tone "peep peep." With slight modification, the receiver can be adapted to transmit the human voice, but at St. Thomas's they prefer a non-verbal signal, as this means that the resident has to ring up the main porter's lodge (where the controller is housed) to find out his message. In this way it can be known for certain that he has received it. The system is described in detail by Mr. W. PEARSON, deputy clerk to the governors, in the October issue of *Hospital*.

Association of Industrial Medical Officers.—The association ended its anniversary celebrations with a dinner at the Royal College of Surgeons on Thursday, September 27. Sir HARRY PLATT proposed the health of the association and the reply was made by Dr. R. S. F. SCHILLING, president of the association. The toast of "Medicine in Industry" was proposed by the EARL OF VERULAM and of the guests by Dr. L. G. NORMAN, past president of the association. Dame FLORENCE HANCOCK replied on behalf of the guests.

Royal College of Obstetricians and Gynaecologists.—The PRESIDENT and Mrs. CHARLES READ received a large number of guests at the annual dinner of the College at the Dorchester Hotel on September 28. In proposing the health of the College the MINISTER OF HEALTH said that infant mortality had been remarkably reduced in the last 50 years, but the mortality of infants in the first week of life and the stillbirth rate were far from satisfactory. Mr. Turton also suggested that members of the College should give their advice and consider what was best in providing the best maternity services. He had set up a committee and hoped to get its report very soon. In reply Mr. READ said that the College was determined to see the country had a first-class maternity service. Professor T. N. A. JEFFCOATE, with elegance of phrase, provided a series of neat biographies which caused no discomfort to the guests whose health he proposed, and in response Mr. DICKSON WRIGHT made even the most austere relax at intervals into unseemly mirth.

Occupational Health Institute Advocated.—Professor R. E. LANE, Nuffield professor of occupational health at Manchester, in his John C. Bridge memorial lecture on September 27 to the Association of Industrial Medical Officers, advocated the establishment of an occupational health institute. Such an institute, he said, should be prepared to undertake operational research, and it might also carry out routine biological and environmental examinations. He suggested that, to begin with, the institute might be jointly financed by employers and trade unions, though later it might become in part self-supporting, or, having demonstrated its usefulness, receive Government aid.

R.C.O.G. Honorary Fellows.—At a meeting of the Council held in the College House on September 28, with the President, Mr. CHARLES D. READ, in the chair, Lord NUFFIELD and Lieutenant-General Lord WEEKS were admitted to the Honorary Fellowship of the College.

World Medical Journal Editor.—Dr. S. S. B. GILDER has been appointed associate editor of the *World Medical Journal*, which is published by the World Medical Association. Dr. Gilder is editor of the *Canadian Medical Association Journal* and was formerly assistant editor of *Abstracts of World Medicine*, published by the B.M.A.

Dr. W. F. Widdas, senior lecturer in physiology at King's College, London, has been appointed to the university readership in physiology tenable at that College.

Dr. Victor A. Sutter, aged 53, Assistant Director-General in charge of Advisory Services in the World Health Organization, has resigned his position in order to accept an

appointment as Minister of Public Health and Social Assistance in his own country, the Republic of El Salvador.

Professor W. J. Hamilton, professor of anatomy in the University of London, has succeeded Dr. E. C. Warner as Dean of the Charing Cross Hospital Medical School as from August 1.

COMING EVENTS

A service for doctors and nurses will be held in the Old Meeting House Congregational Church, Colegate, Norwich, at 3 p.m. on Sunday, October 14. The address will be given by Mr. A. S. ALDIS, F.R.C.S.

British Institute of Radiology.—Annual congress and exhibition, December 6 and 7. Final date for registration, October 15. Details from the general secretary, British Institute of Radiology, 32, Welbeck Street, London, W.1.

British Association of Allergists.—Autumn meeting on October 19, 5.30 p.m., at Brompton Hospital, Fulham Road, London, S.W.3. Full details from Dr. A. W. FRANKLAND, St. Mary's Hospital, London, W.2.

Society of Apothecaries.—The Master's Day Service of the Society of Apothecaries is to be held on Sunday, October 21, at 11.15 a.m. at the Church of St. Mary Aldermary (opposite Mansion House Station).

Westminster Medical School.—Viscount CHANDOS will give the inaugural address at 3 p.m. on October 22 at Church House, Westminster.

Wessex Rahere Club.—The autumn dinner will take place at the Grand Spa Hotel, Bristol, on October 27. Details from Mr. A. DAUNT BATEMAN, 11, The Circus, Bath.

Abortion Law Reform Association.—Immediately following the annual meeting, a public meeting will be held at 7 p.m. on October 31 at Conway Hall, Red Lion Square, London, W.C.1. The subject will be "Immediate Prospects for our Private Member's Bill." Details from the honorary secretary, 53, Gloucester Terrace, London, W.2.

Leeds Medical School.—Annual dinner for past and present male students will be held at the Griffin Hotel, Leeds, on November 2, at 7.30 p.m. Tickets (25s.) from the dinner secretary, Medical School, Leeds, 2.

St. Thomas's Hospital Medical School.—The old students' dinner will take place in the New Hall, The Royal College of Surgeons, Lincoln's Inn Fields, London, W.C.2, on November 8, at 7 p.m. for 7.30 p.m. Professor A. D. GARDNER will be in the chair. Tickets £1 11s. 6d. (exclusive of drinks).

Gastro-enterology Conference.—A specialist conference on gastro-enterology will be held in Glasgow at the Royal Faculty of Physicians and Surgeons, November 26-30. Details will be found in our advertisement columns (p. 54).

SOCIETIES AND LECTURES

A fee is charged or a ticket is required for attending lectures marked ●. Application should be made first to the institution concerned.

Monday, October 8

INSTITUTE OF NEUROLOGY.—5 p.m., Dr. D. McAlpine: Multiple Sclerosis—Clinical Aspects of the Problem.
POSTGRADUATE MEDICAL SCHOOL OF LONDON.—4 p.m., Dr. E. G. L. Bywaters: Henoch-Schönlein Purpura.
ROYAL COLLEGE OF SURGEONS OF ENGLAND.—5.15 p.m., Mr. D. H. Patey: Some Points in the Surgery of the Parotid Gland; 6.30 p.m., Mr. D. Trevor: Surgery of the Patella.

Tuesday, October 9

CHELSEA CLINICAL SOCIETY.—At Rembrandt Hotel, S.W., 8.30 p.m., discussion to be opened by Sir Albert Richardson: Development of the Nineteenth Century (Illustrated by slides).
INSTITUTE OF DERMATOLOGY.—5.30 p.m., Dr. R. M. B. Mackenna: Sebaceous Glandular System.
MANCHESTER MEDICAL SOCIETY: SECTION OF SURGERY.—At Clinical Sciences Building, York Place, 8 p.m., Presidential Address by Mr. S. M. Milner: Business as Usual.
ROYAL COLLEGE OF SURGEONS OF ENGLAND.—3.45 p.m., Imperial Cancer Research Fund Lecture by Dr. C. P. Rhoads: Soluble Puzzle of Cancer Control.
ROYAL COLLEGE OF SURGEONS OF ENGLAND.—5.15 p.m., Mr. T. Holmes Sellers: Carcinoma of the Lung; 6.30 p.m., Mr. F. R. Kilpatrick: Prostatectomy.
WEST END HOSPITAL FOR NEUROLOGY AND NEUROSURGERY.—5.30 p.m., Mr. G. C. Knight: Spinal Compression.

Wednesday, October 10

INSTITUTE OF DERMATOLOGY.—5.30 p.m., Dr. E. J. Moynihan: Connective Tissue.
INSTITUTE OF DISEASES OF THE CHEST.—5 p.m., Dr. N. Lloyd Rusby: Collagen Disorders with particular reference to Respiratory Manifestations.
INSTITUTE OF UROLOGY.—4.30 for 5 p.m., Mr. A. R. C. Higham: Enuresis.
MANCHESTER MEDICAL SOCIETY.—At Medical School, Manchester University, 4.15 p.m., ordinary meeting of Fellows. Presidential Address by Dr. J. F. Wilkinson: What's Bred in the Bone.
POSTGRADUATE MEDICAL SCHOOL OF LONDON.—2 p.m., Dr. F. W. G. Wolff: Biochemistry of Diabetes (1).
ROYAL COLLEGE OF SURGEONS OF ENGLAND.—5.15 p.m., Mr. R. Sampson Handley: The Spread of Breast Carcinoma and its Relation to Treatment; 6.30 p.m., Mr. J. B. Pennybacker: Chronic Subdural Haematoma.
ROYAL MEDICO-PSYCHOLOGICAL ASSOCIATION.—Psychiatry and Social Psychiatry Section, at 11, Chandos Street, London, W.1, 8 p.m., Dr. S. H. Foulkes: Some Observations on Out-patient Psychotherapy at a Teaching Hospital (open to members and guests).
ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE: EDINBURGH BRANCH.—At West Medical Theatre, Edinburgh Royal Infirmary, 5 p.m., Sir Gordon Covell: Some Aspects of Malaria Therapy.
ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE.—7.30 p.m., Dr. H. A. Reid: Sea Snake Research.
YORKSHIRE SOCIETY OF ANAESTHETISTS.—At General Infirmary at Leeds, 8.30 p.m., Dr. H. K. Beacher: New Work on Pain and Pain Relief.

Thursday, October 11

ALFRED ADLER MEDICAL SOCIETY.—At 11, Chandos Street, W., 8 p.m., Dr. James MOORE: Aspects of Modern Psychology.
BRITISH POSTGRADUATE MEDICAL FEDERATION.—At Beveridge Hall, Senate House, W.C., 5.30 p.m., Sir John Cockcroft, F.R.S.: Biological Significance of Atomic Energy.
INSTITUTE OF OBSTETRICS AND GYNAECOLOGY.—3 p.m., Professor J. Chassar Moir: Vaginal Fistulae.
LIVERPOOL MEDICAL INSTITUTION.—7.30 for 8 p.m., Inaugural Address by Professor B. L. McFarland: Adjustment to Adversity.
ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH.—5 p.m., Professor W. J. Tulloch: Medicine as an Aspect of General Biology.
ROYAL COLLEGE OF SURGEONS OF ENGLAND.—5.15 p.m., Mr. A. J. Gardham: Carcinoma Tongue; 6.30 p.m., Mr. H. C. Edwards: Splenectomy.
ST. ANDREWS UNIVERSITY.—At Physiology Department, Queen's College, Dundee, 5 p.m., Sir Neil Hamilton Fairley, F.R.S.: Amoebiasis and Some of its Problems.
ST. GEORGE'S HOSPITAL MEDICAL SCHOOL.—5 p.m., Dr. Desmond Curran: psychiatry demonstration.

Friday, October 12

BIOCHEMICAL SOCIETY.—At National Institute for Medical Research, 2 p.m., 355th meeting.
INSTITUTE OF DERMATOLOGY.—5.30 p.m., Dr. G. C. Wells: clinical demonstration.
INSTITUTE OF DISEASES OF THE CHEST.—5 p.m., Mr. J. R. Belcher: clinical demonstration.
INSTITUTE OF LARYNGOLOGY AND OTOTOLOGY.—4.30 p.m., Annual Address by Mr. R. D. Owen: Review of the Problems in Pharyngeal and Laryngeal Surgery.
INSTITUTE OF NEUROLOGY.—5 p.m., Professor E. Herman (Poland): Tonic Planar Reflex and its Localizing Significance.
KING'S COLLEGE HOSPITAL MEDICAL SCHOOL.—4.30 p.m., 9th Thomas Percy Legg Memorial Lecture by Mr. N. R. Barrett: The Short Oesophagus.
POSTGRADUATE MEDICAL SCHOOL OF LONDON.—10 a.m., Professor C. A. Wells: Conservation of Renal Function; 4 p.m., Dr. L. Guttman: Care of the Paraplegic.
ROYAL COLLEGE OF SURGEONS OF ENGLAND.—4 p.m., Edridge-Green Lecture by Professor W. D. Wright: Diagnostic Tests for Colour Vision.
ROYAL COLLEGE OF SURGEONS OF ENGLAND.—6.30 p.m., Mr. W. J. Lytle: Femoral Hernia.
ROYAL FREE HOSPITAL MEDICAL SOCIETY.—At Royal Academy of Art, 6.30 p.m., Sir Albert Richardson: Anatomy of Art.

Saturday, October 13

SOUTH-EAST METROPOLITAN REGIONAL TUBERCULOSIS SOCIETY.—At Grove Park Hospital, 10.30 for 11 a.m., Dr. J. E. Stokes: Some Cases of Pulmonary Pneumatocele; Mr. I. M. Hill: Some Cases of Miral Disease and Surgery; Dr. C. W. L. Jeanes: A Chest Physician Visits the New World—The Lighter Side.

BIRTHS, MARRIAGES, AND DEATHS

BIRTHS

Hayman.—On September 22, 1956, to Eva (formerly Diamant), S.R.N., S.C.M., and Michael Hayman, M.B., B.S., of 13, Church Street, Bridgwater, Somerset, a daughter—Joanna Louise.
Oakenfull.—On September 19, 1956, at the Maternity Home, Scunthorpe, Lincs, to Isabel (formerly Heath), M.B., Ch.B., wife of Basil G. P. Oakenfull, F.F.A.R.C.S., a son—Michael George.
Roe.—On September 1, 1956, at University College Hospital, London, W.C., to Kathleen (formerly Dempsey), wife of Dr. Peter W. Roe, of 43, Belmont Road, Bushey, Herts, a daughter—Jane Martha.
Taylor.—On April 3, 1956, at the Lady Chancellor Maternity Home, Salisbury, Southern Rhodesia, to Edna (formerly Parish), M.C.S.P., wife of Dr. P. A. Taylor, D.C.H., a sister for Susan, Michael, and Philip—Hilary Margaret.

MARRIAGES

Douglas-Foster.—On September 22, 1956, at Christ Church, Guildford, Surrey, Dr. Eric Murray Douglas, of Beaconsfield, Bucks, to Jean Foster, S.R.N., S.C.M., of Guildford.

DEATHS

Braham.—On September 20, 1956, at Hurlingham Cottage, 14, Manor Road, Bournemouth, Hants, David Braham, M.B., Ch.B., aged 56.
Cuthbertson.—On September 19, 1956, at 157, Essex Road, Leyton, London, E., William Cuthbertson, M.B., Ch.B.
Mackay.—On September 8, 1956, Ernest Charles Mackay, M.D., of West Dene, St. Leonards-on-Sea, Sussex.
Rohan.—On September 7, 1956, at Churchfields, Old Basford, Nottingham, Mary Teresa Rohan, M.B., Ch.B., D.P.H.

Any Questions ?

We publish below a selection of those questions and answers which seem of general interest. It is regretted that it is not possible to supply answers to all questions submitted.

Fog Precautions

Q.—*What precautions are worth taking in any severe fogs this winter, either at home or out of doors? What classes of person need special protection, and what is advised for them?*

A.—The group of people who above all are liable to suffer serious effects in fogs are the chronic bronchitic and emphysematous. Asthmatics without organic lung damage may or may not be affected; usually they are not in such danger of severe exacerbations of symptoms as patients with permanently diminished respiratory capacity from chronic bronchitis and emphysema. To a less extent, patients with certain types of heart disease may be adversely affected by fog, especially those who have suffered congestive heart failure. For any patient who has in the past suffered severely during a fog the best policy, beyond doubt, is to move out of towns where heavily polluted fogs are apt to develop during the winter. For those who must remain in town the simplest advice is to remain indoors in a well-warmed room during the persistence of fog. It seems clear that the coldness of the air has some effect in increasing the liability to serious effects from exposure to fog. On the hypothesis that the acid sulphur dioxide and its derivative sulphur trioxide, which are known to be present in urban fogs, are an important factor in causing irritation of the respiratory tract, the use of ammonia to neutralize the acid has been suggested. Although the results of a formal investigation of its value are not available, some suggestive evidence has been obtained. Strong ammonia solution is put into a bottle with a wick which is raised sufficiently to provide the required concentration of ammonia. The only objective way of judging this is by means of special test papers, but it is possible that the patient's subjective sensations might be a satisfactory guide. Obviously this method could be tried only with an intelligent patient to whom the principles involved could be explained. In the management of acute exacerbations of bronchitis caused by fog, if the patient must remain in the foggy atmosphere, oxygen is invaluable, providing, as it were, local air-conditioning. They must be used, however, with due regard to the dangers of too high a concentration of oxygen giving rise to carbon dioxide narcosis.

Platelet Production and Treatment of Thrombocytopenia

Q.—(1) *What is the physiological mechanism concerned in the regulation of platelet production?* (2) *Have there been any recent advances in the treatment of thrombocytopenic purpura? Is adrenochrome monosemicarbazone of value in this condition?*

A.—(1) The physiology of platelet production has not been so completely elucidated as that of the red or white cells. There is no morphological equivalent of the reticulocyte, the "band" cell, or the early lymphocyte, therefore assessment of activity has had to be made on the number of circulating platelets. Even the origin of platelets has been disputed, but it is now generally accepted that Wright's¹ original hypothesis of origin in the megakaryocytes is correct. Some idea of platelet activity may occasionally be obtained by a study of marrow smears, but this is a very inaccurate method and often misleading. Platelet production appears to be stimulated by thrombocytopenia, widespread tissue damage, haemorrhage, cortisone, and corticotrophic hormone. The spleen controls the platelet count by destroying aged platelets or by a direct hormonal influence on the marrow. Splenectomy in both the normal and the thrombocytopenic

subject is in many instances followed by marked thrombocytosis, whereas increase in splenic size for any reason is often accompanied by thrombocytopenia. Modern techniques with radioactive markers may perhaps throw new light on thrombopoiesis.

(2) The most recent and practical advance in the therapy of the thrombocytopenic haemorrhagic state has been the use of corticotrophic hormone and cortisone.^{2,3} One or other or both of these hormones may produce a rise in the platelet count, and even thrombocythaemia, with considerable improvement in the bleeding tendency. Even if the platelet count fails to rise, the tendency to bleed is usually lessened, presumably owing to the direct action of the hormones on the blood vessels. Thus they provide a means of controlling the haemorrhagic episode before an elective splenectomy or until a spontaneous remission occurs. The technique of platelet transfusion has also been perfected, but the indications for this procedure are few. Failure of hormones or splenectomy to control haemorrhage is probably the only certain indication for selective platelet transfusion.

Adrenochrome monosemicarbazone will reduce the bleeding time and decrease capillary fragility in experimental animals.⁴ In the reports of the sporadic clinical studies so far available there is lack of adequate evidence to prove that cessation of capillary bleeding can be attributed to the action of this drug. Its clinical use in the thrombocytopenic state is as yet unestablished.

REFERENCES

- Wright, J. H., *Boston med. surg. J.*, 1906, 154, 643.
- Stefanini, M., *Arch. Int. Med.*, 1955, 95, 543.
- Dameshek, W., *Blood*, 1956, 11, 384.
- Roskam, J., *Arrest of Bleeding*, 1954. Blackwell Scientific Publications, Oxford.

Subception

Q.—*There was a report in the national press some weeks ago that experiments in the U.S.A. with sub-liminal visual stimuli had been apparently successful in boosting the sales of a particular brand of ice-cream advertised in this way. The advertisement was thrown on to a cinema screen during an ordinary film for a time so brief that the audience was not aware of having seen it, yet the sales of the product are said to have risen. If this result is to be accepted at its face value, the implications seem thoroughly alarming. What experimental support is there for these claims?*

A.—The question divides itself into two parts. First, can physical signals or differences in these, the presence of which the observer cannot report, yet affect his behaviour in some way? Second, have these surreptitious means of stimulation a power of suggestion which is equal to, or greater than, modes of stimulation of which the person is aware? A great deal of work has been done on the first question by experimental psychologists, and the subject is still controversial. This work on "subception," as it has been called, has shown that subjects will block their awareness of obscene words when presented tachistoscopically, even though their psycho-galvanic reflex shows that the words have produced some reaction. A further experiment, designed to eliminate the possibility that the subjects may have been simply embarrassed and thus unwilling to report, was done by pairing an electric shock with some nonsense words, and the previous result was substantiated. Some other experimental possibilities remain to be checked, and the whole set of conclusions based on these and similar experiments has recently been challenged on statistical grounds. Work is at present being done on this subject at University College, London, and the television service has been used in the experiments.

So far as the second question is concerned, there is no good evidence. It is of course well substantiated that suggestion can by-pass consciousness, as in hypnosis. However, there is only the report on the ice-cream advertisement to show that stimuli below "threshold" can have the same effect. Mass experiments of this nature are not very convincing because of the large differences in threshold sensitivity existing in a population. It is very difficult to be certain, unless this is ascertained individually and indepen-

dently, whether or not a subject is aware that he is being stimulated, and, to make it even more difficult, there are large fluctuations in the threshold of an individual's sensitivity from moment to moment. We do not therefore know what proportion of the purchasers of the ice-cream were aware of actually seeing the advertisement. Further work by experimental psychologists is clearly necessary.

Hydrocortisone Snuff

Q.—In a recent annotation¹ you describe a trial of hydrocortisone snuff, in a dosage of 15 mg. hydrocortisone acetate per ampoule, for hay-fever. Is there any evidence that prolonged treatment with this snuff might have undesirable local effects on the nasal mucosa, or even adverse systemic effects?

A.—A dose of 15 mg. of hydrocortisone acetate daily is extremely unlikely to produce adverse systemic effects, especially in cases of hay-fever, whose season lasts from a week or so up to two months; nor would treatment with this dose be likely to cause ill-effects if used for more prolonged periods. Local applications of hydrocortisone in solution have been shown to produce histological changes in the skin, but only temporarily, and it has not been shown that these changes are harmful.

It is not known whether particles of hydrocortisone applied to mucous membranes cause undesirable local effects on the nasal mucosa. Clinically the beneficial effects in hay-fever are not accompanied by any obvious adverse local effects.

REFERENCE

¹ *British Medical Journal*, 1956, 1, 1416.

Repeated Blood Transfusion and Haemosiderosis

Q.—In conditions necessitating repeated blood transfusions, such as aplastic anaemia, is haemosiderosis an unavoidable sequel? How soon is it likely to develop, and what can be done to minimize its effects when it does?

A.—Whenever iron is introduced into the body without removal of a corresponding quantity—usually as blood—that iron will be deposited in the tissues; and, if present in large enough quantities, it will excite the production of fibrous tissue which sooner or later will strangle the liver lobules and the pancreatic islets and produce the pathological picture of haemochromatosis, and later still its clinical manifestations. Haemosiderosis is thus an inevitable result of repeated blood transfusion without bleeding: haemochromatosis will appear only if the patient lives long enough, and its clinical signs may be long delayed. The speed with which fibrosis develops around deposited iron depends on many factors, most of which are not clearly differentiated. Probably the most important is the quantity of iron deposited and the time it remains in the tissues: there is little chance of clinical haemochromatosis developing within two years from less than 15 g. iron, which is contained in 30 litres of blood. One patient received about 25 g. of iron over a period of five years without developing skin pigmentation, hepatomegaly, or diabetes, though her pancreas contained much fibrous tissue; of two others who received 15 g. of iron within a year, one became pigmented and developed hepatomegaly before the year was out, but the other has neither pigmentation nor hepatomegaly three years later. It is proposed to subject this last patient (who seems to be fully recovered) to repeated venesections until most of the excess iron has been removed.

Prevention of haemosiderosis is thus not an urgent matter, since most subjects with aplastic anaemia die within 10 years, but experiments with intramuscular dimercaprol (B.A.L.) or intravenous sodium calcium-edetate have been tried without much success; too little iron is removed to compensate for the prolonged immobilization of the patient. However, if a patient with aplastic anaemia has completely recovered, it is worth while subjecting him to repeated venesections.

NOTES AND COMMENTS

Exact Control in Diabetes.—Dr. WILLIAM BRAND (London) writes: The answer to this question ("Any Questions?" August 18, p. 430) prompts me to introduce a very important point that appeared to be taken at a tangent—namely, that there is no real statistical evidence in favour of hyperglycaemia *per se* being prejudicial to health or expectation of life. I feel that this is a consideration to be faced in the basic treatment of the malady. Every diabetic that I have encountered in hospital and private practice periodically tests his or her urine for sugar. When I endeavour to determine whether they have been testing for ketone bodies they almost invariably and incredulously answer in the negative. From my own small experience I am convinced that patients do not realize, as they should, that it is the presence of ketones in the urine which might herald the onset of diabetic coma (not hyperglycaemic coma), and not glycosuria alone. To counteract the production of ketone bodies, and by the usual methods of supervision, we can assess the minimum of carbohydrate required to balance the fat and protein, the amount of the latter depending on the individual's dietary propensity. Any amount of sugar or carbohydrate over and above this would do no harm but on the contrary would ensure safety under various grades of activity, always keeping in mind that the more active individual will tend to require more insulin than his sedentary counterpart. The resulting hyperglycaemia and associated glycosuria can be compared with cases of renal glycosuria which are classically benign. Do you not think, Sir, that the principles of treatment in diabetes should be established along these lines instead of along those of the complicated and erroneously exact dietary methods set out in every textbook which the student regards with bewilderment? He is thus more often than not completely at sea when confronted by a diabetic he has himself diagnosed.

OUR EXPERT replies: It is true that it is difficult to say for certain that hyperglycaemia *per se* is a bad thing: but there is not only a general impression among those with long experience of diabetes that it is so, but also not a little evidence to support this view. The detailed follow-up of a very large number of cases in Dr. Joslin's clinic in Boston and a similar study by Professor Dunlop in Edinburgh agree in showing that the incidence of complications of the disease is significantly greater in those patients who, by blood-sugar standards, are poorly controlled than in those whose blood sugars approximate more closely to physiological levels. Secondly, in early cases there is good reason to believe that prolonged hyperglycaemia tends to aggravate the diabetes and prevent any recovery of natural function. Further, patients who consistently run a high blood sugar not only more readily develop the symptoms of diabetes when, for any reason such as infection, their diabetes becomes worse, but also have a reduced margin of safety, with the result that they are particularly liable to develop ketosis in these circumstances. I am well aware that these arguments are not conclusive, but taken together I think they constitute a valid reason for continuing the generally accepted practice of trying within reason to keep the blood-sugar level in diabetes as near as possible within physiological limits, although I am equally aware of the fact that this is rarely possible.

Books of "Any Questions?" and Refresher Course Articles.

The following books are still available through booksellers or from the Publishing Manager, B.M.A. House. Prices include postage. *Any Questions?*, Volumes 2 and 3 (8s. each); *Refresher Course for General Practitioners*, Volume 2 (26s. 6d. inland, 26s. overseas); *Clinical Pathology in General Practice* (22s. 3d. inland, 21s. 9d. overseas).

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Indications for Cortisone
Treatment
Patient and Doctor

SEVERE ASTHMA
(STATUS ASTHMATICUS)
Emergency treatment
Normal treatment

CHRONIC ASTHMA
The acute attack
Maintenance treatment
Long term treatment

SIDE EFFECTS
Physical Signs
Metabolic Effects
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LONDON SATURDAY OCTOBER 13 1956

THE PROBLEM OF STAPHYLOCOCCAL INFECTION*

BY

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The control of the great plagues and certain of the acute bacterial infections has not delivered mankind from infectious disease, but it has very decidedly changed the nature of that disease in certain countries of the world, including the United States of America.

The principal change in these countries has had the effect of throwing into prominence those bacterial diseases which characteristically require a relatively greater reduction of bodily defence before infection can become disease. To be sure, the initiation of any disease involving a particular microbe presumably requires some breakdown, however temporary, of the defence mechanisms of the host. Nevertheless, certain microbes seem to require more such help than others.

As we all know, the three principal diseases involving bacteria which are most prominent in the U.S.A. are those produced by the bowel flora, by tubercle bacilli, and by staphylococci. These three groups of diseases have a number of features in common; above all, they share together in the fact that harbouring of the parasite is commonplace but disease is rare. This means that the spread of these diseases among a group of persons is not to be regarded as a visitation from without but rather as an indication that something is going wrong with the crude equilibrium which had previously existed in that community.

If this is so, it follows that we should not be exclusively preoccupied with attempts to drive invaders out, for we are not really dealing with invaders but with original settlers. If they were not actually here first, they were certainly a close second. Indeed, in the specific case of staphylococci most babies acquire them during the first week of life. No, our preoccupation should be instead with attempts to discover what it is that goes wrong which permits these hangers-on to gain control; or, more specifically, with study of what there is to go wrong. And the fact that this indeed is a subject of widespread experimental preoccupation may be seen from the topics listed in our Conference.

Some Generalizations

Before concentrating exclusively on staphylococci, however, it might be helpful to recall to our minds certain of the other properties held in common by staphylococcal disease and its two sister diseases—those caused by tubercle bacilli and those caused by individual members of the bowel flora. There is, first of all, with

* This article was one of a series of papers presented at the conference on "Staphylococcal Infections" held by the New York Academy of Sciences on February 16 and 17, 1956, and is included in the monograph published under the same title in the *Annals of the New York Academy of Sciences*, volume 65, article 3, pp. 55-246.

all three groups of diseases the fact mentioned previously that the presence of the microbe is commonplace, but disease and illness are rare. And this leads to that obvious inference that either the microbe or the host must undergo some significant alteration before infection can become disease. In addition, and with certain individual exceptions, there runs through the microbes of all three groups of disease the common tendencies: to produce localized lesions with destruction of tissue; to produce endotoxins or tuberculin; to survive intracellularly (only in the case of tubercle bacilli and staphylococci); to produce illness which may range from the exceedingly acute all the way to the barely perceptible chronic forms; and, finally, there is the common tendency to exist or to emerge in a form resistant to one or more antimicrobial drugs.

For these reasons, and even without respect to the matter of drug-resistance, the antimicrobial therapy of these forms of localized bacterial diseases has always represented a less important portion of the total therapy than is the case with certain of the acute relatively non-destructive microbial diseases.

Generalizations such as these are quite helpful when we are trying to outline and define a problem, but, as we all know, these generalizations soon reach their limits. And if there is one thing characteristic about staphylococci it is the complete lack of generality which they display with respect to many of the attributes related to disease-production in which we are most interested.

Thus, although we are gathered here to discuss something called staphylococcal infection we all know that this is not always quite the same thing as staphylococcal disease. We know, too, that even if we limit ourselves to the staphylococci which regularly produce the aureus pigment and coagulase, or even to the members of the same bacteriophage type, we are not necessarily on firm ground with respect to their homogeneity in terms of ability to initiate disease in man or some laboratory animal. At times it almost seems as if every staphylococcus is different.

The Microbe and the Lesion

In addition to the strong individualistic tradition among staphylococci, consideration of the subject of staphylococcal infections or disease is further complicated by the very real difficulties in establishing a diagnosis. We have here the same general problem that we face with any ubiquitous microbe, but with the added obstacle that we know that staphylococci are capable of producing lesions virtually anywhere on the body surface and that human carriers of staphylococci are commonplace. As a consequence, we cannot accept the mere

presence of staphylococci in an open lesion such as a wound—even an operative wound—with any degree of confidence that the microbe and the lesion are necessarily related. In short, open wounds in open wards, no matter how carefully the wound may be protected by surgical dressing, are seldom suitable objects for the study of staphylococcal infection and disease, yet we know that some of these lesions could be related to the staphylococci.

Accordingly, in considering staphylococcal infection and disease, one must limit the discussion to lesions which had never shown external drainage at the time of first culture—that is, the so-called “closed lesions” and the infections accompanied by bacteraemia. Even with the so-called “closed lesions” the chance of contaminating the lesion by an irrelevant staphylococcus is present, but can be minimized with proper care.

These points are quite well known to all of us. Nevertheless, I am convinced that we who are familiar with them have almost completely failed to communicate them to our scientific colleagues not directly connected with the staphylococcal field. We have sinned further, in my opinion, by not clearly pointing out that most of the large-scale clinical investigations on drug-resistant staphylococci were not concerned with staphylococcal disease at all but had to do with something quite different—namely, the healthy carriers of staphylococci. Finally, while I am on the subject of our sins, until recently we quite failed to emphasize something we all knew—namely, that a penicillin-susceptible staphylococcal infection in a patient virtually never becomes drug-resistant during therapy. As a result of this failure in ordinary communication I am quite confident that physicians and others interested but not directly engaged in the field have the misconception that the number of patients with actual drug-resistant staphylococcal infections and disease seen each year on a general hospital service can be numbered in the hundreds. They have the further misconception that if one treats a penicillin-susceptible instance of serious staphylococcal disease with penicillin the drug will soon prove valueless because of the emergence to predominance of drug-resistant staphylococci.

Exposure in Hospitals

With full appreciation of the problems presented by this individualistic tradition of staphylococci and the difficulties in diagnosis, let us turn now to the question of the staphylococcal problem as we face it to-day. Let us also try to see whether the problem is significantly different from that presented a decade or so ago.

First, let us ask whether our population at large or the special population in our hospitals are experiencing any greater exposure to staphylococci than was the case ten or twelve years ago. Fortunately, we have careful studies bearing on this point available, and it appears that the answer is “No.”

We have, for example, the detailed studies of A. A. Miles and his associates in England which were published in 1944, and we have many studies with the phage-typing method conducted in widely separated portions of the world during recent years. All of these studies show substantially the same thing.

Approximately one-half of any group of adults not in hospital are nasal carriers of staphylococci when studied at a single point in time. When members of the group are followed individually for periods of several weeks or longer, the percentage harbouring staphylococci at one time or another goes up and may reach 70 or 80%. Likewise, when patients are studied on first admission to a hospital and then throughout a hospital stay, the percentage harbouring

staphylococci goes up appreciably from the 50% level on admission and then tends to fall back again after discharge.

One of the many interesting observations brought out in this type of study has been the indication noted by Miles *et al.* (1944), who stated: “The nasal carrier state varies, not with the environment of the person, but with the person himself. There is a marked tendency for persons to be either persistent carriers* or persistently free from nasal *Staph. aureus*.”

Thus, in answer to this first question it can be said that there is no indication that our degree of exposure to staphylococci either in or out of our hospitals is any greater to-day than it was twelve years ago. This is not particularly surprising, and is perhaps just another way of saying that staphylococci were plentiful then and are plentiful now.

The Problem of Pathogenicity

The next question which arises is whether there is any reason to believe that strains of staphylococci of enhanced pathogenicity for man are more prevalent to-day than ten or fifteen years ago. This question is less readily answered than the previous question, because of the nature of the problem. However, if such an increased prevalence of more pathogenic staphylococci was occurring it would be most readily apparent in the number and the clinical forms of the staphylococcal disease seen in patients on admission to the hospital.

Infections which occurred in the hospital environment itself would not provide much information on this subject unless the infections were truly overwhelming. The reason for this is that in a hospital population the presence of so many people ill with other diseases, or ill as a consequence of treatment, would make it difficult to distinguish in any individual situation between increased pathogenicity of the staphylococci and decreased resistance of the host.

So far as concerns patients newly admitted to hospitals, there appears to have been surprisingly little attention directed to this point in recent years. Everyone seems to agree that one of the commonest forms of serious staphylococcal disease, the primary haematogenous osteomyelitis of childhood and adolescence, has virtually disappeared from our admitting-rooms. I also suspect, but cannot substantiate, that patients with carbuncles and recurrent boils are seen less frequently requesting admission to the hospital than was the case ten or fifteen years ago. In several of the recent reports—for example, one by Barber and Burston (1955) from London a few months ago—the number and the form of staphylococcal disease seen in patients on admission to the hospital are listed, but no comment is made concerning how the material compares with the experience in years past.

Fisher *et al.* (1955) reported that in the twenty-year period, 1933–53, at the Johns Hopkins Medical Center, slightly over one hundred patients with staphylococcaemia were seen. This number presumably also includes patients who developed bacteraemia while in the hospital. Nevertheless, the crude figure of 5 to 10 patients admitted annually with staphylococcal bacteraemia would be about what has been seen at New York Hospital–Cornell Medical Center. It should be mentioned, however, that admission rates of patients with staphylococcal bacteraemia to the large university centres may give a falsely high value because of the tendency to transfer such patients from a smaller hospital after therapeutic failure.

Another serious form of staphylococcal disease, the primary pneumonia of adults, tends to occur in sporadic outbreaks in association with viral influenza. Hence it is difficult to form an estimate of its general annual incidence. By the same token, it seems safe to say that there has been no recent steady increase in primary staphylococcal pneumonia in non-hospitalized patients. Such an increase, related or unrelated to influenza outbreaks, might be expected if strains of appreciably enhanced pathogenicity for man were becoming more prevalent.

* Italics mine.

There is one entity, the staphylococcal empyema of infants, particularly those under the age of 6 months, which has been reported to be on the increase. This entity probably represents a situation which is closer to that of the development of infection in the hospitalized patient than to the adult coming to the hospital with established staphylococcal disease. Hence if there is an increase in this entity—and the fact that a real increase has occurred is by no means clear—it should be considered in relation to the problem of the development of staphylococcal disease by persons with hospital experience.

With this possible exception, however, there is remarkably little to suggest that there is any notable increase in the number of patients, particularly adult patients, appearing at our hospital admission rooms with staphylococcal disease. Moreover, there is nothing to suggest that the forms of the staphylococcal disease seen represent the dissemination of more malignant strains of the microbe or the concentration of more malignant strains in particular localities outside our hospital. Indeed, the one apparently definite change in the form of staphylococcal disease seen is for the better—namely, the virtual disappearance of the serious diseases of primary haematogenous osteomyelitis.

The type of evidence available on this question of the form and numbers of patients with staphylococcal disease requesting hospital admission is admittedly sketchy. Nevertheless, while much has been published on staphylococci in recent years, no one seems to be mentioning any remarkable increase in the number of patients with staphylococcal disease or any increase in unusually malignant forms among the patients who present themselves for admission to hospital.

Is there an Increased Virulence?

We have therefore a situation in which neither our patients in hospitals nor what might be loosely termed the public at large are apparently undergoing any greater exposure to staphylococci than was the case a decade or so ago. And we have no particular reason to believe that there has been a wide increase in the prevalence of unusually pathogenic staphylococci or even that there has been any substantial numerical increase in staphylococcal disease occurring outside our hospitals.

In brief, we have no convincing evidence, or indeed even any particularly well-founded suspicion, that the crude equilibrium between the public at large and the ubiquitous staphylococci is shifting for the worse. If any shifts have occurred they seem to have been on the side of a more favourable situation for the members of the public.

What, then, is the situation of our special communities of hospitalized patients with respect to their crude equilibrium with their staphylococci?

As mentioned before, their risk of exposure to staphylococci in general is presumably no different from what it ever was—or at least from what it has been in the past decade. But how about the possibility that there is a wider prevalence of particular strains of increased pathogenicity for man? Because of the localized and highly special circumstances involved, is it not possible that especially pathogenic strains of staphylococci might be lurking around our hospital environments, whereas the same strains would not be so readily detectable when spread through the community at large?

Let us set a measure of increased virulence in terms of epidemics of unusually serious staphylococcal disease involving a dozen or more patients at a time in a single hospital and occurring throughout our hospitals in general. Viewed in these terms I do not believe that we have a particularly good case for increased virulence of the so-called “hospital staphylococci.” But when one considers the highly individualistic nature of staphylococci it is by no means inconceivable that such strains are present here and there, though operating, thus far, only in terms of tiny localized epidemics. Indeed, there is some reason to believe, in the case of a few strains, notably the enterotoxin-

producing strains, that this sort of thing is actually happening even though its overall numerical expression is still quite small.

Even this occurrence of tiny but multiple epidemics involving enterotoxin-producing staphylococci, however, does not establish that these strains are necessarily newcomers to our hospitals or necessarily have assumed increased virulence for man. For we are obviously doing other things to our patients which we were not doing in years gone by, and it may be that it is the setting rather than any absolute increase in microbial virulence which determines this highly alarming phenomenon.

There is another phenomenon, re-emphasized by Barber and Burston (1955), which might indicate that the staphylococci prevalent in our hospitals to-day have an increased pathogenicity for man. In brief, they have presented evidence that strains of staphylococci from the lesions of active staphylococcal disease may be the chief offenders in terms of cross-infection and the ability to initiate staphylococcal disease in new hosts. It should be emphasized that these investigators do not present their findings as evidence that the lesion-producing staphylococci are necessarily more virulent than the more virulent of our present strains. They merely suggest that it is these lesion-producing staphylococci which have the capacity to initiate new disease, in relative contrast to the staphylococci of the nasal carriers.

These observations made by Barber and Burston with modern techniques are particularly timely and should form the basis for detailed epidemiological investigations. Hence it is no disparagement to point out that their findings recall to mind the well-respected item in the clinical lore of our fathers' generation to the effect that a hand infection in a surgeon or a pathologist was a far more dangerous thing than a hand infection in a housewife who had stuck herself with a pin. It was reasoned that the strain of microbe in the case of the surgeon or pathologist was more dangerous on the grounds that it had been so recently producing disease in a patient.

Although these last few remarks on hospital staphylococci are relevant to the central topic they represent a slight digression from the consideration of whether to-day's hospital staphylococci contain an impressively increased prevalence of unprecedentedly virulent strains. On this subject, I believe it can be said that when one considers the wide range among individual strains of staphylococci in terms of ability to initiate new human disease, there is no convincing evidence that—on the whole—our hospital staphylococci are any more virulent for man than they ever were.

Lowering of Defences

As I see it, therefore, we are not subjecting our patients in hospitals to a greater risk of exposure to staphylococci or to any more especially virulent strains of staphylococci than we ever were.

Does this mean that we are not seeing the development of more staphylococcal disease among our patients while they reside in our hospitals to-day than was the case a decade or so ago? Almost certainly not. Indeed, the only reason for qualifying the situation at all is the lack of precise comparative data for the two time periods. Despite the absence of precise data, I am confident that most of us are convinced that to-day we are seeing with greater frequency the actual development of staphylococcal disease in patients after they have come into our hospitals than was formerly the case. In short, we are beginning to detect signs that the hitherto satisfactory equilibrium between our hospital patients and staphylococci is becoming unbalanced.

It is not so much that our patients in hospitals are being subjected to any greater challenge by staphylococci as it is that they are less well equipped to meet the same old challenge. Because they are less well equipped, it is up to us to give them better protection. At the present time, however, we are doing considerably less than that. Indeed, in many cases we are actually lowering such defences as the patient brought with him to the hospital. We are doing

this by the bodily disturbances we create as an unsought-for accompaniment of many of our modern therapies. In effect, an unfortunate by-product of our life-saving and life-prolonging procedure is to create a favourable market for staphylococci.

This favourable market is being created in several ways. First, our modern therapies are permitting the survival of people who are less able, in various undefined ways, to cope with bacterial infections. Examples of this sort are the insulin-treated diabetics, the children who have had splenectomies for various haematological disorders, the adults who have had total gastrectomies, and perhaps even some who have had partial pulmonary resections. Second, certain of our commonly used treatments such as cortisone, hydrocortisone and corticotrophin, the more widely acting antimicrobials, and x-ray irradiation are known to create circumstances which at times facilitate the development of infection. It is conceivable that on certain occasions treatments such as the antihistamines or the anticoagulants might unfavourably influence infection. Finally, in order to manage many of these modern treatments properly, it is necessary to perform venepunctures and skin punctures with unusual frequency on these very patients who for one reason or another are more liable to the development of infection.

To be sure, this increased congregation of more susceptible hosts in our hospitals is not necessarily the only reason for the apparent increase in staphylococcal infections developing in the hospital. Nevertheless, it does seem to be the principal factor which is *different* in our situation to-day from that of a decade or so ago. Moreover, if it is happening in the hospitals to-day, it is reasonable to expect that it will happen outside the hospitals in the future as these various forces become active on a wider scale.

If we assume the validity of this analysis, how can the situation be improved? It would be pointless to think in terms of attempting to oppose many of the forces which are contributing to this situation, because so many of these forces are such notable scientific achievements for the common good. Moreover, as staphylococci are so ubiquitous, an approach based on attempts to eliminate them from the environment would not seem hopeful. In the same way, it does not appear that antimicrobial drugs *per se* would play an important part. Chemoprophylaxis is a two-edged sword at best. In the present situation, the necessity for protecting the patient for such very long periods against a number of microbial species in addition to staphylococci makes the use of drugs impracticable.

Two approaches exist which seem reasonable. The first is for us all to have a continuing awareness of the fact that our hospitalized patients to-day are on the whole less able to cope with staphylococci than was formerly the case. This means that we should review and probably intensify our aseptic practices not only in the operating-room but especially in connexion with the ordinary "puncture" procedures used in the wards.

The second approach is the major one—namely, to find means for increasing bodily defences against staphylococci and means to restore these defences when they have been reduced. The logic of this approach is evident if you agree with me that the crux of to-day's staphylococcal problem lies not so much in changes in our staphylococci as it does in changes in the status of our hosts. Our difficulties with this second type of approach arise immediately, however, and stem from the fact that we are almost wholly ignorant of the mechanics of staphylococcal infection and disease. Until we can discover more than we now know concerning what determines the pathogenicity of certain staphylococci and how the healthy host manages to live in peace with them, it is not likely that our situation will materially improve.

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THE TRANSMISSION OF STAPHYLOCOCCUS AUREUS

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There is now a great deal of evidence that a high proportion of the staff of many hospitals are nasal carriers of penicillin-resistant *Staph. aureus*, that they soon acquire them after coming into residence (Barber, Hayhoe, and Whitehead, 1949; Rountree and Barbour, 1951; Barber and Burston, 1955), and that similar strains are responsible for sporadic infections of clean operation wounds and for outbreaks of conjunctivitis, mastitis, and pemphigus neonatorum in hospital nurseries. Although this suggests that the nasal carrier is primarily responsible for such infections, it is possible that transfer of organisms from minor staphylococcal infections such as boils, styes, or acne pimples on the person of members of the staff who have remained on duty may be equally important.

Attempts to prevent transfer of infection from either of these two sources are, however, hampered by our lack of knowledge of the methods by which *Staph. aureus* is transmitted from person to person. Except for the work of Duguid and Wallace (1948), little attention has been paid to this. The experiments reported in this paper were designed to throw further light on this question.

Experimental Methods

The manner in which experiments were carried out is given in the appropriate place in the text. It is, however, necessary to give some general details of the methods employed.

Media and Identification of Colonies.—The medium consisted of 1% Lemco agar, and in some of the early experiments an attempt was made to pick out colonies of *Staph. aureus* by their colour, consistency, and behaviour in coagulase tests on slides. In most of the experiments, however, phenolphthalein diphosphate (0.01%) was incorporated in the medium at the time the plates were poured. The majority of strains of *Staph. aureus* (Barber and Kuper, 1951) produce arylphosphatase, with liberation of free phenolphthalein in and around the colonies, which can be detected by a red colour developing when the culture plate is held over the open neck of a bottle of strong ammonia. All plates were examined in this way after incubation for eighteen to twenty-four hours, and counts made of colonies which had a red coloration and which resembled those of *Staph. aureus*. When necessary, subcultures were made in broth, coagulase tests being carried out by the tube method (Fisk, 1940).

Total colony counts were made after incubation for a further 24 hours.

Expression of Results.—The time of exposure of the plates varied in different experiments, and in order to secure uniformity the results are expressed as the number of organisms (or *Staph. aureus*) falling on to 1 square foot (930 square cm.) of medium in one minute.

Transmission of *Staph. aureus* Originating in the Respiratory Tract of Carriers

Except in very exceptional circumstances, it is improbable that *Staph. aureus* in the respiratory tract of a carrier comes directly into contact with that of normal persons, the eyes of newborn babies, or open wounds. Transfer must therefore occur by a more indirect route involving (1) egress from the respiratory tract, (2) transportation to the recipient, and (3) entrance into his tissues.

1. Egress from the Respiratory Tract

Staph. aureus occurs so infrequently in the throat that egress from the mouth need not be considered as an important factor in the dissemination of this organism. Large numbers are, however, present in the anterior nares of about half the population, and such organisms may reach the outside world by (a) expulsion, (b) excretion in the faeces, or (c) outflow on to hands, etc.

Expulsion in Expired Air

In order to study the number of *Staph. aureus* emitted from the nose, and under what conditions they emerge, experiments were carried out with a thin plastic sheet, holding a culture plate horizontally in such a position that its outer zone was only a few millimetres below the nasal orifice of normal adults. The edge of the plastic was cut away into such a shape that it fitted against the upper lip, and prevented organisms from the mouth reaching the culture medium. Subjects sat upright in an armchair in a laboratory, with as few draughts as possible, and carried out certain standardized activities. At intervals during this process the culture plate was rotated a few degrees, to bring a new area of medium below the nose. After exposure the plates were incubated, and both the total number of colonies and those identified as *Staph. aureus* were counted.

These experiments were carried out with known carriers of *Staph. aureus*, and also with individuals from whom this organism had not been obtained on nasal swabs. The results are given in Table I. Contrary to what might have been supposed, *Staph. aureus*, even when present, was generally not expelled. Only as a result of "snorting" did large numbers of organisms emerge; if the individual was a carrier a high proportion were *Staph. aureus*. Snorting is an unusual type of activity which generally occurs into a handkerchief. These results are similar to those obtained by

TABLE I.—Number of Colonies Isolated on Culture Plates held below the Nose during Different Types of Activity

Subject	Presence of <i>Staph. aureus</i> in Nose	Mouth Breathing 5 Mins.		Nose Breathing 5 Mins.		6 Coughs		Counting 5 Mins.		One Sneeze		12 Snorts	
		Total Orgs.	<i>Staph. aureus</i>	Total Orgs.	<i>Staph. aureus</i>	Total Orgs.	<i>Staph. aureus</i>	Total Orgs.	<i>Staph. aureus</i>	Total Orgs.	<i>Staph. aureus</i>	Total Orgs.	<i>Staph. aureus</i>
Fid	+	6	0	7	0	7	4	9	2	2	0	44	37
Bew	+	9	0	5	0	10	0	9	0	5	0	2,500	300
lv	+	1	0	7	0	4	0	7	0	1	0	1,200	162
Cop	+	8	0	6	0	2	0	10	0	20	0	10	1
Win	+	2	0	3	0	0	0	3	0	1	0	131	55
Ric	—	11	0	15	0	6	0	22	0	2	0	44	0
Geo	—	18	0	13	0	1	0	16	0	4	0	71	0
Mar	—	10	0	4	0	1	0	42	0	2	0	81	42
Fos	—	4	0	1	0	1	0	1	0	1	0	6	0
Pri Nov. 4	—	9	0	3	0	2	0	15	0	3	0	67	0
Pri Jan. 9	+	16	0	4	0	4	0	10	0	12	0	760	184

Duguid and Wallace (1948), and suggest that expulsion in droplets or "droplet nuclei" from the nose is not a very successful method for obtaining the egress of *Staph. aureus* into the outer world.

Excretion in Faeces

Brodie, Kerr, and Sommerville (1956) have suggested that nasal carriers of *Staph. aureus* swallow this organism, and have shown that it may reach the faeces, but it is im-

probable that this is the principal reason for the wide dissemination of staphylococci among hospital staffs.

Outflow in Nasal Discharges

The nasal secretions flow towards the nasal orifice, and eventually reach the skin of the upper lip or face in the liquid condition or as dried crusts. Thence they may be transported by the hands or handkerchief to other parts of the body or to objects in the vicinity. Observation of a group of nine students during a lecture of one hour showed that they touched their mouth or nose on 23, 19, 15, 15, 14, 11, 10, 7, and 6 separate occasions. Fluorescent patches (in the light of Wood's lamp) could also be detected on the fingers and many areas of the body, desk, etc., if small quantities of the zinc chelate of 8-hydroxyquinoline were previously placed in the nostrils.

To show that *Staph. aureus*, if present in the nose, may be carried in similar fashion, surveys (using sweep plates for clothing and saline-soaked swabs for skin) were made of healthy individuals working in the hospital. The results are given in Table II, showing that *Staph. aureus* was present

TABLE II.—Presence of *Staph. aureus* on Skin or Clothing of Nasal Carriers and Non-carriers

	Har	Fid	Bew	lv	Cop	Ric	Win	Fos	Pet	Sch	Mar	Pri, Nov. 15	Pri, Dec. 22	Pri, Feb. 20	Geo, Nov. 15	Geo, Jan. 26
Nose	+	+	+	+	+	+	+	—	—	—	—	—	+	+	—	—
Throat	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hair	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Face	+	+	+	+	+	+	+	—	—	—	—	—	+	+	—	—
Wrist	+	+	+	+	+	+	+	—	—	—	—	—	+	+	—	—
Fingers	+	+	+	+	+	+	+	—	—	—	—	—	+	+	—	—
Chest	+	+	+	+	+	+	+	—	—	—	—	—	+	+	—	—
Abdomen	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Back	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Legs	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Front coat	+	+	+	+	+	+	+	—	—	—	—	—	+	+	—	—
Back	+	+	+	+	+	+	+	—	—	—	—	—	+	+	—	—
Handkerchief	+	+	+	+	+	+	+	—	—	—	—	—	+	+	—	—
"pocket"	+	+	+	+	+	+	+	—	—	—	—	—	+	+	—	—
Trousers or skirt	+	+	+	+	+	+	+	—	—	—	—	—	+	+	—	—
Shirt or blouse	+	+	+	+	+	+	+	—	—	—	—	—	+	+	—	—
Socks or stockings	+	—	—	—	—	—	—	—	—	—	—	—	+	+	—	—

+ = *Staph. aureus* isolated. — = *Staph. aureus* not isolated.

on the majority of the sites on the skin and clothing of nasal carriers of this organism, but was found only infrequently on the same areas of individuals who were not carriers.

Swabs taken from the nose of one subject, Pri, on November 1, and on four subsequent occasions, failed to yield *Staph. aureus* until December 22, when a heavy growth was obtained. During the period he was known not to be a carrier—that is, on November 15—examination of his skin and clothing showed that only small numbers of *Staph. aureus* were isolated from a few of these areas. On December 22 this organism was present in large numbers on all areas examined, except one on the skin and one on the clothing. This change in the flora of his nose, skin, and clothing was not accompanied by clinical signs of any description on his part or in his family. This state has persisted. A similar, though less marked, change was also observed with subject Geo.

Sensitivity tests with antibiotics suggested that, in general, strains recovered from the skin and clothing of a carrier were similar to those in the nose. Phage-typing determinations were carried out in detail with strains isolated from the two carriers Ric and Pri. In the case of Ric, his left nostril contained type 52/52A/80, and this strain was found on his face, wrist, and fingers, the back and front of his coat, his pocket, handkerchief, trouser leg, shirt, and socks. His right nostril contained type 3A/3B/55/71+, but this strain was not detected on skin or clothing. The carrier Pri had type 29 in both nostrils, and this type was found on the fingers, abdomen, the front and back of his coat, his handkerchief, trouser leg, and socks. Type 53 was found on his

face, wrist, chest, shirt, and handkerchief. It would thus seem probable that the majority of the staphylococci found on skin and clothing of carriers have been derived from the individual's own nose.

Because of the wide dispersion of *Staph. aureus* on the skin and clothing, it is to be expected that other objects, such as bedding, with which the individual comes into close contact, will be similarly polluted. Five known carriers and five non-carriers took samples of their own bedding, using large woollen swabs moistened with saline. From Table III

TABLE III.—Presence of *Staph. aureus* on the Bedding of Carriers and Non-carriers

	No. Studied	No. of Individuals with <i>Staph. aureus</i> on:				
		Lower Sheet	Upper Sheet	Blanket	Counterpane	Pillow
Nasal carriers	5	3	2	1	2	2
Non-carriers	5	0	0	0	0	1

it is clear that the bedding of carriers was often contaminated by *Staph. aureus*, whereas that of non-carriers was generally free. It is also of considerable interest that the sheets, counterpane, or pillow were quite as likely to possess *Staph. aureus* as the blankets.

2. Transport of *Staph. aureus* to Other Individuals

In view of the wide dissemination of *Staph. aureus* on the skin, clothing, bedding, etc., of carriers, it is possible that other individuals may acquire the organisms as a result of direct contact with such surfaces. It can, however, be shown that the organisms may be liberated into the atmosphere by different forms of activity, so that transportation by air currents is an obvious alternative. This may be demonstrated in a variety of ways.

(a) From Skin

Both nasal carriers of *Staph. aureus* and non-carriers rubbed their hands together, and used the handle of a sterile scalpel to rub their chins or hair over an open culture plate immediately below. From Table IV it is clear that most of the carriers were able to dislodge some *Staph. aureus* from their skin or hair by these activities.

TABLE IV.—Release of *Staph. aureus* from Friction on the Skin

	No. of Persons	No. of Persons from Whom <i>Staph. aureus</i> was Obtained as a Result of:		
		Rubbing Hair	Rubbing Chin	Rubbing Hands
Nasal carriers	8	2	4	2
Non-carriers	6	0	0	1

Other experiments were carried out in a smaller version of the cubicle employed by Duguid and Wallace (1948). It was 6 ft. (183 cm.) high, the walls being 2 ft. 9 in. (84 cm.) and 2 ft. 6 in. (76 cm.) wide—that is, 41.25 cubic ft. (1.168 cubic metres). The walls consisted of plastic curtaining, the roof of three-ply wood, and the floor of moist butter muslin covering the hard surface of the laboratory floor. The whole of the interior surface was wiped down with cetrimide (1%), and the cubicle was left undisturbed for fifteen minutes before the experiments began. In each corner of the cubicle three culture plates were held horizontally, one being at floor level, another 1 ft. 9 in. (53 cm.) and a third 3 ft. 5 in. (104 cm.) above the floor. The temperature of the cubicle was usually 20–25° C. and the relative humidity 95 to 100%.

Control experiments showed that air movement *per se* does not bring to plates exposed in these situations more organisms than when it is still, the number of organisms obtained on culture plates exposed while a sterile gown, suspended from a coat-hanger from the ceiling of the cubicle, was agitated by pulling on pieces of string attached halfway down the sides, being approximately the same as on plates exposed while the gown was still.

TABLE V.—Release of Organisms into Free Air from Skin or Clothing as a Result of Movement

Subject	Presence of <i>Staph. aureus</i> in nose	Subject Clad Only in Bathing-trunks, Sterile Cap, Mask, and Sterile Boots				Subject's Clothes Agitated for 15 Mins.		Subject Fully Clothed Exercising for 15 Mins.	
		Sitting Still for 15 Mins.		Exercising for 15 Mins.		Total Orgs.		Total Orgs.	
		Total Orgs.	<i>Staph. aureus</i>	Total Orgs.	<i>Staph. aureus</i>	Total Orgs.	<i>Staph. aureus</i>	Total Orgs.	<i>Staph. aureus</i>
Bew	+	43.2	0.15	86.4	0.3	197.2	2.1	300.0	1.17
Pri	+	33.4	0.27	85.2	11.7	1,030.0	21.1	720.0	47.4
Ric	+	9.9	0.14	193.1	0.21	378.0	1.57	444.9	0.68
Scho	—	36.7	0.06	80.5	0.0	870.2	0.61	788.2	0.21
Geo	—	9.6	0.0	17.0	0.0	382.6	0.28	215.2	0.14

In this and the subsequent tables the figures give the total number of organisms or *Staph. aureus* falling on to 1 square foot (930 square cm.) in one minute. They are calculated from colony counts on 12 culture plates of the same size exposed horizontally at three different levels in the cubicle.

Subjects clad only in sterile bathing trunks, but with a mask over nose and mouth and a sterile cap over the hair, sat still for fifteen minutes in the cubicle while plates were exposed in the four corners. The plates were changed and the subjects then exercised by marking time and waving their arms about for a further fifteen minutes. After incubation, the total number of colonies and of *Staph. aureus* were counted. The results are given in the first part of Table V.

It is evident from this that during exercise some organisms are liberated into the atmosphere from the naked skin, and that if the individual is a carrier *Staph. aureus* may appear in appreciable numbers.

Staph. aureus may also be liberated into free air in droplets of water in the act of washing. Preliminary experiments showed that the relatively small amount of agitation of the skin and clothing resulting from the motion of the arms did not increase the number of bacteria in the atmosphere to any appreciable extent. But when the hands and arms were washed and scrubbed with toilet soap for five minutes, using clean water in a sterile bowl, the total number of organisms isolated on culture plates standing in the four corners of the cubicle were greatly increased. If the individual was a carrier, a large proportion of the colonies isolated were *Staph. aureus* (Table VI).

TABLE VI.—Release of Organisms from the Skin of Hands and Forearms into Free Air while Washing

Subject	Presence of <i>Staph. aureus</i> in nose	Standing Still in Cubicle for 5 Mins.		Standing While Scrubbing for 5 Mins.		Standing While Washing Only for 5 Mins.	
		Total Orgs.	<i>Staph. aureus</i>	Total Orgs.	<i>Staph. aureus</i>	Total Orgs.	<i>Staph. aureus</i>
		Total Orgs.	<i>Staph. aureus</i>	Total Orgs.	<i>Staph. aureus</i>	Total Orgs.	<i>Staph. aureus</i>
Ric	+	12.2	0	670.7	363.2	591.6	237.8
Win	+	35.4	0	998.5	6.56	680.8	38.75
Pri	+	25.8	0	1,762.2	323.9	1,456.1	300.5
Geo 1	—	16.4	0	607.6	0	669.9	0
2	—	6.4	0	383.7	0	421.5	0.41
Fos	—	21.1	0	983.2	0.21	712.8	0.42

Inspection of the plates immediately after exposure showed that many of them had actual droplets on the agar surface, and if the individual was a carrier large numbers of *Staph. aureus* appeared on these areas after incubation. Further experiments were carried out in which the subjects merely washed their hands without scrubbing. Almost identical results were obtained.

Thus friction, movement, and, perhaps most important of all, washing may disseminate large numbers of *Staph. aureus* from the skin of carriers into the neighbouring atmosphere.

(b) From Clothing

Previous workers (Green, Challinor, and Duguid, 1945; Bourdillon and Colebrook, 1946; Hare and Mackenzie, 1946; Duguid and Wallace, 1948) have shown that bacteria may be released into the atmosphere on particles of fluff or dust when clothing is shaken, but further experiments were undertaken to investigate the importance of this with staphylococcal carriers.

The clothing of carriers or non-carriers was accordingly suspended from a coat-hanger attached to the roof of the experimental cubicle. It was agitated for fifteen minutes by means of strings attached to the elbows of the coat and the knees of the trousers. The cubicle having been aired and its walls wiped down again with antiseptic, the subject then donned his clothes and exercised in it for fifteen minutes. The number of colonies developing on culture plates exposed during these activities is given in the second half of Table V.

It is evident from these experiments that while *Staph. aureus* and other organisms may be liberated into the atmosphere when the naked subject exercised in the cubicle, very much greater numbers reach free air from his clothing when agitated by itself or on the person of its owner.

Other experiments have been carried out in which the clothed subject sat still for 7½ minutes and then, for a further 7½ minutes, undressed and dressed again in the cubicle (Table VII). These experiments confirm the results

TABLE VII.—Release of Organisms into Free Air while Undressing and Dressing

Subject	Presence of <i>Staph. aureus</i> in nose	Subject Fully Clothed Sitting Still for 7½ Mins.		Subject Undressing and Dressing Again in 7½ Mins.	
		Total Orgs.	<i>Staph. aureus</i>	Total Orgs.	<i>Staph. aureus</i>
Ric	+	14.7	0	435.6	20.0
Pri	+	25.8	0	1,957.3	187.8
Jac	+	37.5	0.14	354.5	1.09
Fos	—	19.4	0.14	467.4	0.14
Scho	—	37.3	0.14	859.0	0.70

obtained in the previous experiment, showing clearly that large numbers of organisms are liberated by agitation of ordinary clothing, and by dressing and undressing.

It is of some importance that the amount of air pollution by *Staph. aureus* from the clothing carriers, although always greater than that coming from non-carriers, varied considerably. The clothing of the carrier Pri, for example, consistently produced many more staphylococci than that of the other carriers. Indeed, in his case, *Staph. aureus* accounted for nearly 10% of the total organisms released into the atmosphere.

Phage-typing experiments with the strains isolated when the carrier Ric dressed and undressed in the cubicle showed that type 52/52A/80, which was present in one nostril and that type spread on his clothing, was also the predominant type released into the atmosphere. With the carrier Pri, on the other hand, who had type 29 in his nostrils and which was widespread on his clothing, it was found that only a few colonies on the plates belonged to this type. The majority were type 53, which was also found on some areas of his skin and clothing but which was not found in his nose.

In view of the large number of organisms liberated into free air from the clothes, further investigations were carried out to determine whether carriers wearing the type of clothing usual in operating theatres could contaminate the atmosphere.

TABLE VIII.—Release of Organisms from Theatre Clothing

Subject	Presence of <i>Staph. aureus</i> in nose	Wearing Ordinary Underclothing, Trousers or Skirt, Cap, Mask, and Boots with Sterile Gown				Wearing Sterile Pyjamas, Gown, Cap, Mask, and Boots			
		Sitting Still		During Exercise		Sitting Still		During Exercise	
		Total Orgs.	<i>Staph. aureus</i>	Total Orgs.	<i>Staph. aureus</i>	Total Orgs.	<i>Staph. aureus</i>	Total Orgs.	<i>Staph. aureus</i>
Ric: Oct. 25	+	46.7	0.07	445.1	0.75	226.0	0.31	—	—
Nov. 24	+	32.0	0.07	165.7	0.70	—	—	26.7	0.07
Pri: Oct. 25	+	31.0	0.23	336.9	0.38	303.9	0.31	—	—
Nov. 29	—	42.4	0.21	183.0	0.87	—	—	17.6	0.14
Dec. 19	+	26.4	1.98	209.0	19.00	—	—	12.8	0.86
Geo	—	17.3	0	74.1	0	—	—	11.6	0
Sch	—	25.7	0	364.0	0.07	—	—	25.6	0
Mos	—	32.1	0.70	484.1	0.3	507.8	2.86	—	—
Sus	—	31.4	0.15	64.0	0.31	66.4	0	—	—
Mar	—	9.5	0.15	99.0	2.82	102.5	3.52	—	—

Carriers and non-carriers accordingly exercised in the cubicle wearing trousers and shirt, or frock in the case of women, over which was placed a sterile gown with short sleeves, open at the back but secured by a tape round the waist. As will be seen from Table VIII, large numbers of organisms reached the exposed plates. This suggested that the gown conferred very little, if any, protection. For this reason, some of the subjects exercised while wearing their ordinary clothing and no gown. As will be seen from Table VIII, approximately the same number of organisms were liberated. Thus it must be concluded that the gowns worn by most persons on the floor of an operating theatre do not imprison the organisms on their clothing.

Those nearest to the patient in operating theatres leave their underclothing outside the theatre and wear clean, if not sterile, pyjamas under the gown, thus eliminating the source of some of the airborne organisms. Experiments were therefore carried out in which the subjects wore sterile pyjamas, covered by a sterile gown, and with sterile cap over the hair, mask over the face, and sterile boots on the feet. The results obtained are also given in Table VIII.

Fewer organisms were liberated than when the same subjects wore their own underclothing, but it is of some importance that the carrier Pri, to whom attention has already been drawn, was still potentially dangerous in that as many as 6.82 *Staph. aureus* were reaching 1 square foot (930 square cm.) in one minute in his vicinity.

(c) From Bedding

If, as shown in Table III, the bedding of carriers is contaminated by *Staph. aureus*, it is to be expected that this organism will be liberated into free air when the bed is made or is agitated in any way. Some provisional observations of ours confirm that this is so, but we have not investigated this problem in detail.

It is clear from these experiments that friction on the dry skin, washing or scrubbing with water, and agitation of the clothing may liberate comparatively large numbers of *Staph. aureus* from skin or clothing into the atmosphere if the subject is a nasal carrier.

3. Entry of *Staph. aureus* into the Tissues of the Recipient

This may occur as a result of direct contact between the organisms on the hands of a carrier or clothing, the respiratory tract of a normal person, an open wound, or the eyes and skin of newborn babies. But it is extremely probable that in most instances the organisms reach these areas by way of the atmosphere, particularly if the donor is a heavy carrier in active movement, with much shaking of the clothing.

Transmission of *Staph. aureus* from Septic Processes in Members of the Hospital Staff

When a localized infection of the skin, such as a boil or acne pustule, bursts or is opened *Staph. aureus* will almost certainly spread on to the skin in its immediate neighbourhood, and into whatever dressing may be applied. It is

extremely improbable that the infected area will come directly into contact with susceptible tissues in patients, or members of the staff, but the organisms may become widespread on the person in the same way as can *Staph. aureus* originating in the nose. Release as a result of friction or activity and transportation to others by air currents is therefore a possible alternative.

Skin and clothing surveys were made of 10 patients attending the casualty department with minor staphylococcal infections which, if on the person of members of the nursing or medical staffs, might not have necessitated their standing down from duty. All the lesions were discharging pus and none of the patients had received antibiotics. A comparable series of 14 patients without pyogenic infections were examined at the same time. The results are given in Table IX.

TABLE IX.—Presence of *Staph. aureus* on Skin and Clothing of Patients with and without Mild Local Sepsis

	With Sepsis	Without Sepsis	With Sepsis	Without Sepsis
Nose	+++++	+++++	---	---
Throat	+	+	+	+
Hair	+	+	+	+
Face	+	+	+	+
Wrist	+	+	+	+
Fingers	+	+	+	+
Chest	+	+	+	+
Abdomen	+	+	+	+
Back	+	+	+	+
Legs	+	+	+	+
Front coat	+	+	+	+
Back	+	+	+	+
Handkerchief	+	+	+	+
Handkerchief pocket	+	+	+	+
Trousers or skirt	+	+	+	+
Shirt or blouse	+	+	+	+
Socks or stockings	+	+	+	+
Site of lesion:	Lip Finger Wrist Thigh Eye Finger		Axilla Toe Chin Foot	
Presence of <i>Staph. aureus</i>	+++++		++++	
Lesion discharging (in days)	5 3 1 1 1 7		1 4 1 3	

Six of the infected group and eight of the uninfected were nasal carriers of *Staph. aureus*, and many of them had this organism on different areas of skin and clothing. Although there was a tendency for the clothing in particular to be more widely contaminated when there was infection as well, it cannot be said that the difference was at all marked. There was much less contamination of the skin and clothing of the two groups who had no *Staph. aureus* in the nose, and no very definite evidence that the presence of a purulent infection increased this contamination to any extent.

An investigation comparable to the above was also carried out on a series of infants, aged 5–10 days, in a maternity ward. The results were similar—namely, that heavy staphylococcal contamination of the skin, clothes, and bedding occurred to about the same extent with healthy nasal carriers as with babies suffering from some form of sepsis.

Thus, although there is a possibility that *Staph. aureus* from a septic focus may be more pathogenic than when it is derived from a healthy nasal carrier (Barber and Burston, 1955), there is no evidence that particularly heavy contamination of the skin and clothing occurs.

Discussion

The results obtained in the experiments reported in this paper confirm those of Duguid and Wallace (1948), and show that the mechanism by which *Staph. aureus* is transmitted from the nasal cavity of carriers to other persons is very similar to that suggested for respiratory tract organisms in general by Hare and Mackenzie (1946).

This mechanism does not depend, primarily, on the expulsion into free air of *Staph. aureus* in droplets or droplet

nuclei coming from the anterior nares, but on outflow of this organism in the nasal secretions on to the upper lip or alae nasi. Its subsequent transfer to other persons then involves three separate and distinct steps.

The first step is the transport of the staphylococci by hands, handkerchief, or any object coming into contact with the nose to the skin, clothing, bedding, and other objects in the immediate vicinity of the carrier. The second step is the release of the organisms into the atmosphere. This may result from friction and dislodgment of dried particles from the skin or hair, from the spattering of water droplets in the act of washing, and from shaking of the clothing during activity. This may obviously occur anywhere in the hospital.

The third step involves the transport of these infected particles by air currents to other individuals in the neighbourhood. In this way the organisms may reach the anterior nares of normal persons to produce the carrier state in them, highly susceptible tissues such as the conjunctiva of the newborn infant, or, as probably occurs in operating theatres, open wounds, to produce, in due course, post-operative infection.

There is evidence that some carriers produce a much greater degree of air contamination in their vicinity from friction and movement of their clothing than do others. Such a carrier is probably much more dangerous in the hospital environment than is the member of the staff suffering from a minor staphylococcal lesion of the skin.

The application of these results to the prevention of staphylococcal infections in general is outside the scope of this paper, but, whatever alterations in technique be contemplated, cognizance should certainly be taken of the fact that direct expulsion of *Staph. aureus* into free air in droplets or droplet nuclei from the anterior nares is of much less importance than the almost inevitable presence of this organism on the skin and clothing of carriers, and its release on air-borne particles when the contaminated surfaces are subjected to friction and movement.

Summary

Experiments carried out with nasal carriers of *Staph. aureus* suggest that this organism is not transported from person to person by droplets or droplet nuclei but by an indirect route involving egress in nasal secretions, contamination of the skin, clothing, or bedding, release of the organisms by friction, movement, or washing, and transportation to others by air currents.

There is evidence that some carriers can contaminate the atmosphere in their neighbourhood with much larger numbers of *Staph. aureus* than the majority of carriers. Such individuals wearing a sterile gown over their ordinary underclothing may cause potentially dangerous degrees of air contamination during activity on their part; even when wearing a complete set of sterile operating clothes large numbers of *Staph. aureus* may still be detectable in the surrounding atmosphere.

These carriers are probably more dangerous in the hospital environment than the member of the staff suffering from a minor degree of skin sepsis.

We are grateful to the members of the medical and nursing staffs of this hospital for their help and co-operation, to the experimental subjects who have assisted us, and to Dr. R. E. O. Williams, of the Central Public Health Laboratory, for determining the phage-types of some of our strains.

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STAPHYLOCOCCAL PNEUMONIA IN ADULTS

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Staphylococcal pneumonia has long been known as a complication of epidemic influenza. The fulminating, prostrating type encountered during the pandemic of influenza that followed the first world war was fully described in the writings of Chickering and Park (1919). At that time mortality rates of 80–90% were reported. In 1942 Finland *et al.* recorded a reduction in the death rate to 32%, which they attributed to the use of sulphonamides.

In sporadic form, however, staphylococcal pneumonia is widely regarded as a disease occurring mainly in infants. In these the prognosis is still grave. Recently, Wallman *et al.* (1955) reported 44 cases from Perth, Western Australia, with a mortality of 23%, a figure achieved by modern treatment with antibiotic agents.

In adults, relatively few cases unassociated with major influenza were reported before 1950. Heffron (1939), analysing 3,319 cases of lobar pneumonia, found only six that were considered staphylococcal. Among 298 cases of bacterial pneumonia admitted to the Central Middlesex Hospital in 1942–4, Humphrey *et al.* (1948) described seven which were thought to be staphylococcal. Only one had a history of preceding influenza-like illness.

During the last five years, however, several groups of cases have been reported. Of 110 cases of pneumonia admitted during one year to Hammersmith Hospital and reported by Crofton *et al.* (1951), 10 were considered to be staphylococcal and only two showed serological evidence of influenza B. Neither of these two patients was very ill. Grist *et al.* (1952) saw 10 cases of staphylococcal infection among 129 cases of pneumonia admitted to one hospital in Glasgow during a period of fifteen months. Serological evidence of recent influenza A infection was present in 5 of the 10 cases. Grant and Barber (1954) reported 15 cases from Belfast, constituting 3% of all pneumonia admissions. Only four cases occurred during an influenza outbreak.

Material.—This paper is based on a series of 18 cases of staphylococcal pneumonia in adults admitted to an acute medical unit in Reading during 1952–4. Many cases of pneumonia occurring in the area receive treatment at home, and, in general, only the severely ill patients not responding to penicillin and sulphonamides are admitted. There was no local influenza epidemic during the period under review, but virus studies were not made. The group formed 15% of a total of 122 consecutive patients admitted to the unit in whom the diagnosis of primary pneumonia was radiologically confirmed. There were 11 men and 7 women. Their ages ranged from 16 to 72, with an average of 51 years.

Diagnosis

The aetiological diagnosis of staphylococcal pneumonia is a matter of some difficulty and is often derived from a combination of clinical, radiological, and bacteriological

findings. In the series now reported the criteria adopted were those used by the Medical Research Council (1951) for the investigation of bacterial pneumonias—that is, “When *Staphylococcus aureus* (coagulase-positive) . . . [was] predominant in the sputum the pneumonia was regarded as staphylococcal . . . if this was clinically consistent, even when cultures from other sources were negative.”

Sputum from every case was cultured soon after admission and before the start of treatment if possible. From a number of patients minor growths of staphylococci were reported, together with non-pathogenic organisms, but, in view of the possibility of nasopharyngeal contamination of specimens yielding a few colonies only, such cases were classified as of uncertain origin and excluded from the series.

From 12 of the 18 cases reviewed staphylococci were isolated in pure culture. In the remaining six cases predominant growths of staphylococci were found, together with a proportion of non-pathogenic organisms such as *Streptococcus viridans* and *neisseriae*. In two cases coagulase-positive staphylococci were grown from the pleural fluid.

The organisms were reported to be penicillin-resistant in 10 cases, while results of treatment indicated that resistant strains were probably present in three other patients. Resistance to penicillin was estimated by the disk plate method, the disks being impregnated with 1.5 units of penicillin solution.

It is necessary to add that as most patients received some treatment at home it is impossible to say whether the organisms were resistant at the onset of the illness or became so only after penicillin had been given.

Clinical Features

Six of the patients gave a history of previous chest disease, such as chronic bronchitis, asthma, or recurrent pneumonia. There were serious associated conditions in two other cases— aortic stenosis in one and acute nephritis in another. Two cases occurred following abdominal operations; both later developed lung abscesses.

The duration of symptoms prior to admission ranged from two days to two months, with an average of three weeks. Pleuritic pain was complained of by 14 of the 18 patients. Rigors were present in four cases. Herpes labialis was noted in only one case. Sticky blood-stained sputum was produced by four patients.

Leucocyte counts were not found to be of great significance. They were done in nine of the cases, and the totals exceeded 10,000 per c.mm. in three.

With regard to anatomical distribution, postero-anterior and lateral x-ray films of the chest were available for all cases. The classification adopted was similar to that of Crofton *et al.* (1951). There were nine cases of lobar involvement, seven of lobular involvement, and two were segmental. This compares with the above authors' 10 cases, in which lobar distribution was seen in seven and lobular involvement in three.

The most outstanding features, however, were the severity of the clinical course and the number of serious complications. These were reflected in the duration of hospital stay, which averaged 38 days, compared with 19 days for the remaining 104 pneumonia cases admitted during the same period.

Six of the 18 patients developed abscess or empyema. Short summaries of these cases are given below. They included five men and one woman, their ages ranging from 21 to 72, with an average of 53 years. Their hospital stay averaged 58 days, with a range of 31 to 91 days.

Of the five cases of abscess, two were single and three were multiple. The abscess cavities were thick-walled and irregular, and none had the character of a thin-walled egg-shell cavity as described by Brock (1945).

In the three cases complicated by multiple abscess formation the pneumonia was of a “wandering” type, the consolidation moving from area to area and from one lung to

the other. One of the patients was admitted in a state of collapse, resembling the fulminating type of staphylococcal pneumonia described in association with influenza.

Empyema occurred in two patients. One of these, a woman of 21, developed pyopneumothorax, a complication occurring in 50% of staphylococcal pneumonias in infants but uncommon in adults. Sterile pleural effusions of moderate severity were noted in two patients. Delay in resolution of the pneumonia occurred in 12 of the 18 cases. There was no death in this series.

Treatment

After admission most patients were given penicillin while the results of sputum cultures were awaited, but it was supplemented with streptomycin for severely ill patients. Six of the 18 cases responded to penicillin, including one whose organisms were reported to be penicillin-resistant; seven responded to the tetracyclines (oxytetracycline or chlortetracycline); two to chloramphenicol; and two others to streptomycin. In one man erythromycin effected a dramatic improvement.

Only one of the 10 patients whose organisms were reported to be penicillin-resistant did, in fact, respond to penicillin treatment. On the other hand, three patients, including the case of pyopneumothorax, whose organisms were reported to be penicillin-sensitive responded to penicillin. It will be seen that the response to penicillin closely followed the results which sensitivity tests predicted, thus underlining the importance of such investigations. Of the five cases in which no sensitivity tests were done, three failed to respond to penicillin. These findings compare with those reported by Grant and Barber (1954), of whose 15 cases only six responded to penicillin.

Case 1

This patient, a man aged 64, had no history of past chest disease. Six weeks prior to his present illness he underwent an operation for inguinal hernia. On admission he complained of severe pleuritic pain in the chest and shortness of breath; his temperature was 106° F. (41.1° C.) and he had oedema of the ankles. His leucocyte count was 10,400 per c.mm. Radiography of the chest showed a left pleural effusion with consolidation and collapse of the left lower lobe, and a large abscess cavity with a fluid level. Aspiration of the left pleural space produced 4 oz. (114 ml.) of thick yellow pus which grew penicillin-resistant coagulase-positive staphylococci in pure culture.

Penicillin was first administered, without result; this was followed by tetracycline and later by chloramphenicol with moderate improvement. It then became clear that a broncho-pleural fistula was present, and rib resection with open drainage was performed (Mr. C. Grimshaw).

The patient was discharged fit after 60 days but returned a month later with recurrence of cough and purulent sputum. A small abscess was shown radiographically in the left upper lobe in a different position from the previous cavity, and staphylococci were again grown from the sputum. This time he responded well to chlortetracycline.

On the follow-up a year later there was still extensive pleural thickening over the left lung but no sputum or shortness of breath.

Case 2

In 1941 a diagnosis of ankylosing spondylitis was made in a man aged 52. Four days before admission he had a rigor with vomiting and pleuritic pain at both bases of the lung. Radiography of the chest showed partial consolidation in the right upper and left lower lobes. The right upper lobe was clear within three days, but by then there was consolidation at the base of the left upper lobe. The latter extended during the next fortnight with multiple abscess formation.

Sputum culture produced on two occasions profuse growths of staphylococci resistant to penicillin, streptomycin, and chlortetracycline. There was no therapeutic response

to penicillin combined with streptomycin or to chlortetracycline, and his condition grew steadily worse. Erythromycin was then tried with immediate and dramatic improvement, and he was discharged after 31 days.

Follow-up examination two years later showed fibrosis in the upper zone of the left lung and an obliterated left costophrenic sulcus. He was well and working, and had no sputum or dyspnoea.

Case 3

A man aged 72 had been unwell for two months; pain in the right chest and severe cough had been present for two weeks. On admission he was extremely ill with cyanosis, dyspnoea, and dry tongue. Blood pressure of 70/40 mm. Hg and a pulse rate of 130 a minute were recorded. Radiographs of the chest showed consolidation of the right lower lobe with partial consolidation of the right upper lobe. Three weeks later a single round abscess had formed in the right lower lobe, and this took a further six weeks to clear. Bronchoscopy revealed no evidence of new growth.

A profuse growth of penicillin-resistant staphylococci was obtained from the sputum. He was treated with combined penicillin and streptomycin without effect. Later he responded slowly to oxytetracycline and was finally discharged after 65 days, greatly improved in general condition, with a radiographically clear chest.

Case 4

This patient, a man aged 56, gave a month's history of cough and dyspnoea. Right-sided pleuritic pain had been present for two weeks, and frothy sputum for five days. On admission he was very ill, short of breath, and cyanotic. There were clinical signs of pneumonia at the right base, and a radiograph of the chest showed consolidation in the right lower zone. The leucocyte count was 18,000 per c.mm. Treatment was begun with penicillin, but sputum culture yielded coagulase-positive staphylococci resistant to penicillin and sensitive to streptomycin.

Six days later further radiographs showed some clearing of the right base with fresh consolidation in the left upper and lower zones. He was given streptomycin with little general improvement. After 10 days there was some clearing at the left base, but the left upper lobe had become densely opaque on radiographic examination. A week later there was extensive breakdown with multiple cavitation in the left upper lobe. Treatment was then changed to chlortetracycline, but this had to be stopped because of diarrhoea. Nevertheless, the left upper lobe gradually cleared and tomograms prior to discharge showed no cavitation.

He was further investigated; a bronchogram showed deficient filling of the left upper lobe bronchi, but bronchoscopy did not reveal any abnormality. His total stay in hospital was 91 days.

At a follow-up examination two years later he was well, but radiographs showed fibrosis in the upper zone of the left lung with ring shadows suggestive of cystic changes.

Case 5

In this case, that of a man aged 55, there was no history of chest disease. Following perforation of a sigmoid diverticulum he developed peritonitis, and at operation a left inguinal colostomy was formed, but his condition deteriorated and he was transferred to the medical ward.

On admission he was febrile and very ill. He had carious teeth and foul breath. Radiographs of the chest showed a right hilar opacity. This cleared slowly, but ten days later there was mottling at both bases. In spite of some clinical improvement the radiographic opacities extended. After another three weeks there was dense consolidation in most of the left lung, collapse of the left lower lobe, and multiple cavitations in the lingular segment of the left upper lobe. Slow resolution then began and proceeded steadily, but 60 days later cystic changes were still present at the site of the previous breakdown. Sputum examination revealed a

profuse growth of staphylococci resistant to penicillin but sensitive to chlortetracycline and chloramphenicol. He was treated with chlortetracycline and discharged after 36 days.

At a follow-up examination one year later he was well; there was no dyspnoea. A radiograph of the chest showed fibrotic changes at both bases.

Case 6

One week prior to admission a woman aged 21 developed a right lower lobe pneumonia which at first responded to sulphonamides at home, but was later complicated by pleural effusion.

On examination she was found to be very ill, short of breath, and cyanotic. A radiograph of the chest showed complete collapse of the right lung with air and fluid in the pleural space. Thick, blood-stained pus was aspirated and a profuse growth of penicillin-sensitive staphylococci was obtained on culture. She was treated with intramuscular penicillin daily, together with intrapleural injections of penicillin and streptokinase. She made an excellent recovery, and was discharged after 65 days. When seen three months later there was residual pleural thickening at the right base and in the interlobar fissures.

On a final follow-up examination two years later she was free of symptoms and radiographically the lungs were within normal limits.

Discussion

Staphylococcal infection to-day presents a major problem in the treatment of bacterial disease. The staphylococcus has shown such marked adaptability to antibiotic substances that within a few years of the introduction of penicillin it was found that a high proportion of these infections failed to respond to this drug.

In this country the majority of staphylococci are still sensitive to some of the broad-spectrum antibiotics, such as the tetracyclines, chloramphenicol, and erythromycin, but resistant strains are increasingly encountered in patients previously treated with these substances. In view of the recent tendency to treat chronic bronchitis with prolonged courses of tetracyclines many more resistant cases may be seen in future.

There is good evidence that the incidence of staphylococcal pneumonia is growing. Review of the literature in the last five years suggests that they now constitute from 3 to 10% of all cases of pneumonia admitted to hospital. This is probably an underestimate of the true situation owing to the difficulties in the way of an aetiological diagnosis already mentioned.

Most observers reporting large series of cases of pneumonia during the last ten years have noted the high proportion of patients whose sputum fails to grow pathogenic organisms. It is generally believed that this is due to chemotherapy before admission to hospital. Anderson (quoted by Grist *et al.*, 1952) studied a series of 500 patients between 1939 and 1941, and encountered only eight from whom pathogens were not isolated. Ten years later Crofton *et al.* (1951) were unable to identify an aetiological agent in 52 of the 110 cases of pneumonia studied at Hammersmith Hospital.

In our series of 122 cases of pneumonia admitted in 1952-4 an aetiological diagnosis was made in 50, of which 18 were staphylococcal. It is our belief that these 18 cases did not represent the total number of cases of staphylococcal pneumonia in the series. Staphylococci were, in fact, grown from the sputum of several other cases, but they were excluded because the evidence seemed inconclusive. Before admission to hospital most of the cases were treated with penicillin or sulphonamides, and some with oxytetracycline. Such treatment may have prevented the growth of the responsible organisms without effecting a cure. That this explanation for the failure to grow pathogenic organisms may not be the whole answer, however, is suggested by the

results of a recent investigation by Batty Shaw and Fry (1955) into 80 cases of acute chest infection in general practice. Eight general practitioners in South London, in association with the local hospitals, made every effort to obtain sputum or throat swabs from their patients before any treatment was started. In spite of this early collection of specimens pathogenic organisms were isolated only from 25 of the 80 cases.

Staphylococcal infection often directs its attack against damaged tissues and where local or general resistance is low. Such circumstances were present in 10 of the 18 cases in our series. It is significant in this respect that in fibrocystic disease of the pancreas, where recurrent chest infection is frequent, the staphylococcus is responsible for the majority of cases and accounts for a high proportion of deaths (Anspach, 1947; Shwachman *et al.*, 1949). It is also of interest that most cases of staphylococcal pneumonia in infants occur under the age of 6 months (Wallman *et al.*, 1955).

Reports already referred to and the results of our own review of 122 consecutive pneumonia admissions show that the average age of patients is over 50 years, and that a history of previous chest disease is obtained in at least 40% of the cases. It is not surprising, therefore, that the staphylococcus should play an increasing part in these infections.

Summary

Eighteen cases of staphylococcal pneumonia in adults are reported to have occurred in a series of 122 consecutive cases of pneumonia admitted to one medical unit in 1952-4. There was no epidemic influenza in the area during that period. The outstanding feature in these cases was the severity of the clinical course and the number of suppurative complications. All 18 cases recovered, but only six responded to treatment with penicillin.

There is some evidence that this form of pneumonia is becoming more frequent and that staphylococcal infections are responsible for a considerable number of cases where failure of response to penicillin is encountered. The important part played by pre-existing chest disease or reduced resistance is stressed. Tetracycline and erythromycin are suggested as the antibiotics of choice in these cases.

In future, staphylococcal infections are likely to present a major problem in the treatment of pneumonia.

We wish to thank Drs. A. Anderson, J. B. Bird, and L. M. Jennings for permission to include some of the cases under their care, and Drs. J. Mills and T. D. Martin for the results of bacteriological investigations. We are indebted to Drs. Harley Stevens and H. S. Le Marquand for help in the preparation of this paper, and to Mr. P. Barr and Mr. G. Luck, of the Oxford Regional Board, for assistance with the statistical aspect of the work. We are grateful to Dr. J. G. Scadding for his helpful criticism and advice.

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HYPEREXTENSION AND
HAEMATOMYELIA

BY

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Spinal cord injury occurring without radiological evidence of the corresponding bone injury constitutes a well-recognized picture. The majority of cases are diagnosed as haematomyelia and are seen in medical clinics with a partial or complete lesion of the cervical spinal cord and no radiological evidence of bone injury or dislocation. This paper attempts to explain the actual mechanism of cord injury in these patients.

Jefferson (1928) stated that "in hyperextension the articular processes of the cervical vertebrae lock together to form a solid column of bone which is resistant to injury, and therefore hyperextension injuries fall chiefly on the atlas and axis." Much work has been done on these latter injuries, but hyperextension injuries of the rest of the cervical spine are less generally recognized.

Walshe (1944) gave an excellent description of the clinical features of haematomyelia and stressed its association with closed cerebral injury, without any explanation of the actual mechanism. He also emphasized the frequency of the Babinski inversion of the supinator jerk in such cases as indicating a focal lesion of the cervical cord at the level of the fifth segment.

Natras (1944) described the case of a soldier who on D Day dived from a landing craft into shallow water. He struck his head on the bottom and an immediate weakness of the legs and arms ensued. X-ray films of the neck being normal, the patient was labelled hysterical. On his admission to a neurological unit the diagnosis of haematomyelia was made. Natras stresses the danger of regarding these cases as functional.

Barnes (1948) first described the mechanism of fatal cervical cord compression without radiological evidence of fracture or dislocation. In his cases there had been a dislocation of the neck in hyperextension with spontaneous reduction. The post-mortem findings were rupture of the anterior common ligament at the level of the injury with disruption of the intervertebral disk, the dislocation recurring in forced extension. Taylor and Blackwood (1948) described a similar case.

Taylor (1951) described a case in which quadriplegia and death followed a hyperextension injury of the neck, radiography demonstrating no bone injury. At necropsy there was crushing of the cervical cord but no evidence of bone injury, dislocation, or disk prolapse. Crushing of the cord by the ligamentum flavum, which bulges forward prominently in hyperextension, was suggested as the causative mechanism.

Mechanism of Cord Injury

It is suggested that in the absence of radiological evidence of skeletal injury the crushing of the cervical cord may be due to either of two mechanisms: (1) massive central disk prolapse, or (2) hyperextension injuries.

Massive Central Disk Prolapse

This is much rarer than the common cervical disk syndrome associated with root irritation. It is due to a flexion injury, and it is doubtful whether it can occur in hyperextension. Cramer and McGowan (1944) published serial x-ray films of the cervical spine demonstrating this.

To elucidate this point discograms of excised specimens of the cervical spine have been made. Fig. 1 shows tracings of a discogram in a young subject. In the neutral position the normal outline of the nucleus pulposus is shown. In extension the nucleus moved forward as the posterior angles of the vertebral bodies approximated; thus posterior prolapse of the nucleus seems unlikely in hyperextension injuries.

Hyperextension Injuries

There are two methods of spinal cord injury which occur with forcible hyperextension of the neck.

Type 1.—This is a transient dislocation with tearing of the anterior common ligament and disruption of the intervertebral disk, permitting separation of the vertebral bodies with crushing of the spinal cord. Fig. 2 is a post-mortem radiograph of the excised cervical spine from such a case, showing the mechanism of the injury. As soon as the hyperextending force is removed the dislocation is reduced by muscle pull exactly as in recurrent dislocation of the ankle due to rupture of the external ligament. In non-fatal cases repair of this lesion is by ossification of the torn anterior common ligament bridging the affected disk space. Fig. 3 shows two radiographs of a man who had a hyperextension injury of the neck. The first, taken immediately after the accident, shows avulsion of a flake of bone from the upper border of the sixth cervical vertebra by the torn anterior common ligament. The second film,

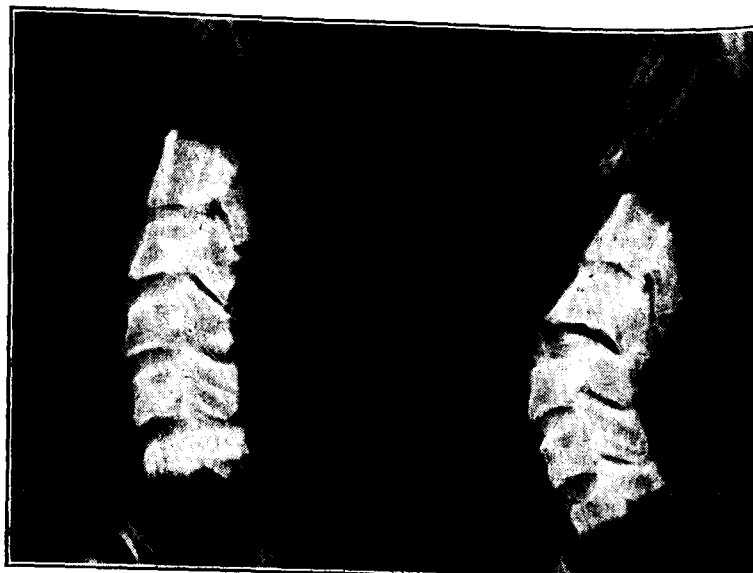


FIG. 2.—Excised cervical spine from a fatal case of a type 1 hyperextension injury, in the neutral and hyperextended positions.

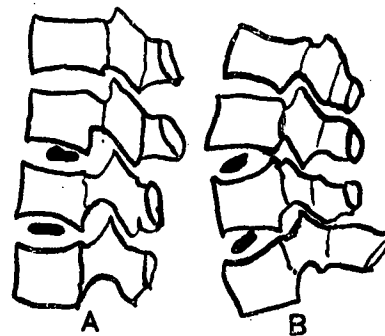


FIG. 1.—Tracings made from discograms of a normal cervical spine. A. In the neutral position, showing the normal outline of the nucleus pulposus. B. In extension, showing the approximation of the posterior margins of the vertebral bodies and the squeezing forwards of the disks.



FIG. 3.—Lateral radiographs of a cervical spine following a hyperextension injury. A. Immediately after injury, showing avulsion of an osteophyte from the upper border of C6. B. Eight months later, showing repair by ossification of the anterior common ligament.

taken eight months later, shows ossification of the damaged ligament bridging the intervertebral space. Fig. 4 is an outline drawing of Fig. 3.

Type 2.—In hyperextension of the normal cervical spine the ligamenta flava between the laminae bulge forward prominently. If there is pre-existing cervical spondylosis with ridging at the posterior aspects of the intervertebral disks, the cord may be crushed between the ligamenta flava and the posterior ridge. Fig. 5 shows two moulds of the cervical spinal canal in forced hyperextension. The first is a normal spine from a young adult, and the mould shows ridging posteriorly where the ligamenta flava have bulged forwards. The second mould is from an older body in which there was cervical spondylosis. In this case the mould is markedly narrowed between the ligamentum flavum behind and the ridging at the intervertebral spaces in front. Had forcible hyperextension of the patient's neck occurred during life she must have sustained a cervical cord lesion.

Case Histories

All cases diagnosed as haematomyelia in a neurological clinic from 1939 to 1954 inclusive were reviewed. Twelve cases were available.

Case 1.—A woman aged 35 was admitted in 1946 with a three-months history of gradual onset of numbness in the

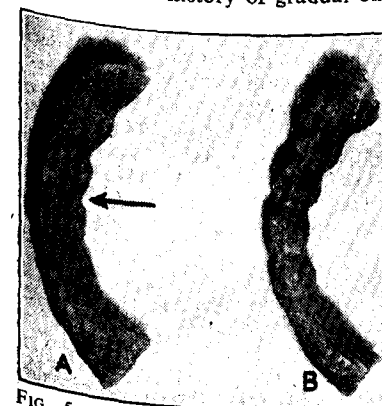


FIG. 5.—Photograph of moulds of the cervical spinal canal in hyperextension. A. From a normal cervical spine in a young man, showing ridging of the mould posteriorly (at arrow). B. From a woman aged 67. In this case there was spondylosis, and the mould is markedly narrowed. This is the mechanism of a type 2 hyperextension injury.

fingers of the left hand and difficulty in walking. She had noticed both legs to be weak. There was no injury. On admission the patient was found to have a left-sided Brown-Séquard syndrome. Present condition: She complains of numbness of the right side of the body. She can walk normally, but there is still some difficulty in running. On examination the cervical spine had a full range of painless movement. C.N.S.:

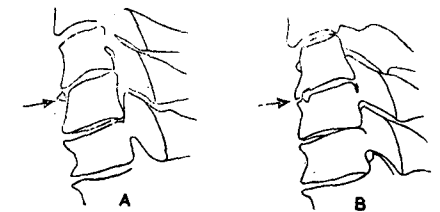


FIG. 4.—Tracing of Fig. 3. The arrows show: A, the avulsed osteophyte; B, the ossified ligament.

Cranial nerves, N.A.D.; sensory blunting and loss of pain sense below the fifth cervical segment of the right side; the only muscle-wasting found was the left first dorsal interosseus; reflexes were normal except for the loss of the abdominal reflex on the left side. Radiographs of the cervical spine showed nothing abnormal.

Case 2.—A man aged 47 was admitted in 1940 following an accident in the black-out. After having drunk some pints of beer he tripped over a low fence and fell, striking his forehead on the ground. He was unable to rise owing to weakness of the legs. On

admission he was found to have a spastic paraplegia with loss of pain sense on the left side of the trunk and in the left arm and leg. Atrophy of the small muscles of both hands rapidly followed. Radiographs of the cervical spine were stated to be within normal limits. He died of intercurrent disease eleven years after the injury.

Case 3.—A woman aged 54 was seen as an out-patient in November, 1939, with a history of having fallen downstairs some weeks previously, striking her forehead on a stair. She had noticed weakness of both hands. Examination confirmed the weakness of both hands, with hyperaesthesia. Present condition:—For several years after her injury she had considerable pain in her neck on movement. This cleared up spontaneously and she now has no symptoms. On examination the cervical spine had a full range of painless movement. C.N.S.: No abnormal physical signs were present. Radiographs of the cervical spine showed some neurocentral lipping and ossification of the anterior common ligament between the fifth and sixth cervical vertebrae.

Case 4.—Following an argument with a bus conductor in July, 1941, a man aged 61 received a blow in the face which jerked his head backwards. He was seen in the out-patient department some weeks later complaining of pain in the neck and difficulty in using the hands. On examination he was found to have astereognosis of the hands and gross painful limitation of neck movement. Radiographs of the cervical spine showed no evidence of fracture or dislocation. Present condition:—He complains of pain and clicking on neck movement. The difficulty in using the hands persists. On examination the cervical spine showed gross limitation of movement with severe pain on forcing. C.N.S.: No sensory loss or abnormality of reflexes was present. There was marked wasting of the small muscles of both hands and astereognosis persisted. Radiographs of the cervical spine demonstrated considerable spondylosis with some neurocentral lipping.

Case 5.—A man aged 73 fell forwards and struck his forehead on the ground in April, 1945. There was immediate weakness of both legs. He was seen in the out-patient department some weeks later complaining of weakness of both legs and difficulty in walking. On examination he was found to have a spastic paraplegia affecting both legs, with muscular weakness and wasting. There were no sensory changes found. Radiographs of the cervical spine showed slight posterior subluxation of the fourth on the fifth cervical vertebra with some spondylosis. An orthopaedic surgeon thought that these changes were part of a long-standing spondylosis. Present condition:—He com-

plaints of pain on neck movements and difficulty in walking owing to weakness of the legs. On examination the cervical spine had a full range of flexion, lateral flexion, and rotation. There was limitation of extension with pain on attempting this movement. C.N.S.:—Cranial nerves: N.A.D. Upper limbs: Marked interosseous wasting; weakness of grip; no sensory changes; reflexes were present but the right supinator jerk was inverted. Lower limbs: Wasting of all muscle groups with marked weakness; walking was only just possible; no sensory change; reflexes were present and equal and the plantar responses were flexor on both sides. Trunk: No sensory change; abdominal reflexes were present. Radiographs of the cervical spine showed marked cervical spondylosis with retrospondylolisthesis between the fourth and fifth vertebrae.

Case 6.—A man aged 62 was admitted in 1950 with a history that after having had several pints of beer in his workmen's club he bent down to pick up a threepenny-piece from the floor. He fell forward, striking his forehead on the floor. He was immediately paralysed, unable to move arms or legs, and unable to speak. He stated that his arms were flexed at the elbows. Next day he could again talk, and some power had returned to the limbs. On admission there was a paresis of arms and legs with loss of reflexes. During the ensuing four weeks, however, a partial recovery occurred, and at the time of his discharge from hospital, some five weeks after the accident, he was able to walk a few steps. **Present condition:**—He is barely able to walk with the aid of two sticks. On examination the cervical spine showed gross restriction of movement in all directions but no pain. C.N.S.:—Cranial nerves: N.A.D. Upper limbs: Wasting of all muscle groups in both arms, especially interossei; diminished power, with spasticity; reflexes increased; inversion of both supinator jerks; no sensory change. Lower limbs: Wasting of all groups, with weakness but only slight spasticity; reflexes increased; plantar responses—right extensor, left flexor. Trunk: Loss of abdominal reflexes on both sides. Radiographs of the cervical spine showed congenital fusion of the vertebral bodies of the second and third segments, also of the sixth and seventh with the first thoracic. There was ossification of the anterior common ligament between the fifth and sixth cervical vertebrae.

Case 7.—A man aged 54 was admitted after his motorcycle ran into a stationary car, causing facial lacerations and hyperextension of his neck. The lacerations were sutured and the following day he noticed weakness of both hands. On examination the cervical spine had a full range of flexion, lateral flexion, and rotation. Extension was limited and painful. C.N.S.:—Cranial nerves: N.A.D. Upper limbs: Wasting of interossei of both hands, with weakness of grip; sensory blunting in fourth and fifth fingers of the left hand; reflexes were present and equal, but the left supinator jerk was inverted. Lower limbs: N.A.D. Radiographs of the cervical spine showed a moderate degree of spondylosis, with fracture of an osteophyte at the upper anterior angle of the seventh cervical vertebra.

Case 8.—This patient, a woman aged 54, was seen in the out-patient department in 1941 four weeks after a fall downstairs. She was unable to give a clear history of the mechanism of the injury, and complained of pain in the neck and weakness of the left hand. On examination wasting of the muscles of the left hand and loss of thermal sensation were found. **Present condition:**—She has no symptoms referable to the accident. On examination the cervical spine showed slight limitation of the extremes of lateral flexion, otherwise there was full range of movement. C.N.S.: No alteration of sensation or muscle-wasting was found, but there was depression of the tendon reflexes of the left arm. Radiographs of the cervical spine showed moderate spondylosis and ossification of the anterior common ligament between the sixth and seventh vertebrae.

Case 9.—A woman aged 53 was admitted in 1943 after a fall downstairs in which she struck the back of her neck

on a stair. She was unable to move after her accident. On examination complete paralysis of all four limbs was found. **Present condition:**—For the first three weeks after the accident she remained completely paralysed, but there had been a gradual recovery over the next three months, and since then her condition has been static. She is able to walk slowly with some difficulty. On examination the cervical spine showed limitation of the extremes of lateral flexion and rotation. No pain on movement. C.N.S.:—Cranial nerves: N.A.D. Upper limbs: Wasting of the interossei of both hands, more pronounced on the right than on the left; no loss of sensation; tendon reflexes increased, with inversion of the right supinator jerk; mild spasticity. Lower limbs: Slight spasticity; reflexes present and equal; plantar responses flexor. Trunk: No sensory change; loss of abdominal reflexes. Radiographs of the cervical spine showed gross spondylosis with ossification of the anterior common ligament between the fifth and sixth cervical vertebrae.

Case 10.—This patient, a man aged 49, was seen in the out-patient department in 1947, some weeks after a mining accident in which he had been struck on the back of the neck by a fall of stone. He was complaining of severe pain in the neck and weakness of the limbs. On examination he was found to have a partial spastic quadriplegia. Radiographs of the cervical spine showed no evidence of fracture or dislocation. **Present condition:**—He complains of some pain in the neck on movement and of weakness of the legs and difficulty in walking. On examination the cervical spine showed limitation of extension and full range of other movements. C.N.S.:—Cranial nerves: N.A.D. Upper limbs: Slight spasticity; reflexes active and equal; no muscle-wasting or sensory loss. Lower limbs: Marked spasticity, with wasting of all groups; reflexes hyperactive; plantar responses extensor. Trunk: No sensory change; abdominal reflexes absent. Radiographs of the cervical spine showed a moderate spondylosis, most marked in the fifth/sixth region.

Case 11.—A man aged 49 was seen in the out-patient department in 1949, six months after a mining accident in which he received a heavy blow on the back of his neck. He immediately noticed numbness of his left hand. He was complaining also of pain in the neck. On examination he was found to have marked limitation of cervical spine movement. Muscle-wasting was present in the left hand, with some sensory blunting. Radiographs of the cervical spine were not taken at this time. **Present condition:** He complains of severe pain in the neck for which he has to wear a plastic collar; the numbness and weakness of the left hand persists. On examination the cervical spine showed gross limitation of movement in all directions, with severe pain. C.N.S.:—Cranial nerves: N.A.D. Upper limbs: Weakness of grip of the left hand with wasting of the first dorsal interosseous muscle; sensory blunting over the whole of the left hand except the index finger; loss of tendon reflexes in the left arm. Lower limbs: Blunting of sensation to pin-prick in the left leg; no wasting or loss of power; loss of left ankle-jerk; plantar responses flexor. Trunk: Sensory blunting of the left half; abdominal reflexes present. Radiographs of the cervical spine show marked spondylosis between the sixth and seventh vertebrae, with sclerosis of the adjacent surfaces of the vertebral bodies.

Case 12.—A man aged 46 was admitted in June, 1951, after having been hit by a locomotive. There was a traumatic amputation of the left foot and a complete quadriplegia below the sixth cervical level. Radiographs of the cervical spine were within normal limits. Death occurred two weeks later, and permission for a post-mortem examination was refused.

Review of Cases

These 12 cases fall into three groups: non-traumatic (1 case), history of hyperextension injury (6 cases), and no clear history of mechanism (5 cases).

Group 1.—This group contains only Case 1, and is outside the scope of this paper. Some other mechanism, such as an intramedullary angioma as described by Clark (1954), must have operated.

Group 2.—This group consists of Cases 2 to 7. In each instance the patient could clearly describe a hyperextension injury. Cases 2, 3, 5, and 6 followed falls on to the forehead, and in each there was local bruising. Cases 4 and 7 followed blows in the face. Particularly noteworthy is Case 6, in which a disastrous cervical cord lesion followed a very minor accident. The mechanical basis was limitation of extension of the cervical spine due to the congenital fusion between C2 and 3, and C6 and 7 and T1. As a result of this, in forced extension there was extreme stress of the remaining intervertebral spaces, and the anterior common ligament ruptured between the fifth and sixth cervical vertebrae. A feature of the history was the loss of speech in the early phase. This was probably due to a retropharyngeal haematoma from the torn ligaments.

Group 3.—This group contains Cases 8 to 12. None of these patients could give a clear history of the mechanism of injury. Cases 8 and 9, however, showed radiological evidence of ossification of the anterior common ligament and so were classified as type 1 hyperextension injuries. Cases 10 and 11 had exactly similar injuries—namely, a blow over the back of the neck. It seems more likely that this would produce hyperextension than flexion of the neck. These cord injuries may therefore have been due to a massive disk prolapse in flexion or, more probably, a type 2 hyperextension injury. Follow-up radiographs in both cases showed marked degenerative changes consistent with the latter diagnosis. Case 12 was unsatisfactory in that a post-mortem examination was not permitted, and there is no evidence to show which of the mechanisms of cervical cord injury operated.

Haematomyelia Due to Hyperextension Injuries

From the foregoing, at least eight and possibly more of these 12 cases of haematomyelia were due to hyperextension injuries. These eight cases were further studied to determine the frequency of the two types of hyperextension injury. In the follow-up radiograph those cases showing bridging of the disk space by ossification of the anterior common ligament were classified as type 1 hyperextension injuries.

Type 1 injuries ..	5 (Cases 3, 6, 7, 8, and 9)
Type 2 injuries ..	2 (Cases 4 and 5)
Died before follow-up ..	1 (Case 2)

The classification of Case 5 as a type 2 hyperextension injury is perhaps open to doubt, as from the original radiograph at the time of his accident there was found to be a retrospondylolisthesis of the third on the fourth cervical vertebra. This suggests a type 1 hyperextension injury with loss of the nucleus pulposus through the tear in the anterior common ligament, but the orthopaedic surgeon who originally saw the case thought these changes existed before the accident. Accordingly a type 2 hyperextension injury is more probable. Both of the cases classified as type 2 injuries thus had established degenerative changes in the cervical spine predisposing to this type of injury.

Treatment of Haematomyelia Due to Hyperextension Injuries

The primary object of treatment must be to prevent recurrence of cord compression. Two points bear on this: (1) In type 1 hyperextension injuries the displacement will recur in extension (Case 13) until reparative changes have restored stability. (2) In early cases it is impossible to distinguish with certainty the two types of hyperextension injuries. Although a type 2 hyperextension injury will not recur unless the original trauma is repeated, in view of the above it is suggested that all cases of haematomyelia following hyperextension injury should be immobilized for one month in a plaster-of-Paris collar with the neck in slight

flexion. Laminectomy is contraindicated except in the presence of a spinal block on lumbar puncture or myelography. The following case shows the unavoidable hazards of cervical exploration.

Case 13.—This patient was a man aged 59. Eighteen months previous to admission, while running forward with both hands in his pockets, he tripped and struck his forehead on the ground. A transient quadriplegia lasting some ten minutes followed, with a complete recovery except that in throwing his head back to drink his daily dose of quinine he had a brief weakness or sometimes paresis of one arm. Radiographs of the cervical spine were normal. Three months after the accident a cervical laminectomy, for a diagnosis of prolapsed disk, was carried out with negative findings. After the operation he noticed stiffness and weakness of the arms and hands. He was reinvestigated some three months later and myelography was done. This showed a block in the C6 region. Laminectomy was again undertaken, but the only finding was some scarring of the cord. After this operation the weakness and stiffness spread to the legs. When he came under our care he was having such severe burning pain in the left hand that he was unable to bear even the bedclothes on it. He was barely able to walk.

On examination a scar midline in the cervical region and gross restriction of neck movements were found. Upper limbs: Weakness and wasting of all muscles, especially intrinsic of left hand; spasticity of all groups, with increased reflexes; no reversal of supinator jerk; left hand showed diminution of sensation in palm and radial aspect of dorsum, redness of the skin of the thenar eminence and the pulps of the fingers with extreme hyperaesthesia. Lower limbs: Weakness and spasticity all muscle groups; increased tendon reflexes with extensor plantar responses; sensory blunting of sole and dorsum of right foot. Abdominal reflexes were absent. Sensation of trunk normal. It was considered that further recovery of the cervical cord was unlikely, and treatment was directed to muscle re-education. The pain in the left hand being temporarily abolished on three occasions by local block of the stellate ganglion, a cervical sympathectomy was carried out on the left side with relief of the causalgic pain in the left hand. No further cervical exploration was considered, as lumbar puncture showed normal pressure and no evidence of spinal block.

Summary and Conclusions

In hyperextension of the neck the spinal cord may be injured in one of two ways: (1) transient dislocation across a disk space, spontaneously reduced by muscle pull and gravity, or (2) crushing of the cord between the ligamentum flavum, which bulges forward on hyperextension, and the posterior lippling associated with pre-existing spondylosis. In both injuries immediate radiographs of the cervical spine show nothing abnormal. The type 1 injury repairs itself by ossification of the anterior common ligament; this may be seen on later radiography.

All cases diagnosed as haematomyelia in a neurological clinic between 1939 and 1953 were reviewed to see how many were due to these injuries. Twelve cases were available. Of these, eight were certainly due to hyperextension injuries, two were doubtful (both blows over the back of the neck), one patient died without being able to give an adequate history and a necropsy was not carried out, and one case was non-traumatic. It would appear, therefore, that most cases of haematomyelia can be accounted for by the known mechanisms of cervical spine injury, but that there is still a small percentage in which other mechanisms operate.

In view of the difficulty of making a firm early diagnosis of which type of hyperextension injury has

occurred, it is suggested that all cases should be immobilized in a short plaster-of-Paris collar for one month, as the type 1 injury will recur if the neck is forcibly extended (see Case 13).

Laminectomy is contraindicated unless spinal block is shown on lumbar puncture or myelography.

I am indebted to Professor F. J. Nattrass for permission to publish these cases, and to Dr. Whately Davidson for permission to reproduce the radiographs. I am grateful to Mr. J. K. Stanger for his help and advice in the preparation of this paper.

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PELLAGRA CAUSED BY ISONIAZID

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In 1913 pellagra occurring in Britain was the subject of articles appearing in the *British Medical Journal* (Box, 1913; Mott, F. W., 1913; Sambon, 1913; Hammond, 1913); and the *Lancet* (Blandy, 1913). At that time Thomas (1913) suggested that certain sedative drugs such as trional and sulphonal, then in common use in mental asylums, might produce pellagra by "intoxication."

The concept of secondary pellagra, as distinct from the endemic disease, was reviewed by Bean, Spies, and Blankenhorn (1944), who listed a large number of abnormal conditions and diseases which rendered the body susceptible to this deficiency syndrome. On the other hand, pellagra was mentioned only rarely as a sequel to the use of chemical compounds.

An observation that isoniazid seemed to be of benefit in disseminated sclerosis (Kurtzke and Berlin, 1954) led to further trials of this drug.

Dr. D. B. Handley gave isoniazid in combination with pyridoxine to a number of patients with disseminated sclerosis. One of these patients, who had been existing on an inadequate diet, developed a typical pellagrous dermatitis. Three weeks after stopping the drug, while still taking the same poor diet, her symptoms persisted. There was a rapid response to nicotinamide therapy.

Case History

A spinster aged 45 had suffered from disseminated sclerosis for twenty years. Her first symptoms occurred at the age of 25, with paraesthesiae in the legs and hands. There was a constant sensation of pins-and-needles in both legs up to the groins and in the hands and fingers up to the wrists. She also noticed that she could not appreciate hot water as acutely as before, but nevertheless never burnt herself because of this. Pin-prick, too, did not feel quite so sharp as formerly. There was no weakness of the legs, but she often felt as though she was walking on air.

After eighteen months these sensations passed off, and were later followed by pains in the legs, chiefly in the knees and calves, which were present day and night throughout the year. Then came some weakness and stiffness of the legs, especially on going upstairs. However, she could still

walk long distances if she wished. On direct questioning she said that she had never had any visual or auditory symptoms, no double vision, and her speech had always been normal. There was no dyspepsia, her bowels were opened regularly, and she had never had difficulty with, or precipitancy of, micturition, or any urinary incontinence.

In 1950 she had been investigated in a neurological centre, and a diagnosis of disseminated sclerosis had been made.

History.—Her appetite had always been poor. She would have only a cup of tea and a biscuit for her breakfast, and the same again at noon. She would take a very light lunch, with little meat and fish. At tea-time she would again have tea and biscuits, and nothing further until next morning. There was no family history of fits, faints, or neurological or mental disease. Her two brothers were both well. Her father died at the age of 60 (carcinoma); her mother died aged 70 (following a stroke). At school she was reasonably intelligent, and reached the senior class. Later she worked for ten years as a bookbinder. However, for the last few years she had been doing light work in a chemist's shop, chiefly dispatching and bottling medicines. She smokes little, and drinks no alcohol.

Development of Pellagrous Dermatitis.—In May, 1955, 300 mg. of isoniazid was given daily, together with 20 mg. of pyridoxine three times a day. She took her usual inadequate meals, as her appetite did not improve. She pursued her normal activities, and did not expose herself unduly to the strong sunlight, but it was an exceptionally fine summer. During July she experienced burning sensations in the hands and feet, and the typical symmetrical pellagrous dermatitis developed on the hands and feet.

On examination her intelligence was not high; she was quite co-operative, but did not give a very good history. She was a thin woman, height 5 ft. 2 in. (157.5 cm.), weight 8 st. 2 lb. (51.7 kg.). **Special Senses.**—No anosmia. Visual acuity, good; visual fields, full to confrontation; fundi, disks normal; retinal vessels, normal; no haemorrhages or exudates. Hearing normal. Taste, normal. **C.N.S.**—Cranial nerves, normal. Motor system: nutrition of limbs—rather thin, but no wasting; no fasciculation; slight hypotonia of arms; slightly increased tone in the legs, no clonus. Power in arms, normal; both legs could be raised from the bed simultaneously. Other movements within normal range except for moderate weakness of dorsiflexion of the right ankle. **Co-ordination.**—Finger-nose test performed well, but on each side some clumsiness, especially on the left when performing repetitive movements; finger flexion normal. The impression was of slight ataxia on the left. **Co-ordination of legs** within normal limits. **Reflexes.**—Arm reflexes brisk and equal; abdominals sluggish; knee- and ankle-jerks brisk and equal; plantar responses extensor—the responses being obtained from the foot only. **Sensations.**—Pin-prick and cotton-wool were normally appreciated. Two-point discrimination, within normal limits. Postural sensibility, normal. Projection of one limb towards another with eyes closed was well performed. Vibration sense, normal. No rombergism.

Her legs were held stiffly, especially the right. Although she was a little unsteady on turning, there was no marked ataxia. The skull was normal, no bruits. Spine: no scoliosis or kyphosis; full range of movements. Heart normal in size; sounds normal, no murmurs; pulse regular; blood pressure, 105/75. The respiratory system and abdomen were normal.

Skin Manifestations.—There was a typical pellagrous dermatitis, chiefly affecting the dorsal surfaces of the hands and dorsa of the feet. Around the mouth was a fine branny desquamation. The neck was not affected. The hands and feet showed a reddish-brown colour with coarse scaling, the upper boundary of the involved skin was sharply demarcated from the normal, as in the classical case (Figs. 1 and 2). The tongue was normal but angular stomatitis was marked. There was some fine scaling of the lips. Although the drugs were stopped her symptoms persisted; there was no change in her appetite or diet.

Three weeks after the drugs were discontinued she was given 1,000 mg. of nicotinamide daily. The burning sensations in her limbs rapidly lessened; her dermatitis also quickly improved, and within eighteen days the skin appeared normal.

Investigations.—Blood count, normal. Plasma protein, normal. Fractional test meal, normal. Serum cholesterol, 159 mg. per 100 ml. Urine, no porphyrins. An E.E.G., taken on August 22 by Dr. J. A. Irwin, showed that the dominant activity in the post-central areas was an 8-9 c/s alpha rhythm which was blocked by eye-opening. On these occasions a lower-amplitude 11-12 c/s rhythm was visible. Traces of low amplitude 4-5 c/s activity were mixed with the alpha rhythm and blocked by it. Overbreathing increased the amount of slow activity, and a small amount of low-amplitude 3 c/s activity was seen in the posterior temporal regions. This record is abnormal, containing an excess of theta activity and an unstable hyperventilation response.

Discussion

Although our patient's intake of food was poor it was sufficient for her ordinary needs; at least, it did not lead to a recognizable vitamin deficiency. She continued with this diet while taking isoniazid and developed pellagra. Since



Fig. 1.—Showing typical pellagrous dermatitis affecting the hands.

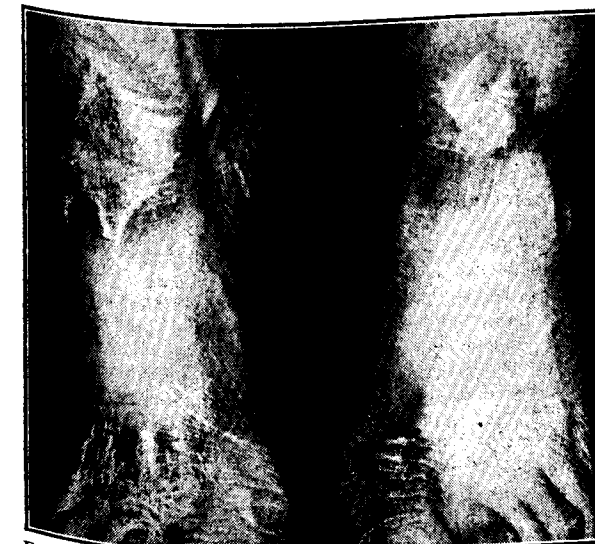


Fig. 2.—The involved skin of the feet is seen to be sharply demarcated from the normal.

the symptoms appeared during the isoniazid administration there would seem to be a causal relationship, and her improvement after nicotinamide treatment would be proof that she had been deficient.

That isoniazid may lead to the development of pellagra in poorly nourished patients was also observed by Wood (1955). Bantu out-patients with pulmonary tuberculosis receiving isoniazid developed pellagra within a few weeks and required admission to hospital. Wood also found that patients who had both pulmonary tuberculosis and pellagra could not be treated satisfactorily on a good diet, even with vitamin supplements, if isoniazid were given concurrently; in fact, clinical deterioration occurred in some cases.

In this country McConnell and Cheetham (1952) observed the occurrence of pellagra in a patient receiving isoniazid for abdominal tuberculosis, a condition known to predispose to secondary pellagra.

In our case pyridoxine was given together with isoniazid, as previous studies (Biehl and Vilter, 1954) suggested that peripheral neuritis, a common complication of isoniazid therapy when large doses are given, was due to an effect on pyridoxine metabolism.

Our patient was given the standard dose of isoniazid (5 mg. per kg. body weight). The development of pellagra suggested a nicotinamide deficiency, which raises the question of a metabolic antagonism between isoniazid and nicotinamide.

Reports of an antagonistic action between nicotinic acid and sulphonamide drugs led Bean *et al.* (1944) to use pyridone-3-sulphonic acid, related to nicotinic acid as sulph-anilamide is to para-aminobenzoic acid, in three patients with subclinical pellagra on a vitamin-B-free diet for a two-weeks period. Under these circumstances pellagra did not occur, but those workers thought that larger doses for longer periods were necessary before conclusions could be drawn.

Nicotinamide is an integral component of the pyridine nucleotides (P.N.) and the co-enzymes diphosphopyridine nucleotide (D.P.N.) and triphosphopyridine nucleotide (T.P.N.), which play an important part in cellular metabolism. McConnell and Cheetham suggest that the pellagra-producing effect of isoniazid depends on the patient's original nicotinamide level being low; the amount of isoniazid which would compete successfully with nicotinamide in the formation of co-enzyme depending, by the law of mass equilibrium, on their relative concentrations and their relative affinity for the co-enzyme residue.

However, the mechanism of the biological activity of isoniazid is not yet known; the highly specific action against *Mycobacterium tuberculosis* suggests interference with an essential metabolite. It is established that there is a high concentration of nicotinic acid in the tubercle bacillus (Pope and Smith, 1946; Bird, 1947).

The structural similarity of isoniazid to both pyridoxal and the pyridine nucleotides has suggested that it may act by competing with structurally similar essential co-enzymes in the organism.

Zatman *et al.* (1953) observed that certain D.P.N. nucleotidases cause an exchange of isoniazid for the nicotinamide portion of D.P.N. Their preliminary experiments indicated that the acetylpyridine analogue of D.P.N. can be synthesized in the whole animal, and especially in tumour tissue, with the administration of acetylpyridine, which is closely related to nicotinamide. They thought it possible that the synthesis of the analogue in the intact animal might be a factor in the toxicity of the compound, which could lead to symptoms resembling nicotinamide deficiency (Kaplan *et al.*, 1954).

However, to date Kaplan and his co-workers (1955, personal communication) have not been able to show any direct relationship between nicotinamide and isoniazid in animals.

Also with regard to pyridoxal, A. Albert (1955, personal communication) states that the biological antagonism between isoniazid and pyridoxal would seem to be due to the

ordinary chemical reaction (hydrazone formation) between a substituted hydrazine and an aldehyde, which occurs readily at room temperature in dilute aqueous solution; this would be sufficient explanation for pyridoxal deprivation.

Fisher (1954) showed that haemin antagonizes the effect of isoniazid; however, Albert and Rees (1955) and Knox *et al.* (1955) proved that haemin catalyses the oxidative destruction of isoniazid even in the absence of tubercle bacilli.

Recent work by Cyerman-Craig *et al.* (1955) presents experimental evidence that the action of isoniazid appears to include an essential chelation step, but this is not the whole story.

Summary

Pellagra developed in a woman who was receiving isoniazid for disseminated sclerosis. Her intake of food was poor. The dermatitis appeared during a particularly sunny summer.

Isoniazid was stopped. During the next three weeks her symptoms persisted. She continued to take the same inadequate diet. The burning sensations in both hands and feet were so severe that they caused her great distress. She was unable to sleep at night with her limbs covered. These latter symptoms were quickly relieved when nicotinamide was given. The dermatitis cleared completely in just over two weeks.

As the symptoms of pellagra came while isoniazid was taken, there seemed to be a causal relationship.

Other clinical observations are mentioned which point to isoniazid being a contributory factor in producing pellagra if the patient is in a pre-pellagrous condition.

These clinical findings suggest a possible metabolic antagonism between isoniazid and nicotinamide. Isoniazid bears an undoubted structural similarity to nicotinamide, which is an integral component of an essential oxidation-reduction co-enzyme—that is, D.P.N.

Experimental work has shown that it is possible by enzyme action to cause an exchange of isoniazid for the nicotinamide portion of D.P.N., which points to a mechanism whereby isoniazid might produce nicotinamide deficiency; but in experiments on the whole animal this has not yet been demonstrated. The biological antagonism between isoniazid and pyridoxal is due to a purely chemical reaction.

The suggestion that the pellagra-producing effect of isoniazid depends on the patient's initial level of nicotinamide being low would cover the facts observed in our case.

The interest of these observations is not so much the causation of pellagra as the demonstration of an apparent relationship between isoniazid and a condition which is caused specifically by a nicotinamide deficiency; this would therefore point to an interference by isoniazid in nicotinamide metabolism; as an integral component of D.P.N., nicotinamide has its most important known metabolic function. The question remains whether these observations are a reflection in the human of the mechanism whereby the tubercle bacillus is inhibited by isoniazid.

The photographs were taken by Miss E. Mason, St. James' Hospital

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CASE OF FETISHISM TREATED BY AVERSION THERAPY

BY

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Fetishism, or more accurately "erotic fetishism," is the tendency to be sexually attracted by some special part or peculiarity of the body or by some inanimate object. Of all the sexual aberrations, fetishism is one of the most intriguing, perplexing, and varied. The literature is rich in detailed case reports and in speculation about theories of causation. I have been able to find, however, only three apparently successful results in established cases; one attributed to a co-operative wife (Hirschfeld, 1939), one to psycho-analysis (Romm, 1949), and the third to temporal lobectomy (Mitchell, Falconer, and Hill, 1954). I have been unable to find any previous record of a fetishist who responded favourably to aversion therapy. The following case is also of interest in that the fears implicit in psycho-analytical theory, and stressed by East and Hubert (1939), of releasing homosexual or sadistic drives, have not so far been confirmed.

Case Report

The patient, a married man aged 33, was referred in November, 1954, from the out-patient department of a mental hospital for consideration of a prefrontal leucotomy after he had attacked a perambulator. This was the twelfth such attack known to the police, and because of the previous incidents they were taking a serious view of his recent actions in following a woman with a perambulator and smearing it with oil. Since his first involvement with the police his career had been as follows.

First Charge (six incidents).—In September, 1948, whilst in the R.A.F., he slashed two empty prams on a railway station before setting them on fire and completely destroying them. He also admitted five other incidents involving cutting or scratching prams, which had been the subject of police investigations over a period of months. He was convicted of causing malicious damage and put on probation to accept medical treatment. He then left the R.A.F. and was in a mental hospital from March to April, 1949, before being transferred to a neurosis unit, where he stayed for a further month. The view was there expressed that he was unsuitable for psychotherapy, was potentially dangerous, and should remain in a mental hospital.

Seventh and Eighth Incidents.—He did not remain in a mental hospital, and early in 1950 he smeared some mucus from his handkerchief on to a handbag and also damaged a pram by scratching and cutting it. He was not charged, but was admitted to a mental hospital and stayed there from February, 1950, until June, 1951.

Second Charge (ninth incident).—In April, 1952, he deliberately rode his motor-cycle combination into a perambulator with a baby in it. He swerved at the last moment but hit the perambulator and damaged it. He was convicted of careless driving and was fined.

Third Charge (tenth incident).—In August, 1952, he damaged a pram and a woman's skirt and stockings by squirting oil on them. He was convicted of causing malicious damage and was fined.

Fourth Charge (eleventh incident).—In 1953 he rode his motor-cycle through a muddy puddle, splashing a pram and its coverings and the woman who pushed it. He was charged with driving without due care and attention, but the court gave him the benefit of the doubt.

Fifth Charge (twelfth incident).—In September, 1954, came the first incident mentioned. He was charged and convicted of causing wilful damage, and was put on probation to accept medical treatment.

During the court proceedings arising from his latest escapade, the prosecuting counsel, while stressing that the accused deserved sympathy, had said nevertheless that he was still a menace to any woman with a pram. He went on to speak of "a real fear that he may cause serious injury to a baby or mother unless he is put under some form of restraint."

The patient said that he had had impulses to damage perambulators and handbags since about the age of 10, and that, although the police knew of only twelve perambulator attacks, the number of times he had so indulged was legion. He had sometimes made several attacks in one day, but he estimated the average at about two or three a week, fairly consistently. With the handbags he was usually satisfied if he could scratch them with his thumbnail, and as this could be done unobtrusively, a handbag had only once led him into trouble with the police.

He had received many hours of analytical treatment and had been enabled to trace his abnormality back to two incidents in his childhood. The first was when he had been taken to a park to sail his boat and had been impressed by the feminine consternation manifest when he struck the keel of his yacht against a passing perambulator. The second was when he became sexually aroused in the presence of his sister's handbag. He had been led to see the significance of these events and to understand that perambulators and handbags were for him "symbolic sexual containers," but the attacks continued.

His mother was a paraphrenic who was certified at the age of 54 (when he was 12) and died aged 66. His father died aged 66 (when the patient was 15). His work took him away from home for long periods. There was one sister, twelve years his senior, who had played the maternal role, and to whom he was much devoted.

Personal History

His physical health as a child had been good, and his schooling had been normal. He left at the age of 14, having reached the top standard.

Occupational.—After leaving his elementary school he attended a technical school for three years before, joining the R.A.F. as an engine fitter. He served for ten years and was then discharged because of his fetishism. Since then he had worked well at a job requiring a degree of mechanical skill and ingenuity, and also a facility for making personal contacts. He was industrious and successful, and his employers thought well of him.

Sexual and Marital.—From the age of about 10 he had masturbated, with fantasies of prams and handbags, and particularly of damage being caused to them by their owners. He first had sexual intercourse after his marriage at the age of 27; but intercourse, he said, was only possible with the aid of fantasies of handbags and prams. There were two children, and his wife said that he was a good husband and father. The domestic perambulator and his wife's handbags, however, were not immune from attack.

and a handbag filled to capacity and bulging often provided piquancy to his masturbation. While it was true that handbags and perambulators aroused him sexually, his attacks upon them were never accompanied by emission, though he was usually conscious of release of tension.

He described himself as a good mixer, but said he was never perturbed by solitude, and had always been a day-dreamer. He read a good deal, especially adventure and crime novels, and he was keen on gardening and woodwork. His knowledge of perambulators and handbags was considerable, and there was no doubt that a good deal of his leisure time was devoted to them.

Treatment

On examination he was found to be a man of good intelligence, who showed no psychotic abnormality. He said he was depressed because he doubted whether anyone could help him, and though he said self-reproachfully that his trouble was lack of will power, it was noticeable that he gave his history in a facile way, and, it seemed, with a certain amount of relish.

In reflecting upon this man's plight, the despair of his family, and his poor response to treatment previously given, the idea was conceived that he might benefit from aversion therapy similar to that used in the treatment of alcoholism.

It was explained to the patient that the aim of treatment was to alter his attitude to handbags and perambulators by teaching him to associate them with an unpleasant sensation instead of with a pleasurable erotic sensation. Though he was frankly sceptical about the treatment, he said he was willing to try anything, for his despair had been deepened by recent sexual arousals when handbags appeared in the ward on visiting-day, and by illustrated advertisements in newspapers.

A collection of handbags, perambulators, and coloured illustrations was obtained, and these were shown to the patient after he had received an injection of apomorphine and just before nausea was produced. The treatment was given two-hourly, day and night, no food was allowed, and at night amphetamine was used to keep him awake. At the end of the first week, treatment was temporarily suspended and the patient was allowed home to attend to his affairs.

He returned after eight days to continue the treatment, and he reported jubilantly that he had for the first time been able to have intercourse with his wife without use of the old fantasies. His wife said that she had noticed a change in his attitude to her, but was unable to define it. Treatment was recommenced and continued as before, save that emetine hydrochloride was used whenever the emetic effect of apomorphine became less pronounced than its sedative effect.

He was asked to write an account of the attractive qualities of perambulators and handbags, and this he did between treatments, writing at considerable length and with a wealth of technical detail. He also wrote an account of the ways in which they are commonly and carelessly misused. At this stage his difficulties were discussed, and attention was chiefly directed towards the pride with which he had always cherished his eccentricity, the exhibitionistic element in his attacks on perambulators, and ways in which they had become a threat to his liberty. After five days he said that the mere sight of the objects made him sick. He was now confined to bed and the prams and handbags were continually with him, the treatments being given at irregular intervals. On the evening of the ninth day he rang his bell and was found to be sobbing uncontrollably. He kept repeating, "Take them away," and appeared to be impervious to anything which was said to him. The sobbing continued unabated until the objects were removed with ceremony, and he was given a glass of milk and a sedative. The following day he handed over a number of photographic negatives of perambulators, saying that he had carried them about for years but would need them no

longer. He left hospital but continued to attend as an out-patient.

After a further six months it was decided empirically to readmit him for a boosting course of treatment. He agreed to this, although he did not consider it at all necessary. A coloured cinematograph film was made of women carrying handbags and pushing prams in the careless, provoking ways which he had described previously. The film was started each time just before the onset of nausea produced by an emetic and was continued throughout the period of nausea. He was also given handbags to handle.

When asked to write an account of any change which he thought had taken place, he said that he no longer regarded himself as an expert on perambulators, and often made mistakes about them in the street. He wrote: "The will power had been there all the time, but before treatment prams and handbags had a fascination for me which my will power was too weak to overcome." The fascination, he said, had become much less because his will power had "matured."

Progress

Nineteen months after he first had aversion therapy he still appeared to be doing well.

Patient's Report.—He says that he no longer requires the old fantasies to enable him to have sexual intercourse, nor does he masturbate with these fantasies.

Wife's Report.—She says that she is no longer constantly worrying about him, and about the possible imminence of police action against him. Their sexual relations have "greatly improved."

Probation Officer's Report.—He says that the patient has made "very noticeable progress" and that "his general attitude to life, his conversation, and his appearance have all shown a marked improvement."

Work Record.—He has been promoted to a more responsible job.

Police.—He has not been in any trouble with the police.

Literature

Among the earliest speculations on this subject are those of the French philosopher Descartes, who was himself a slight fetishist. In 1649 he wrote: "From whence came those extraordinary passions which are peculiar to certain men? There is so close a union between mind and body that once we have combined a certain action with a certain thought, the one never subsequently presents without the other." Referring to strange aversions (anti-fetishisms) that some people have, he concluded that they may well have formed in early infancy to "remain imprisoned in the brain until the end of life."

Binet (1888), however, first gave the term "fetishism" its sexual connotation, defining it as the erotic idolatry of something which cannot directly satisfy the ends of reproduction. He stressed that everyone was to some extent a sexual fetishist and that the difficulty was in knowing where the normal became abnormal. Fetishism, he said, arose from an "accident acting on a predisposed subject," and the predisposition was in the form of a general nervous hyperaesthesia. According to Binet the form taken by any sexual perversion was determined purely fortuitously by an external event, and he stated that "the man who can love only men could easily have been a nightcap fetishist or a shoe-nail fetishist." He distinguished a minor and major fetishism. In minor fetishism some effective detail or object was the centre of attraction, but did not overshadow the person to whom the love was gradually transferred. In major fetishism there was no such transference. Minor fetishisms, he said, were not at all obvious or easy to recognize, but in them lay the secret of many strange loves and astonishing marriages.

Krafft-Ebing (1939) accepted Binet's conclusion that in connexion with the first awakening of the fetishist's sexual life some event determined the association of lustful feeling

with a single impression. The fetishist's abnormality, according to Krafft-Ebing, lies not in what stimulates him, but in what does not stimulate him—that is, in his limited sex interest. He classifies fetishes according to the type of fetish object: (1) part of female body, (2) part of female clothing, (3) special materials, (4) animals. Group 1 may be physiological or pathological, but the other three are always pathological.

He stresses its *forensic importance*, because it may present as strange acts aimed at defiling the object or at its theft, and its importance as a *cause of impotence*.

Havelock Ellis (1906) states that fetishism tends to occur in sensitive, nervous, timid, and precocious individuals, and can usually be traced to a definite starting-point in some sexually emotional episode in early life. The degree to which this influences an individual's subsequent life depends on his "morbid emotional receptivity."

Hirschfeld (1939) elaborates Binet's theory and says that the predisposition is not a generalized nervous hyperaesthesia but a specific psychological make-up and that it is only a certain type of "accident" which is capable of arousing fetishism. In summary, he says that "fetishism is based on a conscious or unconscious associative absorption of sensual perception that is in accord with the individual's psycho-sexual constitution."

Freud's (1928) views may be briefly, and no doubt inadequately, summarized as follows. A fetish object is a substitute for the woman's (mother's) phallus in which the boy once believed. It remains as a triumph over the castration threat, and saves the fetishist from becoming homosexual by endowing women with the attribute which makes them sexually acceptable. The object may, however, symbolize the boy's last impression before the traumatic discovery which it screens from his conscious memory.

Stekel (1930) states that fetishism can be totally explained as flight from the woman, and in his experience homosexuality was the end of every case. It is, he says, a complicated compulsive neurosis giving rise to impulsive, often sadistic, acts carried out in a twilight state and expressed in symbolism which can be interpreted only by psycho-analysis. Stekel stresses the fetishist's pride in being unusual, his psycho-sexual immaturity, his harem cult, and his impulses to exhibitionism.

Karpman (1934) states that sadism is the root of fetishism, though sado-masochistic fantasies may not be present. Common to sadism and fetishism are predominance of fantasy life, depreciation of the sexual partner, and incestuous attachment.

Rarity in Females.—All authorities agree that fetishism is predominantly a male disorder. Krafft-Ebing (1939) considered that pathological fetishism had been observed only in men, and Havelock Ellis (1906) noted the "great rarity of fully developed fetishism in women" but thought that slight degrees might occur. Stekel (1930) stated that it was "generally a male disease," and Fenichel (1945) that it was "very rare" in women. Kinsey *et al.* (1953) state that it is "an almost exclusively male phenomenon." Of 7,789 females, they reported only two or three who were regularly aroused by objects not directly connected with sexual activity.

Fetishism in Homosexuality.—East (1949) states that fetishism is not confined to heterosexuals, for in rare cases it is associated with homosexuality. Thoinot and Weyse (1920) recorded the case of a male homosexual fetishist who was erotically excited by contemplating the patent-leather shoes of other men.

Frequency as a Primary Medical Problem.—In a series of 4,000 patients seen in private practice, Curran (1954) found only five cases in which fetishism was the primary problem. None of these was on a charge.

Frequency as a Legal Problem.—Fetishism, according to East (1949), is seen infrequently in the criminal courts. It is also quite rare in divorce proceedings (R. Ormerod, 1956, personal communication).

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Discussion

To use aversion therapy in treating this patient seemed a logical approach if one believed that the results obtained in alcoholism are not dependent upon the specific biochemical changes produced by any drug but upon the establishment of a conditioned response. The fetishist's predisposition propounded by Binet as a general nervous hyperposition may well be expressed as an unusual capacity for forming conditioned responses, and this capacity might prove as great an asset in treatment as it was a liability when the fetish was formed. To use nausea and vomiting as a means of producing the aversion was clearly less appropriate than in alcoholism, but familiarity with the procedure, the ease of administration, and reluctance to use other available stimuli favoured its use. Also the modification of attitudes and psychological conversions are more easily obtained in states of exhaustion and hunger, and from that point of view the technique was suitable.

It was thought that should aversion be successfully established there might be some risk that impotence would ensue. According to Freud's (1928) view, overt homosexuality might emerge if the protective fetish objects were removed; while Stekel's (1930) experience suggested that this would happen anyway. East and Hubert (1939) stress the danger of changing a sexual fetish into strong homosexual or sadistic drives by treatment. So far none of these eventualities has arisen.

Romm's case is interesting because apparently the impulses to aggressive action disappeared or were controlled, although unusual interest in what had been the fetish object still remained, and was even occasionally used in fantasies.

Much of what our patient says—for example, that he makes mistakes about perambulators—also indicates the habits of observation persist to some extent. He insists, however, that observation is more casual, and that sexual stimulation never occurs as a result.

Summary

A report is given of a case of fetishism believed to be unique in that the patient responded favourably to aversion therapy. A brief review of the literature is given and discussed in relation to the treatment of this case. It is suggested that the predisposition to fetishism, first discussed by Binet, may lie in an unusual capacity to form conditioned responses, and that this capacity may be used as an asset in treatment.

I am indebted to Dr. Desmond Curran for the opportunity to treat this patient, and for permission to publish this report. I also thank him and Sir Paul Mallinson for much helpful criticism and advice in the preparation of this paper. It is a pleasure to acknowledge the help and co-operation of the nursing staff at Atkinson Morley's Hospital.

ACTION OF DIBENYLIN ON THE PERIPHERAL CIRCULATION

BY

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"Dibenyline" (phenoxybenzamine hydrochloride) is chemically related to though much less toxic than "dibenzamine." It has been thought to cause increased blood flow in many tissues by an action mainly involving the vasomotor nerves. Studies with dibenyline in patients with peripheral vascular disease have yielded conflicting results. Moser *et al.* (1953), Haimovici (1951), Friend and Edwards (1954), and Wertheimer *et al.* (1954) found it valuable when given intravenously or orally in the treatment of vasospastic disorders, causalgia, and acrocyanosis. Wertheimer *et al.* (1954) claimed some benefit in arteriosclerosis obliterans, but most workers consider the drug to be less efficacious in organic vascular disorders.

Animal investigations have suggested that the vascular response to dibenyline is largely dependent upon an adrenergic blocking action on the sympathetic nervous system (Nickerson *et al.*, 1953; Green *et al.*, 1954; Harvey and Nickerson, 1954).

The present investigation was designed to assess the effect of the drug on diseased blood vessels and to study the role of the sympathetic nerves in the response to dibenyline in man.

Subjects and Methods

The blood flow responses of 22 sympathectomized limbs to dibenyline were studied. Most patients were given dibenyline while still in hospital in the immediate post-operative period following surgical sympathectomy. A few were tested with the drug as out-patients after sympathectomy.

The subjects belonged to one of two fairly distinct categories: (1) patients with hyperhidrosis or uncomplicated Raynaud's phenomenon who had no evidence of organic vascular disease and were therefore considered to have comparatively healthy blood vessels (eight limbs); and (2) patients with arteriosclerosis, scleroderma, or Raynaud's disease with ischaemic lesions, in whom there was undoubtedly organic vascular change (14 limbs). The effects of intravenous and of intra-arterial dibenyline were separately investigated.

The blood flow in the limbs was measured in each case by venous occlusion plethysmography, under standard conditions (Barcroft and Swan, 1953). Each limb under observation was enclosed in a neatly fitting thin rubber sheath and inserted into a plethysmograph of appropriate design. Throughout every test the temperature of the water surrounding the segment of limb in the plethysmograph was kept at $34 \pm 1^\circ \text{C}$; the room temperature was maintained between 23° and 25°C . Regular measurements of blood flow were made at intervals of half to one minute; the systemic blood pressure was recorded with a sphygmomanometer every five to ten minutes.

Control observations of blood flow were made for at least ten minutes. An intravenous or intra-arterial infusion of saline was then set up, using a power-driven infusion apparatus delivering saline at a constant rate of 3 ml. a minute (Duff, 1952). Saline alone was infused for ten minutes; the desired amount of dibenylin was then added, after which the plain saline infusion was resumed. Blood flow was measured regularly throughout the entire period.

In the studies in which dibenylin was given *intravenously* the total dose was determined by the size and condition of the patients, and was between 25 and 60 mg. The drug was infused at a rate of 0.5 to 1 mg. a minute.

In the study of *intra-arterial* dibenylin unilateral infusions were given into the brachial artery just above its bifurcation. The total dose was under 0.5 mg., given at a rate of 50 to 200 μg . a minute.

Evidence that the vasomotor nerves had been effectively interrupted in the investigated limbs was provided both clinically and by the use of the plethysmograph. Increased warmth of the skin and absence of sweating were noted; in addition Horner's syndrome was observed in those having stellate ganglionectomy. In most subjects an increase in blood flow was recorded soon after operation; however, a failure to induce vasodilatation after indirect warming of the body was regarded as the most reliable indication of successful sympathectomy (Landis and Gibbon, 1933).

Effects of Intravenous Dibenylin on Sympathectomized Vessels

Healthy Vessels

Results of a typical experiment are portrayed in Fig. 1. Bilateral cervicodorsal ganglionectomy had been performed seven days previously in a young woman with uncomplicated Raynaud's phenomenon. Soon after the start of the dibenylin infusion the blood flow in the hand increased from about 8 to over 25 ml. per 100 ml. a minute. The flow was still elevated three hours later. However, 24 hours later the

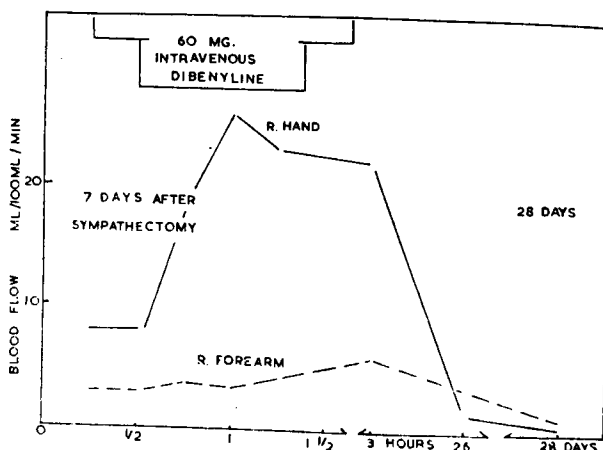


Fig. 1.—Blood flow in hand and forearm of a woman aged 27, with uncomplicated Raynaud's phenomenon, on seventh day after sympathectomy, during infusion of saline (shallow block) and dibenylin (deep block). With dibenylin the circulation increased greatly in hand, slightly in forearm. One month later blood flow in both tissues was below control level.

mean hand blood flow had returned to about the resting (pre-dibenylin) level. The increased blood flow was therefore of comparatively brief duration, and at an examination one month later the blood flow was still low.

Increased blood flow through comparatively healthy vessels after intravenous dibenylin is also shown in Fig. 2. This subject, a woman aged 37, had had bilateral cervico-

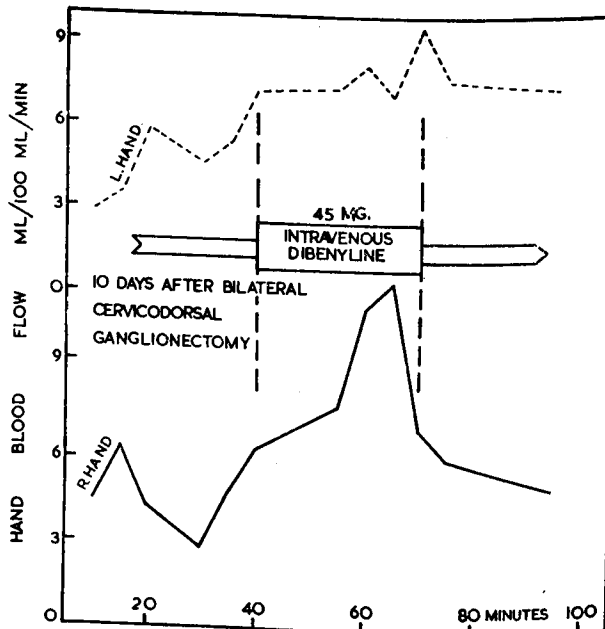


Fig. 2.—Circulation in sympathectomized hands of a woman aged 37 during continuous intravenous saline infusion. Dibenylin given between 40th and 70th minute (dotted line) was accompanied by some increase in flow in both hands, especially the right.

dorsal ganglionectomy ten days previously. A mean increase in hand blood flow of between 50 and 100% was recorded during the infusion of 45 mg. of dibenylin.

Diseased Vessels

Dibenylin caused little or no increase in blood flow in some of the subjects in this group. Findings in a man aged 53 with intermittent claudication due to arteriosclerosis of the lower limbs are illustrated in Fig. 3. Five days previously bilateral lumbar sympathectomy had been performed.

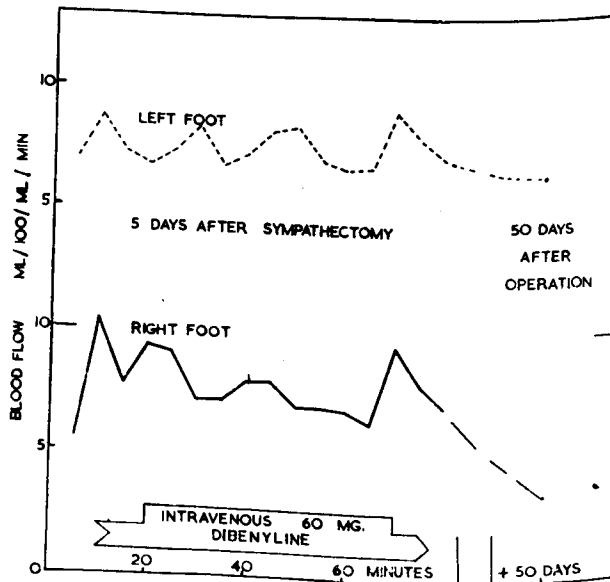


Fig. 3.—In this patient, a man aged 53 who had undergone sympathectomy for intermittent claudication, 60 mg. of dibenylin failed to influence the blood flow in the feet.

A slight increase in the blood flow in the feet had resulted from the operation. No further increase in flow occurred with intravenous dibenylin even when 60 mg. had been given. Seven weeks later the blood flow in both feet was at the pre-operative level.

In other subjects with organic vascular disease dibenylin did increase the blood flow. The circulatory response in the hands to an infusion of 25 mg. of dibenylin in a woman with scleroderma is shown in Fig. 4. An increase in flow

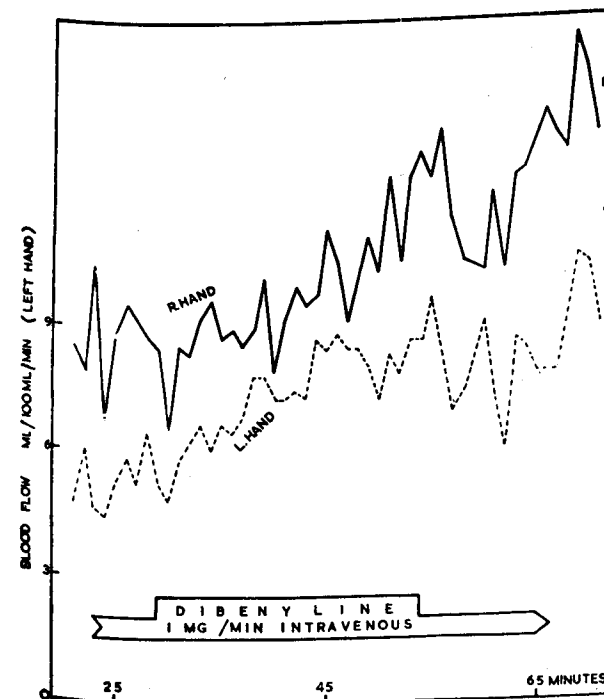


Fig. 4.—Intravenous dibenylin caused some increase in flow in both hands of a woman aged 65 with diseased blood vessels.

of approximately 100% occurred in both hands. The flow was no longer raised two months after the infusion. This patient had obtained little or no symptomatic relief from bilateral cervicodorsal sympathectomy nine years previously, or from vasodilator drugs such as tolazoline hydrochloride. She claimed considerable relief from a subsequent course of oral dibenylin.

Effects of Intra-arterial Dibenylin

In this series a regular infusion of saline into the brachial artery of the right arm was maintained continuously. At half-minute intervals the blood flow was measured simultaneously in both hands. After a control period of five to ten minutes dibenylin was added to the infusion in an amount sufficient to produce a concentration between 50 and 200 μg . a minute. This was given for four minutes; then, after a further control period on saline alone, a second infusion of dibenylin was given.

The total amounts of dibenylin were too small to have any measurable effect on systemic blood pressure or on blood flow in the non-infused left hand.

Healthy Vessels

Dibenylin caused a marked increase in blood flow in the infused right hand without affecting the level of flow in the left hand.

Fig. 5 illustrates the response in a man of 48 with coronary disease but otherwise healthy blood vessels. Six days before the test bilateral cervicodorsal ganglionectomy had been performed, and Horner's syndrome and anhidrosis of the denervated areas had resulted. The blood flow in the infused right hand averaged 7 ml. per 100 ml. a minute during the initial saline control period. Soon after adding dibenylin at a concentration of 100 μg . a minute the blood

flow in the right hand rose to between 12 and 13 ml. On resuming the plain saline infusion the flow in that hand fell slightly, but when dibenylin was given again, at 200 μg . a minute, a further increase in flow occurred, to between 14 and 16 ml.

Fig. 5 illustrates the important control provided by the non-infused left hand which failed to exhibit any increased flow. This confirmed that the dibenylin did not escape from the right hand into the blood stream in an amount sufficient to cause systemic effects on the peripheral circulation. No change in heart rate or arterial blood pressure was recorded during the intra-arterial infusions of these small amounts of dibenylin.

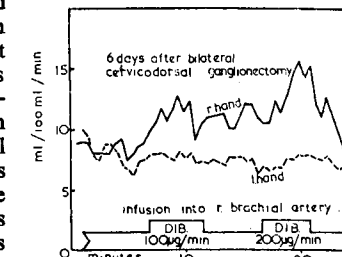


Fig. 5.—Two infusions of dibenylin into the right brachial artery caused increase in blood flow in the right hand of a man aged 48, with angina, on the sixth day after bilateral cervicodorsal sympathectomy.

Diseased Vessels

Similar responses were recorded in patients sympathectomized for peripheral vascular disease of the upper extremity. The results of one such test are illustrated in Fig. 6. The blood flow was measured in both hands of a woman of 39 who had had bilateral cervicodorsal ganglionectomy eight days previously. A continuous infusion into the right brachial artery was maintained throughout the period of observation. During the initial saline control period the blood flow in the right hand averaged about 12 ml. per 100 ml. a minute. Soon after adding dibenylin to the intrabrachial infusion (at a rate of 100 μg . a minute) the flow in the right hand rose to over 20 ml. This marked

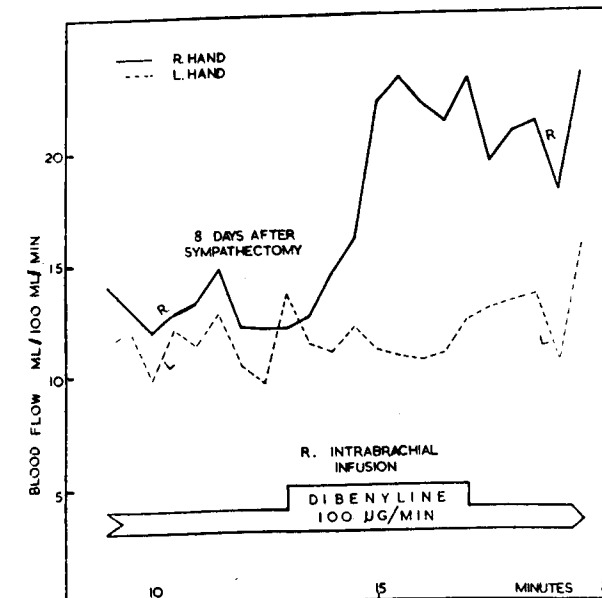


Fig. 6.—Intra-arterial dibenylin caused vasodilatation confined to the infused hand of a woman aged 39, with Raynaud's phenomenon and calcinosis, sympathectomized eight days previously.

increase in flow with dibenylin was not invariably found. A young girl of 15 was studied five days after cervicodorsal ganglionectomy for hyperhidrosis. Only a slight increase in flow accompanied infusions of dibenylin in concentrations of 50 and 200 μg . a minute. In none of the tested subjects, however, was dibenylin associated with a reduction of flow in the infused hand, and the common response, irrespective of the condition of the blood vessels, was a distinct increase in blood flow.

Discussion

This study has shown that in man dibenylin is capable of increasing the blood flow through vessels surgically deprived of their sympathetic innervation. The increase in flow after intravenous dibenylin was generally greater in subjects with little or no organic arteriolar narrowing than in those with structural ischaemic change. The volume of blood flowing through any part of the arterial tree is determined by the "perfusing" pressure and by the vascular resistance. In these experiments there was no increase in pressure; on the contrary, the blood pressure generally fell a little with the intravenous infusions of dibenylin. The increased flow was therefore due to a lowering of resistance—that is, to an increase in mean vascular calibre. Since the blood vessels had been denervated the increased flow was not due to any effect of dibenylin on the sympathetic nerves. The vasodilatation could therefore be attributed to an action of the drug at the periphery or to the systemic release of some vasodilator substance by the intravenous dibenylin.

The mechanism was further elucidated by the studies using intra-arterial dibenylin. Dilatation during infusion of the drug into the brachial artery was confined to the corresponding hand. This demonstrated that the vasodilatation with dibenylin can result from a purely peripheral action without involving any systemic or central effect. This peripheral action presumably involves the receptor elements or the contractile muscle of the arterioles.

In subjects with intact vasomotor nerves this action is no doubt reinforced by the effects of the drug (when given orally or intravenously) on the sympathetic nervous system. It has been demonstrated that dibenylin is capable of dilating blood vessels by peripheral action beyond the sympathetic terminals. This is of particular importance in patients in whom the vasomotor nerves have been ablated by surgery or impaired by metabolic or nutritional disorders. Dibenylin is specially indicated in acute ischaemia of an extremity, for it may be infused directly into the artery of any limb to which the vascular disturbance is confined. It is effective in doses that do not influence the blood pressure or systemic circulation.

If two or more limbs are involved the drug may be given intravenously in larger amounts (25–60 mg.). By this route its systemic actions, especially its tendency to lower the blood pressure, may be a disadvantage.

Undesirable effects tend to occur with intravenous doses of over 40 mg. of dibenylin. The most serious of these—tachycardia and hypotension—are related to the widespread vasodilatation produced. The drug is therefore best withheld from people known to have heart disease. After intravenous administration all patients should be kept in bed for 24 to 48 hours, and the heart rate and blood pressure carefully watched. Some drowsiness and lethargy is to be expected during this period, but requires no treatment. Nasal stuffiness due to congestion of the mucosae is common, but rapidly passes off. If dibenylin is given continuously by mouth, especially in daily doses greater than 20 mg., nasal congestion, lethargy, and giddiness may occur, but considerable relief is usually afforded by the use of an amphetamine inhaler and small doses of dexamphetamine sulphate tablets, B.P.C.

Summary

It has been shown that dibenylin is capable of increasing the blood flow in the limbs by a peripheral action independent of any effects it may have on the sympathetic nervous system.

The vasodilatation from a single injection is of rapid onset and persists for several hours.

The drug may be of particular value in treating acute ischaemia of a limb, for it is effective when infused intra-arterially in doses (under 0.5 mg. into the brachial

artery) that do not appreciably affect the general circulation.

Dibenylin is effective even in patients in whom the integrity of the vasomotor nerves has been lost.

However, it must always be remembered that the extent to which any blood vessel may dilate with dibenylin or with any other agent is determined ultimately by the degree to which disease has induced structural change in the vessel wall.

The patients were investigated by courtesy of Professor Sir James Paterson Ross, Professor J. B. Kinmonth, and Mr. G. W. Taylor, to whom I am much indebted. For valuable encouragement and advice I am grateful to Dr. Geoffrey Bourne and Dr. Graham Hayward, of St. Bartholomew's Hospital, and to Professor Henry Barcroft and Dr. Jean Ginsburg, of St. Thomas's Hospital Medical School. I would like also to thank Dr. Kenneth Carter and the secretarial staff of Smith, Kline and French International Co. for supplies of dibenylin and for secretarial help.

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CARDIOVASCULAR COLLAPSE DURING APOMORPHINE TREATMENT

BY

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Apomorphine treatment for alcoholism is being used on an increasingly large scale, and published reports suggest that it is effective and safe. In principle, the method, which was introduced by Dent in 1934, consists in giving drinks of alcohol together with subcutaneous or intramuscular injections of apomorphine repeatedly over a few days. There has recently been a trend, expounded chiefly by Feldmann (1952), of Geneva, towards long and intensive courses of treatment, such as apomorphine 1/10 gr. (6.5 mg.) by injection and alcohol by mouth, two-hourly day and night for six to ten days, during which time other foods and fluids are absolutely withheld.

In view of the safety claimed for this treatment, it is thought worth publishing the following observations on a patient who showed an anomalous and dangerous reaction to apomorphine. In spite of his experiences under therapy, he generously volunteered to have further doses of the drug experimentally, and thereby made it possible for the nature of this unusual reaction to be more accurately defined.

Case History

The patient, a man of 32, was of markedly asthenic physique and had a thoracic kyphoscoliosis. He had a history of repeated attacks of intestinal colic, which had not been cured by a reconstruction operation carried out on the hypothesis that an aberrant mesenteric vessel might be responsible. He came under psychiatric treatment because of a confusional state provoked by drugs and alcohol. The most notable feature in his drug-taking history was the injection of pethidine in doses up to 2,500 mg. daily, intermittently

over nine months with periods of freedom from the drug of up to three weeks. In addition, he had on rare occasions taken intravenous thiopentone in such dosage as 0.5 g. His drinking history was less remarkable, amounting to frequent symptomatic excess rather than confirmed and continuous addiction, his daily intake being of the order of 3 pints (1.7 litres) of beer and nine whiskies. His confusion cleared before admission.

Before starting on apomorphine treatment, a course of modified insulin was given to improve his general physical condition. He proved to have a high insulin tolerance, taking as many as 440 units without losing consciousness.

Treatment by apomorphine was started on the 57th day after admission. The patient, who was anxious and apprehensive, had a B.P. of 120/60 and a pulse rate of 96 a minute. In accordance with the method of Feldmann (1952), he was then given an initial dose of 1/10 gr. (6.5 mg.) of apomorphine subcutaneously, with 20 oz. (570 ml.) of beer. After 10 minutes he experienced nausea, and after 15 minutes he vomited copiously, whilst his pulse rose to 126. Twenty minutes after the injection he suddenly became pale and cyanosed. Profound cardiovascular collapse followed, with cessation of respiration, absence of radial pulse, loss of consciousness, and an appearance of extreme prostration. Artificial respiration and oxygen were given and the return of shallow irregular respiration and of a slow pulse was accompanied by generalized clonic jerking. He recovered consciousness within a minute or so, but with some transient confusion. He was then restless and agitated, but within 15 minutes of the collapse his physical condition no longer gave cause for concern.

In view of this severe and dangerous collapse the treatment was withheld for a week. During this time an E.E.G. showed mild bilateral dysrhythmia of constitutional type, but no evidence of epilepsy. An E.C.G. revealed a sinus bradycardia of 50 a minute, with flat P waves in all leads, but the curves were considered to be within normal limits. The bradycardia was an isolated finding, his usual pulse rate being 70 to 80. It was decided to proceed cautiously with the treatment. He was watched very closely after each dose of the drug and means of immediate resuscitation were kept at hand. His reactions to subsequent doses are summarized in the Table.

Reactions to Apomorphine				
Days after Admission	Time	Dose of Apomorphine	Vomiting	Cardiovascular Effects
64	6.55 p.m.	gr. mg. 1/40 1.6	After 5 mins.	Nil
64	9.05 "	1/30 2.2	" 5 "	(1) Fall of pulse from 84 to 48 after 10 mins. (2) Malaise, shock, pallor, cyanosis after 15 minutes. B.P. 70 systolic. Nikethamide 5 ml. given i.m. (3) Improving 20 minutes after injection. Pulse 84. B.P. 95/50
65	10 a.m.	1/60 1.1	Nil	Nil (difficulty in focusing after 5 mins.)
65	12 noon	1/50 1.3	Nausea only after 6 mins.	Nil
65	1.30 p.m.	1/40 1.6	Nil	Yawning and fall of B.P. from 110/75 to 90/50 after 20 mins. Nil else.
65	3 "	1/30 2.2	Nausea after 6 mins. (retching)	Pulse steady
65	4.10 "	1/20 3.2	After 5 mins.	Malaise and fall of B.P. to 95/60 after 13 mins. Pulse steady
65	8.08 "	1/20 3.2	" 5 "	Pulse 46 after 10 mins. Pallor and collapse after 12 mins. requiring oxygen and nikethamide
66	10 a.m.	1/30 2.2	Nil (nausea after 5 mins.)	Nil significant (facial flush and blurred vision after 15 minutes)

Because of its manifest hazards in this case, apomorphine treatment was abandoned. The patient agreed, however, to have further doses of the drug under experimental conditions so that electrocardiographic recordings could be made.

Experimental Observations

The patient was given a series of injections of apomorphine, each on a different day. Tracings were taken as indicated by a Cambridge Electrite cardiograph, lead II being used throughout. In the following summaries of the observations made, the times noted refer to the interval after injection, and letters A–F to the series of E.C.G. tracings (Fig. 2) corresponding to the points on the pulse chart (Fig. 1) for the third experiment.

First Experiment (71 days after admission).—Resting E.C.G. normal. Pulse 75, regular. Apomorphine 1/40 gr. (1.6 mg.) subcutaneously. 9 minutes, slight malaise. 13 minutes, yawning. No vomiting. No significant change in E.C.G.

Second Experiment (78 days after admission).—Resting E.C.G. normal. Pulse 88, regular. Apomorphine 1/25 gr. (2.6 mg.) subcutaneously. 9½ minutes, vomiting followed by malaise. No significant change in E.C.G., pulse, or blood pressure.

Third Experiment (83 days after admission).—Resting pulse 97. B.P. 120/70. (A.) Apomorphine 1/20 gr. (3.2 mg.) intramuscularly. 4 minutes, subjective flushing. 7½ minutes, vomiting. 8–9 minutes, rapid fluctuations in size of pupils. 10 minutes, onset of malaise. 15 minutes, slight conjunctival injection. 16 minutes, further vomiting; pupils reacting briskly to light, sluggishly to accommodation. 18 minutes, inability to focus; much more severe malaise; a floating feeling. 19 minutes, increasing malaise, restlessness, and pallor. 20 minutes, onset of severe collapse. (B.) 21–26 minutes, cyanosis and profound collapse; oxygen and nikethamide given. (C. D. E.) 29 minutes, rapidly improving; B.P. 110/50. 30 minutes onwards, steady and uninterrupted recovery. (F.) 45 minutes, hiccuping and drowsiness; B.P. 115/60.

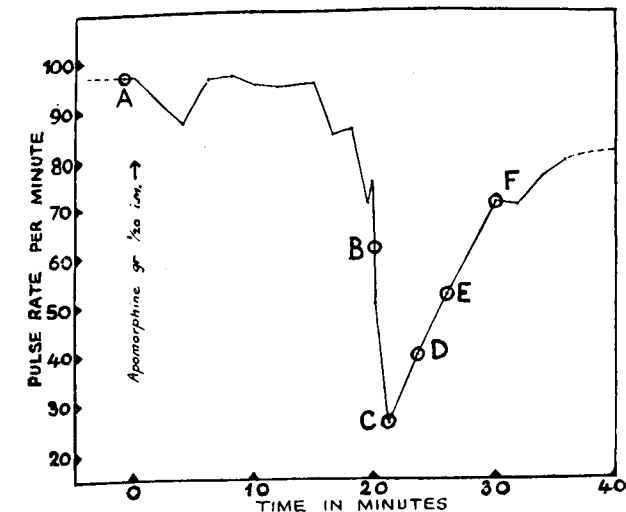


FIG. 1.—Pulse chart showing third experiment. A–F refer to times at which the electrocardiographic tracings shown in Fig. 2 were taken.

The urgent need for resuscitative measures made it impossible to take blood-pressure readings while he was collapsed, and the state of the pupils was also neglected. For similar technical reasons, there were short breaks in the E.C.G. tracing between points B and C, and C and D. Fig. 1 shows the changes in pulse rate. Representative sections of the E.C.G. are reproduced in Fig. 2.

This series of electrocardiographic changes supports the clinical diagnosis of a severe vasovagal syndrome, the gravity of which is well illustrated by the tracings C and D. The rapid return of the E.C.G. to normal is regarded as evidence against the possibility of a direct toxic action of apomorphine on the heart.

Discussion

The pharmacology of apomorphine was extensively reviewed by Sumwalt (1943), while, of the standard works of reference, those of Drill (1954) and of Goodman and Gilman (1955) give comprehensive accounts of the drug's actions. Apomorphine is, of course, a central emetic which acts

selectively (according to Borison and Wang, 1953) on a chemoreceptor trigger zone in the floor of the fourth ventricle, separate from the emetic centre in the fasciculus solitarius. Vomiting occurs 5 to 15 minutes after a dose of 2 to 8 mg. in most adults. Emesis is not the only excitatory effect of the drug; restlessness, tremor, polypnoea, and even convulsions have occasionally been reported. There is, in addition, a central depressive action, manifest usually by

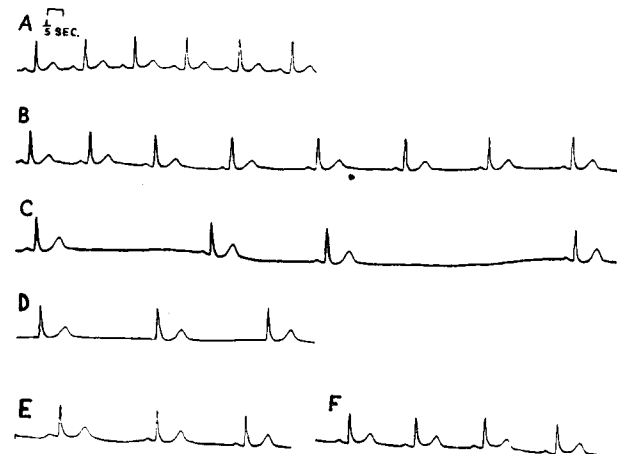


FIG. 2.—Electrocardiographic findings (third examination). A. (Time zero.) Normal E.C.G.; rate 97; P-R interval 0.16 second. B. (20 minutes.) Rapidly increasing bradycardia; rate regular, 75-50; P-R interval 0.12 second. QRS complex normal. C. (21½ minutes.) Extreme slowing and irregularity; rate 26; P-R interval 0.12 second; QRS complex normal. D. (23½ minutes.) Regular bradycardia; rate 39; all P wave activity suppressed; idioventricular rhythm; QRS complex normal. E. (26 minutes.) Regular bradycardia; rate 52; normal P wave re-established; P-R interval 0.12 second; QRS normal. F. (30 minutes.) Normal curves; rate 71; P-R interval 0.14-0.16 second.

fatigue and somnolence after vomiting. According to Drill, central depression of vasomotor tone, causing momentary syncope, occurs in 1 to 5% of patients having the drug, and in rare cases there is fatal cardiovascular collapse. No reference to E.C.G. changes in humans has been found, but Crittenden (1932) reported cardiographic evidence of heart block and cardiac arrest in unanaesthetized animals given subcutaneous apomorphine. The wide range of variation in individual susceptibility to apomorphine has been generally stressed.

Apart from the uses to which it has been put by psychiatrists, apomorphine has few therapeutic applications. It is recommended, traditionally but with great caution, as an emetic in alcoholic intoxication and other instances of acute poisoning, and as a remedy for paroxysmal tachycardia (Finkle, 1939). Apomorphine has less often and with doubtful effect been tried as an analgesic in obstetrics, as premedication for emergency operations in delirious patients, and to reduce tremor in Parkinsonism. In experimental pharmacology it has been found useful in the evaluation of anti-emetic substances.

The apparent efficacy of apomorphine in the treatment of alcoholics depends, in part, on the production of conditioned aversion to alcohol. Psychodynamic processes such as expiation of guilt by submitting to such unpleasant treatment may also be important. There is, however, some evidence that the main action of the drug is not in effecting psychological changes in these ways, but in correcting physiological abnormalities causally underlying the alcoholism. Feldmann (1955), who has treated over 3,400 patients (not all alcoholics) with apomorphine, inclines to this last view.

Feldmann (1955) carries out preliminary physical assessment in every case, but says that apomorphine treatment given for alcoholism by his rigorous technique has "absolutely no contraindication." He and Dent, in personal communications, regard the case here reported as quite exceptional (as do we, from our much smaller experience of the method at the Atkinson Morley Hospital). In Feldmann's clinic,

apomorphine treatment has been given without mishap to cases of severe cardiovascular degeneration, including six patients with bundle-branch block. It would, however, be unfortunate if the confidence felt in such a large and well-staffed clinic was casually assumed and misapplied elsewhere.

As to the dangerous idiosyncrasy exhibited to apomorphine by our patient, it might be postulated that he possessed inherently abnormal autonomic lability. The rapid fluctuations in pupillary size following injection would support this hypothesis, as would the history of attacks of intestinal colic. On the other hand, anomalous responsiveness to other drugs was shown by the high pethidine and insulin tolerance (the latter being a common incidental finding in psychiatric patients). A year after these experiments he developed minimal but definite signs of thyrotoxicosis in the inexplicable presence of a blood cholesterol of 405 mg. per 100 ml.

Aside from such speculations, the clinical and electrocardiographic observations in this case leave no doubt that apomorphine is a potentially dangerous drug in certain individuals. Whenever it is given, the patient should be under very close observation for at least 30 minutes after each dose. It is best to start with a small dose, such as 1/30 gr. (2.2 mg.) in case of idiosyncrasy, and oxygen and restoratives should be at hand for immediate use. Malaise and restlessness after vomiting (instead of the usual nauseated drowsiness and relaxation) are danger signals. Syringes should be sterilized by boiling, since alcohol destroys apomorphine, perhaps making it more difficult to judge dosage. Finally, if any green coloration is seen in the prepared injection it should be discarded and fresh supplies obtained.

Summary

The case is described of a man of 32 who showed profound and dangerous cardiovascular collapse with therapeutic doses of apomorphine. Electrocardiographic findings following experimental administration of the drug to the same patient are described and illustrated. It is suggested that the traditional caution of pharmacologists and physicians in the use of apomorphine should not be disregarded now that the drug is finding a new and promising application to psychiatric problems.

I am grateful to Dr. Alastair Hunter for interpreting the electrocardiograms; to Sir Paul Mallinson, under whose care the patient was admitted, for criticizing the manuscript, and to Dr. John C. Pittman for his invaluable assistance. Special thanks are due to Miss J. Hurst, of the E.C.G. department of St. George's Hospital.

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In his report for the second quarter of 1956 the city analyst of Birmingham, Mr. H. H. BAGNALL, reports that "an ointment and medicine prescribed by another of the pseudo-medical geniuses with whom the country appears to be infested were, as usual, the cheap common articles that one has come to expect in such cases." The patient treated by this person (at 3 guineas for a consultation and 13s. 6d. a month for medicines) was said to be suffering from spinal injury and gravel on the kidney. The ointment was kaolin poultice and the medicine a dilute laxative syrup. The cost of the two specimens would be less than 1s., reports Mr. Bagnall, and he remarks on "the apparent ease with which effrontery of this kind is able to impose on a certain section of the population."

B.C.G. VACCINATION AFTER REPLACEMENT BLOOD TRANSFUSION

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B.C.G. vaccination has been performed for a number of years in many maternity hospitals in this country and Gaisford (1955) has suggested that it might with advantage become an accepted part of the care of the "new-born" in such hospitals. In spite of the number of publications on the subject we have not seen direct mention of B.C.G. having been given to a baby within a short time of its receiving replacement transfusion.

Case Report

A baby suffering from haemolytic disease was born in a Glasgow maternity hospital on March 24, 1955, and a replacement blood transfusion was carried out the same day. B.C.G. vaccination was given on March 28. One week later the reaction had so far progressed that there was an indurated area 8 mm. in diameter, with a small ulcer crater in the centre from which there was watery discharge. During the next two weeks the ulcer became slightly larger and there was slight discharge of yellowish pus. The ulcer crusted frequently, only to break down again, but it healed finally at about three months. A few weeks later the mother noticed a small lump in the axilla. This was ignored until the middle of October, when it was felt to be larger. At that time it was a rubbery swelling 19 by 15 mm., with no definite fluctuation, though the skin over it was rather telangiectatic. The child's general condition was excellent and x-ray examination of his chest showed no evidence of past or present pulmonary tuberculosis. The Mantoux test, using 1/1,000 dilution, gave a strong positive reaction. There was an area of erythema extending to 38 mm. diameter with a central induration of 21 mm. diameter.

The swelling was kept under observation, and by November 11 it had increased to 25 by 18 mm. Definite fluctuation was now present and the pus was aspirated, with streptomycin replacement. The pathological report on the pus was: "Exceedingly scanty acid- and alcohol-fast bacilli present; no growth obtained on culture."

The x-ray film of the mother's chest showed no evidence of pulmonary tuberculosis and her Mantoux (1/1,000) reaction was negative.

At the replacement transfusion 540 ml. of blood was withdrawn from the baby and 600 ml. administered. Of the latter, 540 ml. was received from donor A and 60 ml. from donor B. In each case the blood had been donated on March 22. The donors have subsequently been examined. Their x-ray films show no abnormality. Donor A proved negative to a 1/10,000 dilution tuberculin test, but developed positive induration of 20 mm. diameter with the 1/1,000 strength. Donor B gave a positive result with induration of 7 mm. diameter with the 1/10,000 and of 10 mm. with the 1/1,000 dilution.

Discussion

The following is an extract from Irvine (1954): "When introduced into the skin of a tuberculin-negative person in a suitable dose, nothing appears to the naked eye for two to three weeks. . . . At the end of this time a small area of induration may be felt at the site of the vaccination which gradually increases to a lump or papule, usually about the

size of a split pea. Between the fourth and sixth weeks a bleb appears on top of this papule in the majority of cases." Another baby from our area was vaccinated in the same hospital on the same day and with the same batch of B.C.G. In this case the papule began to appear on the fourteenth day and pursued the usual course.

The following factors are worthy of consideration.

(a) *Secondary Infection.*—The rapidity with which the ulcer formed must suggest the possibility of secondary infection at the time of vaccination. However, the whole course of eruption was normal, apart from the unusually short time taken to reach this stage. Further, the subsequent glandular enlargement and the pus therefrom were identical with those of B.C.G. adenitis.

(b) *Rate of Evolution of Lesion Altered by Maternal Influences.*—There is at present a diversity of opinions whether or not children born to tuberculous mothers respond more quickly or more slowly to B.C.G. than is normally the case. Gaisford (1955) found that 97% of contact infants had converted by four weeks, compared with 81% in the non-contact cases. Hewell and McClellan (1954) reported similar findings. However, Hagberg (1954) reported that the conversion rate was much slower than in the non-contact group. Roloff and his co-workers (1954) are in agreement with this latter view, believing that there is passively transferred antibody, but that this does not pass across the placenta. Ström (1950) has shown that even the newborn possess the ability to localize the B.C.G. organisms to some extent at the site of the inoculation. This supports the view that there may be some passively transferred immunity. The baby under consideration here has shown no evidence of congenital tuberculosis and was breast-fed for the first six weeks. The x-ray film of the mother's chest showed no abnormality and her Mantoux reaction was negative. These factors indicate that the baby could not have been "tuberculin positive" at birth and was unlikely to have received any passive immunity from the mother.

(c) *Rate of Evolution of Lesion Altered by Blood Received from a Tuberculin-positive Donor.*—When B.C.G. inoculation of a tuberculin-positive person occurs, a Koch phenomenon and possible local glandular reaction are to be expected. Zammit-Tabona (1952) reported that the commonest finding in the Koch phenomenon was a darkish circular ulceration, with a tendency to sloughing at the vaccination site three to six days after inoculation. His other findings sometimes included concurrent enlargement of lymph nodes in the axilla on the side of vaccination. There is no doubt that a circulating antibody exists which may give passive immunity, but there are conflicting opinions concerning the allergic state. Harries and Mitman (1947) state: "Like immunity, hypersensitivity may be induced actively or passively. Almost all clinical examples of hypersensitivity are active. Passive sensitivity follows the injection of serum from a sensitized animal. The state develops more rapidly and passes off quickly."

Hadfield and Garrod (1947) state: "The serum of a sensitized animal will render a normal animal anaphylactic—whereas no amount of serum from an allergic animal will confer on a normal animal the capacity to react allergically. Anaphylaxis thus depends on the presence of circulating antibody, and allergy does not." However, they go on to quote Rich and Lewis (1932), who claim to have proved that the change is in the cells themselves. Tissue cultures were prepared from the leucocytes and spleen of guinea-pigs sensitized by an injection of avirulent tubercle bacilli. To these cultures were applied various dilutions of tuberculin, which were found to kill the cells while they had no effect on the cells of similar cultures prepared from a normal animal.

Rich (1951) states: "In contrast to the anaphylactic type, the tuberculin type of hypersensitivity cannot be transferred to a normal individual by an injection of the serum of a hypersensitive one. The reported exceptions to this rule are so rare and irregular that it is evident that in this type of

Medical Memoranda

Herpes Zoster

Between October 1, 1948, and October 1, 1954, I attended 72 patients with herpes zoster (41 females, 31 males). Their ages ranged from 13 to 88 years, and more of these patients were over than under 50 (Table I).

TABLE I.—Ages in Decades

	1-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89
No. of cases	0	4	5	2	5	15	20	16	5

The distribution of the rashes was as follows: trigeminal first division, 7 cases; second division, 2; third division, 3; cervical roots, 16; dorsal roots, 35; lumbar roots, 3; sacral roots, 6. There was some overlapping, as adjacent roots were often affected, and in one third-division trigeminal case the second cervical root was also involved.

Pre-herpetic pain varied from nil to severe, and was variously described as itching, irritation, "like a needle," neuralgia, burning, soreness, shooting, crushing bones, stomach-ache. Pre-herpetic symptoms were absent or negligible in 44 cases, slight or moderate in 21, and severe in 7. The longest period of pain before the onset of the rash was 10 days, the usual being two to three days (Table II).

TABLE II.—Pre-herpetic Pain in Days Before the Onset of the Rash

Days	Nil	1	2	3	4	5	6	7	8	9	10	Total
No. of cases	44	1	12	9	1	1	0	3	0	0	1	72

Pain during the stage of eruption varied from slight discomfort to severe pain, and the same descriptions were applied as for pre-herpetic pain where it had occurred. Eruptive pain was experienced by some patients who had had no pre-herpetic pain, and vice versa. The amount of rash varied within wide limits, but no relation was noticed between the extent of rash and the degree of pain. One man aged 26, with left intercostal (D 5) herpes, was dyspnoeic on exertion during the eruptive stage. Eruptive pain usually corresponded with the distribution of the rash, but in two supra-orbital cases the main pain was in the mastoid region. Two males with S 4/5 involved had painful and difficult micturition during the eruptive stage.

Treatment was mainly symptomatic with powder, calamine lotion, or collodion, and aspirin, aspirin compounds, or "nepenthe" as required. Four cases received ultra-violet rays, three systemic penicillin (two oral and one parenteral), and one chloramphenicol at the onset of the rash. The reasons for giving these additional treatments were more experimental than clinical. In no case was the course of the disease apparently altered thereby, but it is interesting to note (see below) that two cases treated with ultra-violet rays developed post-herpetic pain and two did not, and the one case treated with parenteral penicillin developed post-herpetic pain, as did also the one treated with chloramphenicol.

The vesicles dried into scabs which separated in from five days to six weeks. Although the cases often appeared in batches of two, three, or four, with intervals of up to six months without a single case, no association was established with known chicken-pox epidemics.

Pain lasting more than six weeks from the onset of the rash, and severe enough to require advice or treatment, occurred in five cases—that is, one in 14. Three were males and two females. In each case this post-herpetic pain was a continuation of the eruptive pain and was of the same nature. In these five cases the ages and situation of the rashes were: aged 73, maxillary; aged 70, supraorbital; aged 70, occipital; aged 68, intercostal; aged 56, intercostal.

hypersensitivity the serum rarely contains sensitizing antibody in amount sufficient to sensitize the previously normal body." He further quotes the work of Chase (1945), who reported that guinea-pigs injected with a leucocytic peritoneal exudate derived from tuberculous hypersensitive guinea-pigs acquired, within one to three days, the capacity to react to tuberculin. This reactive capacity was of brief duration, and, curiously, could be conferred only by living cells. Freezing the cells of the exudate, or heating them to 48° C. for fifteen minutes, destroyed their sensitizing power.

The prompt reaction to the B.C.G. with local tissue destruction in our patient, who received *whole blood*, was identical with the Koch reaction, which is usually ascribed to a state of hypersensitivity (Rich and McCordock, 1929; Rich, 1930). Clawson (1933) found that the lesions produced by intravenous B.C.G. were more extensive and severe in previously sensitized rabbits than in the control animal.

Apart from the speeding up of the appearance and stages of the local reaction which we describe, there is no definite evidence that the B.C.G. vaccination was more pathogenic than usual. The subsequent gland abscess could fairly be regarded as a typical accepted complication. However, the extent of the induration (21 mm. diameter) resulting from 1/1,000 tuberculin is much in excess of the average seen after B.C.G. conversion. The glandular complication was not prevented by passive immunity, though the local fixation effect of agglutinating antibody received from the donors might have waned before a natural cellular reaction had time to develop.

Conclusion

In a case such as we have described one has to decide which of the following factors played a part: allergy and/or immunity; if allergy, from the cells and/or serum of a tuberculin-positive donor; if immunity, from a passive humoral agglutinating antibody reaction, with or without a cellular reaction.

Having regard to the opinions quoted above and to our investigations, the reaction appears to have been an immediate allergic phenomenon without obvious evidence of immunity, and was probably induced by the cells in the 600 ml. of refrigerated, but not frozen, blood received from the tuberculin-positive donors.

When, as at present, the study of allergy is of such general interest and importance, and when, in addition, immunization as a preventive measure on the one hand and desensitization as a therapeutic measure on the other are being advocated, this case, though a single one, seems to be worthy of record and consideration.

It is hoped that parallel findings by others will also be reported.

We wish to thank Dr. John Wallace, regional director, Glasgow and West of Scotland Blood Transfusion Service, for his willing help, and our colleagues in the Lanarkshire Tuberculosis Service for carrying out the examination of the donors.

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In the supraorbital case it has so far lasted for over three years, but in the others it tended to remit within 18 months. Two of these five had severe pre-herpetic pain, the other three had none.

No effective treatment for post-herpetic pain was discovered. The methods tried were analgesics, including aspirin and its compounds, opium, nepenthe, levorphanol tartrate, pethidine, local injections of procaine, deep x rays (two cases), short-wave therapy, ultra-violet rays, ultrasonics (one case), E.C.T. (one case), liver, posterior pituitary injection, ergotamine tartrate, dextroamphetamine sulphate, the chlorpromazine. The deep x-ray therapy was given to the supraorbital and one intercostal case, the ultrasonotherapy and E.C.T. to the supraorbital case, the latter on account of mental depression. No relief of pain resulted.

Of these five cases with post-herpetic pain, as stated above, two had ultra-violet rays at the onset of the rash, one had parenteral penicillin at the onset, and one had chloramphenicol at the onset. No significance is attached to this, except to indicate that these measures did not prevent the development of post-herpetic pain. Four of the five were emotionally unstable individuals, and the fifth developed generalized neurodermatitis 18 months after the shingles. Eight others, in whom post-herpetic pain did not occur, were also regarded as neurotic or emotionally unstable.

I am indebted to Sir Charles Symonds for advice and criticism.

L. J. BARFORD, D.M.

Herpes Zoster after Fractured Spine Complicating E.C.T.

Since its introduction by Cerletti and Bini in 1938 electric convulsion therapy (E.C.T.) has been used widely and increasingly in the treatment of various forms of mental illness. Although vertebral fractures are now a well-recognized complication of E.C.T. they were not described until four years after its inception, because they are largely symptomless and discoverable only by radiography (Cook, 1944). The *British Medical Journal* (1954) states that the incidence of vertebral fractures as a result of unmodified E.C.T. is high, and Lingley and Robbins (1947) and Meschan *et al.* (1950) give the incidence as 21.3% and 35.4% respectively. All workers agree that complications of the vertebral fractures are extremely rare (Kitching, 1954). A case is described below in which herpes zoster appeared after a fractured spine resulting from E.C.T. I have been unable to trace any record in the literature of the occurrence of this particular sequence.

CASE REPORT

A man aged 29 suffering from schizophrenia was admitted to hospital on June 6, 1955. He was recommended for a course of E.C.T. Routine radiography of the spine showed no abnormality. He received his first treatment on June 27. After the third treatment, on July 1, he complained of pain in his back, and lateral and antero-posterior x-ray films were taken of his thoracic spine.

The x-ray report stated: "There is a slight upper dorsal scoliosis and there is wedging of the bodies of D 4 and 5 and to a lesser extent of D 3, the appearances being of a compression fracture. D 3 is certainly involved, as there is some irregularity of its anterior margin. In the antero-posterior projection there also appears to be minimal lateral wedging of D 6."

No further E.C.T. was given and the patient was seen by the orthopaedic surgeon, who advised no special treatment. The pain in the back gradually spread to the front of the chest, and on July 8 the patient reported the appearance of a rash running from the middle of his chest under the left armpit and on to the middle of the back as far as the spine. On examination there was an eruption of grouped vesicles upon an inflamed base involving the left second and third intercostal nerves. A diagnosis of herpes zoster was made. One week later the lesions were crusted for the most part, but the patient still complained of pain

which was severe enough to require an analgesic to enable him to sleep. By the end of July most of the crusts had fallen off and the pain had practically gone. However, the patient refused any further treatment, although his mental condition had not yet cleared up.

COMMENT

Herpes zoster appearing after injury to the vertebrae in the region of a ganglion was observed by Mitchell and Keen as far back as the American Civil War (Klauder, 1947), and Roxburgh (1941) states that it often follows injuries to the spine. In view of the vast number of patients treated with E.C.T. in the last 17 years and the high incidence of vertebral fractures as a result of this therapy it is rather surprising that there have been no cases similar to the one described above. It must be mentioned, however, that Kitching (1954) was impressed by the discrepancy of the figures given by different investigators for the occurrence of fractured spine following E.C.T. He says that these figures show all too convincingly that the radiological diagnosis of vertebral fractures is by no means an exact science.

As regards the zoster being a chance occurrence, Chalker and Martin (1932) formulated two circumstances in order to associate trauma with the presence of herpes zoster. Firstly, herpes zoster should appear in the region or within the range of the injury. Secondly, the disease should appear within one day to one month after the injury. These two conditions were satisfied in the above case.

The appearance of zoster following trauma to a nerve ganglion is ascribed to the awakening into activity of a dormant chicken-pox virus within the ganglion (Sequeira *et al.*, 1947), and in the case here described there was a history of chicken-pox occurring at about 8 years of age.

Finally, it may be mentioned that Meschan *et al.* (1950) reported that the incidence of vertebral fracture (radiologically shown) was reduced from 35.4% to 19.5% when curare was administered, and Kitching (1954) states that in all situations where time and space permit modified E.C.T. should be encouraged. In my case the use of modified treatment would possibly have prevented the occurrence of the fractured spine and hence averted the resulting herpes zoster.

I thank Dr. Edward Marley for his valuable advice in the preparation of this report.

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The Food and Agriculture Organization has established a number of fellowships with the object of fostering research in the field of food and agriculture. These fellowships will be called after André Mayer, who was closely associated with scientific research in France as well as with work in the international field, particularly in relation to F.A.O. The fellowships will be awarded for advance training in research work in fields of particular interest to member countries and to F.A.O. as a whole. Only persons with the highest qualifications who have already shown a strong inclination and a real aptitude for research and who would benefit from additional training will be selected. Five or six fellowships will be offered in 1956 and will be spread over the whole field covered by F.A.O.—i.e., agriculture, agricultural economics and statistics, fisheries, forestry, and nutrition. Further information can be obtained from the Secretariat of the F.A.O. National Committee for the United Kingdom, c/o Ministry of Agriculture, Fisheries, and Food, 10, Whitehall Place, London, S.W.1.

Reviews

SECRETION OF URINE

Modern Views on the Secretion of Urine. The Cushny Memorial Lectures. Edited by F. R. Winton, M.A., M.D., D.Sc. (Pp. 292+vii; illustrated. 30s.) London: J. and A. Churchill Ltd. 1956.

Modern Views on the Secretion of Urine is a series of ten lectures delivered last year at University College, London, to commemorate the work of Cushny, who occupied the Chair of Pharmacology at University College from 1905 to 1918. Naturally the lectures are mainly physiological (it should cause no surprise nowadays that some were given by clinicians), but they are readable and almost wholly understandable by any physician interested in renal function, and there is important material here for anyone in any branch of medicine wishing to revise his knowledge of renal physiology. Some of the lecturers (Dicker on clearances; Nabarro on the adrenal cortex and renal function, for instance) have summarized the present knowledge of their subject. Others (such as McCance and Widdowson on renal function in the first two days of life, and Harris on genetic aspects of tubular function) have dealt with an aspect of renal function to which they have themselves made major contributions. L. E. Bayliss on the process of secretion gives the most fundamental lecture and perhaps the most difficult for the pure clinician, though this is no criticism of its exposition. The editor, Professor Winton, includes in his own lecture on "Pressures and Flows in the Kidney" a very interesting account of Pappenheimer's cell-separation theory of autoregulation in the kidney. This is the first readily accessible account of this interesting work. According to this theory the vascular system of the kidney is so designed that the plasma and cells of the circulating blood become separated to a variable degree, the plasma-rich blood being skimmed off to perfuse the glomerulo-tubular systems, while the viscous, concentrated cell suspension is shunted through shorter channels. There is a good deal of evidence to support this idea, which would explain some peculiar facts of renal blood flow, including its virtual independence, within a wide range, of the systemic blood pressure; for rise of blood pressure would increase the separation of cells and plasma and thereby steeply increase the viscosity of the cell-rich stream, thus increasing the vascular resistance.

The last two lectures are closest to the direct concern of the clinician—namely, Rosenheim on renal failure and Bull on osmotic diuresis in tubular necrosis. In a short review it is not possible to discuss the book in any greater detail, but, having referred to eight of the ten lectures, it seems a pity not to complete the table of contents by mentioning the excellent contributions of Grace Eggleton on tubular reabsorption and secretion, and of Mary Pickford on anti-diuresis.

ROBERT PLATT.

BACTERIAL ENDOCARDITIS

Subacute Bacterial Endocarditis. By Andrew Kerr, Jr., M.D. (Pp. 343+xviii. 47s. 6d.) Springfield, Illinois: Charles C. Thomas. Oxford: Blackwell Scientific Publications. 1956.

This monograph in the American Lecture Series reviews the whole subject of subacute bacterial endocarditis exhaustively, and the 800 references, from many of which there are quotations in the text, illustrate the author's industry in collecting in one volume nearly all the published facts about this disease. The approach to the clinical manifestations is historical, and the author is at pains to establish priority of description of the various eponymous signs such as Osler's nodes and Roth's spots. The difficulty of differential diagnosis of bacterial endocarditis and rheumatic fever in young adults is emphasized, though the statement that anaemia is more severe in bacterial endocarditis is contrary to most experience in this country. The difficulty of diagnosis of bacterial endocarditis, particularly in elderly patients when signs of renal or central nervous system involvement

may predominate, is discussed, but the section on differential diagnosis is short, the author preferring to treat patients early with full doses of antibiotics if there is a reasonable clinical possibility of this disease being present. Treatment is planned according to the clinical response of the patient, and little reliance is placed on laboratory tests of sensitivity of the infecting organism. There are detailed instructions for treatment of the different bacteriological types of bacterial endocarditis, but it would seem difficult to justify the routine use of streptomycin with penicillin for all cases. In all other respects the treatment advised is in accordance with the usual practice in this country, and the danger of using predominantly bacteriostatic antibiotics such as chlortetracycline, chloramphenicol, and oxytetracycline is stressed. The mortality from subacute bacterial endocarditis is still high, although failure to control the infection is uncommon, and the emphasis throughout this book on early diagnosis and treatment should help to decrease the incidence of heart failure, vascular catastrophes, and renal failure, which are now the chief causes of death.

This book can be recommended both as a work of reference with an excellent bibliography and also to provide practical help in the diagnosis and treatment of bacterial endocarditis.

GRAHAM HAYWARD.

ELECTROCARDIOGRAPHY

Clinical Electrocardiography. Part I. The Arrhythmias, with an Atlas of Electrocardiograms. By Louis N. Katz, A.B., M.A., M.D., F.A.C.P., and Alfred Pick, M.D. (Pp. 737; illustrated. £6 10s.) London: Henry Kimpton. 1956.

Although this volume is really the first section of the third edition of *Electrocardiography*, now divided into two parts, it is virtually a new book and should be regarded as such. The change of title to *Clinical Electrocardiography* emphasizes the fact that it is not just another atlas of electrocardiograms illustrating the arrhythmias, but a monograph on the subject as a whole, the electrocardiograms serving to illustrate the text. This is a refreshing change which should have put electrocardiography in its proper place as a clinical tool, but one is left with an uneasy feeling that the graphs are still pre-eminent and the patient little more than a volume conductor. A glance at the 16-page index emphasizes this point. As a descriptive atlas the book is excellent in respect of both the many illustrations and their detailed captions; as a monograph on the arrhythmias from which so many patients suffer it is too incomplete to be really helpful. Nevertheless this new edition has an improved shape, and can be highly recommended to students of electrocardiography, and to clinicians who feel in need of an advanced refresher course in the electrocardiographic diagnosis of the arrhythmias.

PAUL WOOD.

PRACTICAL HAEMATOLOGY

Practical Haematology. By J. V. Dacie, M.D., M.R.C.P. Second edition. (Pp. 229+vii; illustrated. 20s.) London: J. and A. Churchill, Ltd. 1956.

A comparison of the first and second editions of Dr. Dacie's book shows how greatly haematology has increased in complexity, even in the last quinquennium. Less than half the book is occupied by the classical methods of counting and staining the blood cells and marrow smears. A wide range of serological techniques has been devised for the study of the haemolytic anaemias, radio-isotopes are routinely used for the estimation of the blood volume and the red-cell survival, and plasma proteins and haemoglobin are studied by electrophoresis and chromatography. A battery of tests has been devised for the investigation of the haemorrhagic disorders, and blood grouping can at times be a highly elaborate procedure needing the resources of a reference laboratory. Dr. Dacie has achieved a miracle of compression in bringing so much precise knowledge in such a small volume. There are over 350 references, so that it is easy for anyone who wishes to consult the original papers. This is not only a practical book, but a book of great scholarship, and Dr. Dacie has once more put haematologists in his debt.

L. J. WITTS.

BRITISH MEDICAL JOURNAL

LONDON

SATURDAY OCTOBER 13 1956

TROUBLESOME STAPHYLOCOCCI

Staphylococcal infections are fast becoming the most troublesome and disturbing with which the epidemiologist and clinician have to contend. The staphylococcus has almost entirely replaced the haemolytic streptococcus as a cause of epidemic hospital sepsis. One reason for this is clear—that streptococci are unable to acquire resistance to antibiotics, whereas staphylococci have an almost unparalleled capacity for doing this. Few hospitals can have been so fortunate as to escape trouble of this kind, particularly in their surgical and maternity units; in many the results have been highly inconvenient and in some frankly disastrous. Dr. Walsh McDermott, of Cornell University Medical College, New York, one of the leading authorities in the United States on the clinical use of antibiotics, considers this situation from a detached and philosophic standpoint in a paper published in our opening pages this week. He rightly points out that this and two other infections which are rather less amenable to treatment have been thrown into high relief by the therapeutic triumphs of the past few years. He then asks whether the present ravages of staphylococci are attributable to a change in them or change in the patient. In favouring the second hypothesis, he observes that patients are now being subjected to many new surgical and even some medical procedures calculated to diminish their resistance to infection. Perhaps not everyone will agree on whether he is right in concluding that the properties of staphylococci have remained unchanged. There is at least a strong suspicion that antibiotic-resistant staphylococci have a greater capacity for epidemic spread than sensitive strains and perhaps a different capacity for producing lesions. This was expressly postulated by C. W. Howe¹ on the basis of his study of the increasing incidence of surgical infections. Antibiotic resistance is not an entirely independent character unrelated to all others; a large majority of resistant strains belong to one of the main phage groups. Further, there is at least a suspicion that acute membranous staphylococcal enterocolitis, perhaps the most serious of all these infections, can be caused only by certain

strains and not by others, just as only certain strains form enterotoxin and can thus cause food-poisoning. There is a lot to be said for the idea that the use of antibiotics is selecting a tougher race of these organisms than those with which we had to contend before. It is also possible, though difficult of experimental proof, that the appetite of the staphylococcus grows by what it feeds on, for frequent transference from host to host enhances the virulence of haemolytic streptococci, and to a less striking degree that of other species as well.

McDermott does not believe that staphylococcal pneumonia is increasing in frequency. This belief is contrary to the experience of Drs. W. Hausmann and A. J. Karlish, who record on p. 845 this week that 18 out of 122 consecutive cases of pneumonia treated in Reading during 1952–4 were due to this infection. These occurred apart from any known epidemic of influenza, to which staphylococcal pneumonia is so often secondary. This series of cases strongly emphasizes the value of bacteriological examination of sputum and of determinations of antibiotic sensitivity in a species in which this property is so variable. But for assiduous work of this kind, all these patients might not have recovered.

In another paper on these troublesome organisms, at p. 840, Professor Ronald Hare and Dr. C. G. A. Thomas, of St. Thomas's Hospital, describe an experimental study of one of the mechanisms by which hospital cross-infection takes place. It is well known that in any unit where this infection exists large numbers of the staff may be entirely symptomless nasal carriers. Precisely how they disseminate the organisms is a matter of much importance. The usual belief is that they are expelled in droplets of secretion, and masks are extensively worn with the object of preventing this. Hare and Thomas's work shows that their distribution on the person of the carrier is widespread and that dissemination must be largely by particles of dust from contaminated skin and clothing. Whereas breathing, coughing, talking, and even sneezing expelled few staphylococci from the noses of carriers, the organisms were frequently recovered from various areas of skin, always from handkerchiefs and the pockets in which they were kept, and often from items of clothing on not only the upper but the lower part of the body. The shedding of staphylococci from these surfaces was studied under various conditions in a cubicle in which culture plates were exposed. Even an almost naked subject liberated them, but much larger numbers were liberated when clothing was shaken or merely moved to the extent required in dressing and undressing. Perhaps the most disturbing result of these experiments was to

¹ Howe, C. W., *New Engl. J. Med.*, 1954, 251, 411.

² MacCabe, A. F., and Gould, J. C., *Scot. med. J.*, 1956, 1, 223.

show that wearing a sterile gown over ordinary clothing does not prevent dissemination of infected particles. Another highly disquieting observation was that the act of washing the hands scattered water droplets containing staphylococci, which were cultivated in large numbers on plates exposed in the four corners of the cubicle.

These observations demand a wholesale revision of our ideas about the effects of the nasal carrier state. They may seem also to require an intensification of aseptic precautions, especially in operating theatres. It would certainly be better if more were known about the factors underlying the development of the nasal carrier state, and if measures could be devised for preventing its development. Alternatively it may be susceptible to treatment. The use of most of the major antibiotics for this is inadvisable because of the danger of inducing resistance, but A. F. MacCabe and J. C. Gould² mention having cleared up two carriers by the application of 1% "hibitane" cream, and advise this treatment for carriers of antibiotic-resistant strains. Some such method which goes to the root of the matter would be far preferable to the elaborate precautions which these new observations seem to demand, at least when any surgeon or nurse is a carrier.

ANAESTHETIC DEATHS

The number of deaths every year associated with anaesthesia is sufficiently large to be a matter of some concern. Indeed, the latest report of the Chief Medical Officer of the Ministry of Health¹ for the first time devotes a section to this problem: in 1953 there were 562 deaths associated with anaesthesia, or about 1 per 1,000 of all deaths in the population.

The circumstances surrounding such deaths have in the past often eluded exact definition. The causes indicated on the death certificate sometimes fail to give a clear lead, since they may come from persons not in possession of the full details of the anaesthetic procedure and thus unable to fill in the pharmacological and physiological background to the death. Nor has public inquiry by coroners' courts advanced scientific knowledge of these deaths. Simple analyses of mass statistics also seem unlikely to yield helpful information. In one such analysis² relaxant drugs appeared to be incriminated, but criticism of this investigation not only pointed to the unreliability of

such methods in these circumstances but emphasized the importance of considering many factors, often intangible, connected with the administration of anaesthetics. Thus the experience and training of the anaesthetist, and whether proper efforts at resuscitation were carried out, are as important as what particular anaesthetic drugs were used. Fully aware of their responsibilities in this matter, the anaesthetists themselves, through the Association of Anaesthetists of Great Britain and Ireland, initiated in 1949 a scheme to encourage the voluntary reporting of anaesthetic deaths. A standard questionnaire was made available to anaesthetists, who were invited to return details of anaesthetic deaths with which they were connected. The reports were anonymous but signed by local senior anaesthetists to vouch for authenticity.

A committee was set up to consider these deaths, and it has now issued its report³ on the first thousand collected. In nearly 600 of these cases the death is considered to be entirely or to a large extent the result of anaesthesia. The report discusses with great clarity and pungency, but with commendable restraint, the various categories into which these deaths fall. Opinions and facts of far-reaching importance are put on record, and it is to be hoped that every doctor and hospital administrator will read the report in its original. It is to be reprinted separately.

Certain parts of the report stand out. The danger of inhaling vomit has always been known. The extent to which this cause—the commonest single one—is still responsible for death is striking. A particularly distressing occasion is during labour. Indeed, in operative obstetrics anaesthesia has now become the commonest cause of maternal death.^{4 5} The report also reveals the frequency with which the intravenous barbiturates cause death. This is the price being paid by the community for its insistence (real or assumed) on an intravenous induction of anaesthesia. Insufficient care of the patient in the post-operative period also takes a heavy toll; death is then usually due to such causes as respiratory obstruction or depressed breathing. Many other less common causes of death are given. Pre-operative obstruction of the respiratory tract, endotracheal anaesthesia, convulsions, the administration of antidotes and stimulants, the induction of hypotension and spinal anaesthesia—these are but a few of the many occasions or causes listed and discussed.

Few readers will disagree with the report when it repeatedly points to lack of skill, poor equipment, and insufficient medical or nursing supervision as paramount factors that lead to so many deaths. Too often

the acute observer can see unconscious patients left unattended or in the care of a junior probationer, wards without the means of efficient suction, powerful drugs given without enough thought to their pharmacological effects, or outmoded techniques used. British anaesthesia stands exceptionally high in world esteem, and this report is an indictment which must be taken note of. In the first place a detailed review is required by regional hospital boards of their arrangements for providing anaesthesia in the hospitals. In doing this certain pertinent questions might be asked: Is the number of specialist staff adequate? Are too many junior trainees being employed without sufficient supervision? Is every modern requirement for safety, such as suction, and proper means of ventilation of the lungs in cases of respiratory failure, available wherever anaesthetics are administered or unconscious patients treated? Is there sufficient staff, both anaesthetic and nursing, to supervise these patients? Is the anaesthetic staff consulted about the arrangements for providing service and have their recommendations been considered? Ultimately the prevention of anaesthetic deaths will be a matter for better training of anaesthetists and nurses—particularly the former, for the report makes clear that more skill and experience would have averted many of those recorded. Anaesthetists have realized that all is not well with the training of young specialists, and a welcome novelty was the holding of a symposium on anaesthetic teaching at the Postgraduate Medical School recently. Meanwhile, good is certain to result from the publication of this report.

A NEW LEASE OF LIFE

C. S. Beck and his colleagues¹ recently reported that a doctor suffering from ischaemic heart disease who died from a sudden heart attack at the moment of leaving hospital had been successfully resuscitated by cardiac massage and defibrillation. He finally left hospital feeling fit enough to return to his practice. Another similar case was reported by L. B. Reagan and his colleagues,² in which ventricular fibrillation developed during the recording of an electrocardiogram and the patient was resuscitated by cardiac massage and defibrillation. With the rapid development of new techniques in cardiac surgery, the treatment of cardiac arrest and ventricular fibrillation has become of increasing importance, and much experience in treating these conditions has been gained, both in animal experiments and

during cardiac operations. The possibility arises of applying this experience to the treatment of cardiac arrest and ventricular fibrillation when these occur spontaneously in patients with ischaemic heart disease or Stokes-Adams disease, and Beck and Reagan and their colleagues and also P. M. Zoll and colleagues³ have now demonstrated that resuscitation from these terminal arrhythmias is possible.

The restoration to life of a patient who in normal circumstances with conservative treatment would certainly have died raises the question how far such treatment is generally applicable. Two main problems have to be considered—first, the feasibility of the method, and secondly the chances of successful resuscitation in each individual patient. Whatever the method of resuscitation, immediate treatment is of vital importance, and it is the lack of time for organization or preparation which more than anything else will limit the general applicability of the method. Cardiac massage through the open chest requires oxygen given under positive pressure by intratracheal tube, and it will only be possible to begin treatment within five minutes of the onset of the arrhythmia by a fortunate coincidence of circumstances or when the arrhythmia has been anticipated and a trained team is ready to begin resuscitation immediately. In addition an electrical defibrillator must be available without too long a delay. It would obviously be preferable to resuscitate the patient in an operating theatre, as in the case of Beck's patient, but patients only rarely collapse immediately outside an empty operating theatre. An attempt to carry out resuscitation by such means in the open ward might well prove intensely distressing to other patients in the ward and could certainly not be envisaged as a routine procedure: the privacy of a side room would appear essential. It seems, therefore, that this method of resuscitation could be carried out in hospital only in exceptional circumstances. Another method of resuscitation which has recently been used successfully is the application of the external cardiac pace-maker and the external defibrillator described by Zoll and his colleagues.^{3 4} This method has the advantage that it can be applied direct to the intact skin and there is no necessity to open the chest. On the other hand the apparatus and facilities for using it must be immediately available if successful resuscitation is to be achieved, and it is likely to be of use only when a fatal arrhythmia has been anticipated and preparations for resuscitation already made.

The second important consideration in deciding whether to attempt resuscitation must be the underlying pathological process responsible for the terminal arrhythmia. If it is known that the patient has had an extensive cardiac infarct, the chances of successful defibrillation must be small. In addition there is the possibility that, even if cardiac resuscitation is successful, the patient may be left with permanent mental impairment or indeed may never recover consciousness as a result of the prolonged period of cerebral anoxia. In some patients with ischaemic heart disease, on the other hand, who die suddenly and unexpectedly, the

¹ Report of Ministry of Health, 1954, Part 2, p. 165, H.M.S.O., London.

² Beecher, H. K., and Todd, D. P., *Ann. Surg.*, 1954, 140, 2.

³ Edwards, G., Morton, H. J. V., Pask, E. A., and Wylie, W. D., *Anaesthesia*, 1956, 11, 194.

⁴ Parker, R. B., *British Medical Journal*, 1954, 2, 65.

⁵ *British Medical Journal*, 1956, 1, 341.

¹ Beck, C. S., Weckesser, E. C., and Barry, F. M., *J. Amer. med. Ass.*, 1956, 161, 434.

² Reagan, L. B., Young, K. R., and Nicholson, J. W., *Surgery*, 1956, 39, 482.

³ Zoll, P. M., Linenthal, A. J., Gibson, W., Paul, M. H., and Norman, L. R., *New Engl. J. Med.*, 1956, 254, 727.

⁴ Zoll, P. M., Linenthal, A. J., Norman, L. R., and Belgard, A. H., *Circulation*, 1954, 9, 482.

heart at necropsy shows only small scattered fibrotic lesions with no major occlusion of a coronary artery and no clear area of cardiac infarction. These patients almost certainly die from ventricular fibrillation or cardiac arrest, and if this terminal arrhythmia can be aborted the heart should be capable of return to normal function. The report of these cases of successful resuscitation serves to emphasize that, though spontaneous cardiac arrest and ventricular fibrillation are usually terminal, they need not necessarily be so if facilities for courageous and energetic treatment are at hand.

ANTIBIOTICS AS FOOD PRESERVATIVES

Several uses have been found for antibiotics apart from the treatment of disease in man, animals, and plants. They are extensively used as food supplements for accelerating growth in young farm stock and poultry, an effect which is still imperfectly understood, although it appears to depend on some change in the intestinal flora. Again, as discussed at a recent conference in Rome and reported at p. 879 of the *Journal* this week, another use is for arresting or delaying the bacterial growth responsible for food spoilage. An odd example of this which has been suggested, though not, it would seem, adopted, is the addition of subtilin to canned foods to inhibit the growth of *Cl. botulinum*.¹

The principal field for this sort of treatment is meat, and there are several possible methods of applying it. The animal can be given a therapeutic dose of the antibiotic before slaughter, or the carcass can be perfused with a solution. No doubt the penetration so achieved would be most effective, but a simpler process has been found satisfactory and is now widely used in the United States, which is simply to dip meat and poultry in a solution. The most effective antibiotics, presumably because of their wide antibacterial spectrum, are chlor- and oxytetracycline (aureomycin and terramycin). The former is the active constituent in the "acronize" process, which includes citric acid as a stabilizer. The solutions contain 5 to 10 parts per million, and treatment with them prolongs the storage life of meat and poultry considerably. It is claimed that the minute amounts used are harmless to the consumer, and in any case are destroyed by cooking; that it would be necessary to eat an entire uncooked steer to get a therapeutic dose of the antibiotic, or to eat 2 lb. (0.9 kg.) of chicken daily for 70 years (whether cooked is not clear) to obtain half such a dose. Even shrimps and eggs are mentioned as benefiting from such treatment, and an important application is certainly the preservation of fish. The addition of chlortetracycline to the ice in which fish are preserved in trawlers should enable voyages to be extended by 7-10 days. The Department of Scientific and Industrial Research recently announced that this process was to be applied experimentally to the catch in a trawler which would subsequently visit Aberdeen, Grimsby, and Hull so that the trade could judge its effects.

¹ Anderson, A. A., *J. Bact.*, 1952, 62, 145.

The present law does not permit this process, but medical authorities may well be asked in the near future to decide whether it should do so. Apart from a general uneasiness about the increasing application of artificial processes in the food industry, or about entrusting such potent substances to people ignorant of their properties, is there any objection to the preservation of meat, poultry, and fish with antibiotics of the tetracycline group? It is true that the dose capable of being taken in a meal is very small, and there is no evidence—although perhaps this should be verified by *ad hoc* experiment—that exposure to minimal concentrations can elicit bacterial resistance. It seems unlikely that the consumption of such minute amounts could induce sensitivity, though this again seems to need confirmation. On the other hand, it is far from certain that the consumption of even minute amounts would be harmless in a person already sensitized by therapeutic doses. Possibly American experience will provide an answer to these questions before a decision is made here.

COLONIC MOTILITY

The colon is normally in a state of more or less continuous muscular activity as judged by the pressure changes recorded by small balloons introduced into it or by the more satisfactory system of open-ended tubes filled with saline and connected to electro-manometers. In 1941 H. F. Adler, A. J. Atkinson, and A. C. Ivy¹ showed that the human colon displays three different types of pressure waves, which correspond closely to what had been found earlier in the dog's colon.² Type I waves are simple monophasic waves lasting from 5 to 20 seconds and of low amplitude. Type II are also simple monophasic waves but of longer duration (12 to 60 seconds) and of greater amplitude. They are the major manifestations of muscular activity in the normal pelvic colon, occurring throughout two-fifths of the time of observation. It is probable that they represent localized circular contractions of the colonic wall which produce the appearances of "haustation" in barium enema radiographs. Type III waves are complex, with a change in the basal pressure, regarded as a "tonus" change, and with Type I or II waves superimposed on this. They occur only infrequently in the normal colon and last from one to four minutes. They are thought not to be propulsive waves but possibly to assist in absorption by changing the hydrostatic pressure.

Similar studies made on patients with ulcerative colitis have yielded a picture which differs sharply from the normal.^{3,4} The three types of wave observed in normal subjects are either absent or much reduced in number. However, another type of wave (Type IV) is present in these patients. These are unusually large waves, which are apparently propulsive in nature and directly related

¹ Adler, H. F., Atkinson, A. J., and Ivy, A. C., *Amer. J. dig. Dis.*, 1941, 8, 197.
² Templeton, R. D., and Lawson, H., *Amer. J. Physiol.*, 1931, 96, 667.
³ Spriggs, E. A., Code, C. F., Bergen, J. A., Curtiss, R. K., and Hightower, N. C., Jr., *Gastroenterology*, 1951, 19, 480.
⁴ Kern, F., Jr., Almy, T. P., Abbott, F. K., and Bogdonoff, M. D., *ibid.*, 1951, 19, 492.
⁵ Davidson, M., Sleisenger, M. H., Almy, T. P., and Levine, S. Z., *Pediatrics*, 1956, 17, 807.
⁶ *ibid.*, 1956, 17, 820.
⁷ Lium, R., *Arch. Intern. Med.*, 1939, 63, 210.

to the occurrence of diarrhoea. The absence of the normal Types I, II, and III waves is regarded as responsible for the lack of haustration usually noticed on barium enema films of patients with active ulcerative colitis.

Recent studies at Cornell by M. Davidson and colleagues^{5,6} extend these observations to children. Data obtained from 40 normal children agree closely with those for adults. In cases of acute infantile diarrhoea these workers observed the characteristic propulsive waves already noted in adults with ulcerative colitis. They also observed similar waves among those children who responded to oral magnesium sulphate, subcutaneous mecholyl, or the introduction of iced water into the rectum by developing abdominal pain followed by defaecation. On the other hand they did not find these waves in seven children with ulcerative colitis of at least one year's duration. However, none of these seven children was suffering from diarrhoea at the time of study, though three of them were passing blood in the stools and all had characteristic sigmoidoscopic appearances. It would thus appear that Type IV waves are not an essential feature of ulcerative colitis but are to be found whenever diarrhoea occurs in this and other diseases. This is of interest in relation to the view originally put forward by R. Lium⁷ that ulcerative colitis may be due to muscular spasm of the colon with secondary necrosis and ulceration of the mucosa. The findings of Davidson and his colleagues would favour the view that the excessive colonic propulsive activity which results in diarrhoea is the consequence of an inflamed colonic mucosa and not the cause of it.

INFANTILE GENETIC AGRANULOCYTOSIS

From time to time doctors are puzzled by an undue, and indeed fatal, susceptibility to infection occurring in several members of a family. One disorder of this kind has now been defined as agammaglobulinaemia, in which the essential anomaly is an absence of gamma-globulin; in the idiopathic form this is probably due to a sex-linked recessive gene.¹ Another disorder has recently been defined in an isolated district of Sweden. In 1950 R. Kostmann² reported a sibship with congenital agranulocytosis; one infant, a girl, was fully studied, but three elder children had presented a similar clinical picture. There were also six normal children in the family and the parents were third cousins. He concluded that the disease was a hereditary "reticulosis" due to a recessive gene. Two earlier reports^{3,4} are clinically very similar, but in each case only one child in the family was affected. An extensive study of all branches of Kostmann's original family, recently reported by J. A. Böök and Kostmann,⁵ revealed three other branches of the family with a child who was affected and had been fully investigated; three further branches contained a child who died with essentially the same clinical picture,

¹ *British Medical Journal*, 1955, 2, 32.
² Kostmann, R., *Svenska LäkT.*, 1950, 47, 2861.
³ Hotz, A., *Z. Kinderheilk.*, 1941, 62, 529.
⁴ Tobler, W., and Buser-Piüss, E., *Ann. paediat. (Basel)*, 1942, 159, 258.
⁵ Kostmann, R., and Böök, J. A., *Acta. paediat. (Uppsala)*, 1956, 45, 64, Suppl. 105.
⁶ *ibid.*, 1956, 45, 34, Suppl. 105.

though not fully investigated in hospital. No fewer than 10 children, all of the same generation, were affected with this rare disease in this family, which stemmed from common great-great-grandparents and was much inbred. Two further families, one with one affected child and one with two affected sibs, were found in Sweden which were not clearly related to the original large family, but the parents in each case were blood relations and came from the same district as the large family. The proportions affected in these families leave little doubt that a recessive gene with full penetrance in the homozygous state is responsible for the condition. No evidence was found that the heterozygous parents were in any way abnormal.

Clinically the picture is uniform. In a few weeks or months the children develop multiple abscesses, mainly in the skin, and die within the first year. The infection can be temporarily controlled with antibiotics. Blood smears show agranulocytosis or severe granulocytopenia. The bone marrow shows an arrest of maturation of granulocytes at the myelocyte stage. This arrest is also seen in marrow cultures in the patient's plasma, but not in plasma from a normal child. The essential nature of the metabolic error is suggested by the finding originally made by B. Vahlquist and C. M. Plum that the maturation defect seen in culture in the patient's plasma may be corrected by adding the sulphur-containing amino-acid cysteine to the culture medium.⁶ The obvious next step is to try the effect of giving this amino-acid to a child suffering from the condition. An interesting point is why this rare and lethal recessive condition should be relatively common in one geographical area. It is presumably a chance effect; the recessive gene mutation occurred in a remarkably fertile family in this isolated area, which in the next few generations indulged in much cousin marriage, bringing the mutation to light.

PARALYTIC POLIOMYELITIS AND PHYSICAL ACTIVITY

Since the outbreak of poliomyelitis in 1947 there have been some changes in the epidemiology of this disease in Britain. The average age of the patients is higher than formerly and it seems that the involuntary muscles are now paralysed more often than when the disease was described as infantile paralysis. At one time it was very rare for more than one in a family to be attacked, but now multiple cases in a family are not uncommon. In some large localized outbreaks which occurred during the epidemic in 1947 it was found that the attack rate varied in different social groups, a higher proportion of children in the residential areas being infected than the children in the crowded central areas. This trend was not apparent in subsequent outbreaks and now environment is not thought to be a factor of any importance in the attack rate. Another belief that seemed to be well established was that paralysis was particularly likely to develop in patients who over-exerted themselves at the onset of the attack. Doubts of the truth of this hypothesis have been raised by the results obtained by I. N. Sutherland¹ from a

¹ Sutherland, Ian N., *Brit. J. prev. soc. Med.*, 1956, 10, 58.

large inquiry into the experience in Scotland during the four years 1950 to 1953. The number of cases of poliomyelitis in this series was 1,718, and consequently he was able to subdivide them by age groups and by degree of activity at onset of attack. In the younger children no association was found between physical activity after onset of illness and the degree of paralysis. Sutherland suggests that the apparent relationship between over-exertion and paralysis was due to age, since with increasing age there is a trend towards more severe illness, with greater physical activity before symptoms appear and less rest after the onset of symptoms.

THE KING'S FUND

King Edward's Hospital Fund for London has greatly varied and enlarged its beneficence, even as the problems with which it has to deal have changed their form since, nearly sixty years ago, the prince who afterwards became Edward VII established the Fund to help the metropolitan hospitals. Formerly its grants were made largely with a view to the promotion of the material efficiency of hospitals—uniformity of accounting, for example, and the drawing up of architectural codes. In more recent years it has recognized that its resources could be invested in people as well as in materials. It has taken to heart Sir Richard Livingstone's declaration that the growth of colleges and centres for adult residential study is one of the most interesting developments of post-war Britain, and it has established bursaries and training centres for ward sisters, hospital administrators, cooks and caterers, and, finally, for matrons, for whom it provides four-week refresher courses. Another piece of useful work is the nursing recruitment service which was established by the Fund sixteen years ago. Perhaps the most urgent nursing problem of the moment is the staffing of mental and mental-deficiency hospitals, and it is acknowledged that the recruitment service, while giving what help it can, is no more able to solve it than the hospitals themselves. Some idea of the urgency of the need may be gained from the fact that, while there are over 91,700 beds for male patients in mental and mental-deficiency hospitals, only 460 male nurses qualified in 1954. Last year was notable in the history of the Fund for the exceptionally large allocation of grants to mental hospitals. The amount granted was £250,000, to be used over the three-years period 1955-7, and a new chapter in the relationship between the Fund and the mental hospitals has thus been opened.

The Fund, as shown by its latest annual report, assists in many other directions, among them the personal aid service for the elderly. The emergency bed service is also a special feature of the Fund. It was founded twelve years ago and now has had over half a million applications. About 1,250 calls a week are accepted, varying very much, of course, with the season, and it is its proud boast that the average time required to see a successful admission through from the general practitioner's initial call is 27 minutes, not including the cases of infectious disease which are comparatively

easy to admit. It would be a great thing if this service merely resulted in saving the practitioner's time and vexation of spirit, but it has also proved an indispensable link between two partners of the medical service of London. Moreover, the calls upon the service provide an index of any rise or fall of sickness among the people of London, and thus serve to give the medical administrator timely warning of trouble ahead.

FLUOROHYDROCORTISONE

The substitution of a fluorine atom for a hydrogen atom in the hydrocortisone molecule has yielded 9 α -fluorohydrocortisone, or fludrocortisone, which turns out to differ from hydrocortisone in some important respects. First, its effect on the excretion of sodium and potassium is so marked that it is doubtful whether systemic administration is ever likely to be indicated. Secondly, it is remarkably more effective quantitatively than hydrocortisone when applied to the skin. Fludrocortisone lotion and ointment, now appearing on the market in Britain, have been available for nearly two years in the U.S.A. and have been carefully assessed by various workers, whose results have reached close agreement.^{1,2}

The optimum concentration of the hormone in either lotion or ointment is 0.1%. In this concentration it has been found effective slightly more often than 1% hydrocortisone, but the range of disorders in which it is beneficial is exactly the same. (The cost of 0.1% fludrocortisone is also about the same as that of 1% hydrocortisone.) Individual cases respond differently, however, some doing better on fludrocortisone, and some, though fewer, on hydrocortisone. The base also may have considerable influence, so that a trial of local steroid therapy in any case should not be abandoned until both compounds in various bases have been given. Broadly, the best results are obtained in localized anogenital pruritus, otitis externa, and eczemas of all kinds, including infantile and atopic eczema. Eruptions of the hands and feet do not usually respond so well, psoriasis and lichen planus not at all.

An advantage of hydrocortisone locally applied is that systemic effects are never seen; the same cannot be said of fludrocortisone, the systemic effects of which may be troublesome if large areas are treated, particularly if the skin is denuded. These effects may be countered by a low-salt diet and the administration of potassium, but in general it is evidently better to avoid fludrocortisone when large areas are affected and also in cases of heart failure, renal disease, or when some other condition likely to cause oedema is present.³

Combinations of steroids with antibiotics are still under trial. Such applications may be useful in cases where superficial infection is superadded, and there is no serious objection to them.

¹ Witten, V. H., Sulzberger, M. B., Zimmerman, E. H., and Shapiro, A. J., *J. Invest. Derm.*, 1955, 24, 1.

² Robinson, H. M., Robinson, R. C., and Cohen, M. M., *Bull. Sch. Med. Maryland*, 1955, 40, 72.

³ Fitzpatrick, T. B., Griswold, H. C., and Hicks, J. H., *J. Amer. med. Ass.*, 1955, 158, 1149.

REFERRALS IN GENERAL PRACTICE

BY

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The primary objects of the investigation described in this paper were two in number: (1) to examine the reasons for which patients may be referred by a general practitioner to his consultant and specialist colleagues; and (2) to discover what functions are most required by the patient and his doctor from the hospital service.

Analysis of the results has not only answered these questions, it has also provided further evidence of the high incidence of psychoneurosis and stress disorders. This study was based on a single practice.

The Practice

The practice is centred on a part of London where all social classes are represented. A near-by colleague and I deputize for each other for one half-day each week, alternate week-ends, and holidays, and with this arrangement it is a simple matter to keep complete records.

There is a fairly large turnover of patients, as people are constantly moving into and out of this district, and this may account for the high percentage of the practice population seen each year. A number of temporary residents are included in the study.

Table I shows the size of my National Health Service list for the three years 1951, 1952, and 1953, and Table II shows the number of patients entering and leaving the practice during this time. I estimate that some 85% of the practice population consult me each year.

TABLE I.—Number of Patients on National Health Service List, and Temporary Residents for 1951-3

For Quarter Ending:	1951		1952		1953	
	On List	Temp. Res.	On List	Temp. Res.	On List	Temp. Res.
Mar. 31 ..	1,217	18	1,339	19	1,409	19
June 30 ..	1,265	15	1,355	18	1,425	11
Sept. 30 ..	1,272	11	1,341	17	1,486	19
Dec. 31 ..	1,272	15	1,386	11	1,515	12

Average No. of patients "at risk" each year=1,370-1,355 on list and 15 temporary residents.

TABLE II.—Number of Patients Joining and Leaving List in 1951-3

	1951	1952	1953
Joining list ..	376	430	401
Leaving list ..	250	314	272

In an analysis of the clinical records of eight practices during the period April, 1951, to March, 1952, Logan (1953) found the number of consultations per 100 practice population to vary from 287 in a rural practice to 468.9 in a "lower working-class neighbourhood."

If this method of expressing the rate of consultations is used in my practice it works out at 321 consultations per 100 practice population. In Logan's survey the two practices with rates per 100 nearest mine were in North-east London (338.8) and in "a better working-class practice in Norwich" (331).

The number of consultations in my practice made during the years 1951-3 is shown for each year and place of

TABLE III.—Number and Place of Consultations for each Year

Consultation	1951	1952	1953	Total	%
In surgery ..	3,125	3,328	3,648	10,101	76.5
On visit ..	919	1,021	1,167	3,107	23.5
Total ..	4,044	4,349	4,815	13,208	100

consultation in Table III. It is interesting to note that the average number of consultations per 100 practice population per annum for the three years is 330.

Logan found that for all eight practices in his survey the average attendance rate at the doctor's surgery was 68%. From these figures it would seem reasonable to say that the behaviour of my patients is very similar to that in the practices which formed the basis for Logan's survey. It is certainly true that the general incidence of illnesses classified in the usual groups is much the same in my practice as in others that have been recorded and published.

The Investigation

My daybook contains a record of all patients seen, and the material for this investigation was obtained from this source.

By "referral" I mean that a patient was referred to a consultant or specialist at a hospital or clinic, or in a small number of instances by private arrangement between the patient and the consultant. In all cases, however, the patients were registered with me under the National Health Service. A patient seen by a consultant with me at a domiciliary visit is also here accepted as a referral. Patients referred to a casualty department of a hospital are also included under this term.

Throughout this paper the figures given (unless otherwise stated) are for referrals and do not indicate actual patients. All such referrals during the three years 1951-3 were determined from the daybook, and total 1,225. Table IV shows their distribution as in-patients, out-patients (including those referred to casualty departments), and those seen on domiciliary visits; the figures are given separately for medical and surgical conditions.

TABLE IV.—Analysis of 1,225 Referrals, According to Sex, as In- and Out-patients, and Domiciliary Consultations, for Medical and Surgical Conditions during 1951-3

	No. of Referrals for Medical Conditions			No. of Referrals for Surgical Conditions			Total	%
	In-patient	Out-patient	Dom. Consn	In-patient	Out-patient	Dom. Consn		
Male ..	30	173	17	31	267	14	532	43.4
Female	31	207	29	24	382	20	693	56.6
Total	61	380	46	55	649	34	1,225	100
	487			738				

TABLE V.—Distribution of 860 Patients According to Sex and Age Group

Sex	0-14	15-44	45-64	65+	All Ages	%
Male {No. ..	53	227	63	42	385	44.8
{% ..	13.7	58.9	16.5	10.9		
Female {No. ..	58	248	112	57	475	55.2
{% ..	12.3	52.1	23.4	12.2		
Total {No. ..	111	475	175	99	860	100
{% ..	12.8	55.2	20.3	11.7		

TABLE VI.—Percentage Distribution of Practice Population According to Sex and Age Group, as Calculated in June, 1955

Sex	0-14	15-44	45-64	65+	All Ages
Male ..	10.6	59.7	20.8	8.9	46.1
Female ..	12.9	50.1	24.4	12.6	53.9
Total ..	11.8	54.7	22.7	10.8	100

During the three years under review the actual number of patients referred was 860. Their distribution according to sex and age group is shown in Table V. The percentage incidence of patients according to sex and age group in the practice population was recently calculated in preparation for participation in the Morbidity Survey which is being conducted by the College of General Practitioners (1955) in collaboration with the Registrar-General's Department. The findings are shown in Table VI. Comparison of these

figures shows a fairly even distribution of all age groups among the referrals, there being only a slight relative reduction in the number of males in age group 45-64, with a slight increase in the males in age group 65+ referred.

The large majority of these 860 patients referred attended hospital only once or twice each; only a small number were referred three or more times each. The figures are shown in Table VII.

TABLE VII.—Number of Patients Referred One to Six Times each

No. of Patients			Times Each was Referred	Total No. of Referrals
Male	Female	Total		
292	328	620	1	620
60	96	156	2	312
23	34	57	3	171
8	9	17	4	68
1	5	6	5	30
1	3	4	6	24
385	475	860		1,225

In the medical literature available to me I have been able to find very little reference to the subject of referrals from general practice, and even this has been confined only to actual statistics.

Pemberton (1949) published a survey of illness occurring in eight practices in Sheffield. He reported that 2% of the 4,656 consultations resulted in referral to a hospital out-patient department, in 0.16% to an in-patient department, and in 0.2% to a local authority clinic.

Fry (1952) described the work in his practice for the year 1951. Of the 4,456 patients on his list he referred 307 for consultant's opinion (6.9% of practice); 240 for radiological investigation (5.4% of practice); and 220 for pathological investigation (4.9% of practice). No mention is made of patients referred to hospital for treatment.

Logan (1954) summarized his findings in a survey of the work of eight practices during the year April 1, 1951, to March 31, 1952, and he gives a detailed statistical analysis of the numbers of patients referred to hospitals as in- and out-patients, and also of those seen on domiciliary consultations and by private arrangement. He reported that two-thirds of the total lists of the eight practices were seen. In all, 19,000 patients were seen for 105,000 consultations. Over 4,300 referrals were recorded, an average of 15.8 per 100 patients on the combined lists or 4.1 per 100 consultations given. Logan comments on the "startling differences" between the referral rates in the eight practices—the rate ranged from 32.1 per 100 patients in Polegate to 6.4 in Walthamstow. There is no indication, however, of the types of cases referred or the reasons for their referral.

Referral for Treatment

Examination of the reasons for referring patients is more revealing than a simple statistical analysis. It is fully appreciated that individual practitioners may vary widely in their approach to their patients and in their methods of treatment, but it is more than likely that there may be factors common to all. The commonest reason for referral of patients during the three years 1951-3 was for some form of treatment requiring a special technique, and of the 1,225 referrals under discussion 660 (53.8%) were for treatment. Some had already been investigated in order to confirm a provisional diagnosis before referral, or to exclude possible underlying physical disease before referral for psychiatric treatment. Very often the actual treatment is decided by the general practitioner when he chooses the specialist to see a particular patient.

Analysis of the 660 referrals for treatment is shown in Table VIII. Out-patient referrals are more numerous than in-patient referrals; for referrals to physicians the ratio out-patient:in-patient is approximately 2:1. As might be expected, in the case of surgical referrals the ratio of out-patient:in-patient is nearly 5:1. The proportion of females:

TABLE VIII.—Analysis of 660 Referrals for Treatment

Referral to	In-patient		Out-patient		Total	%
	Male	Female	Male	Female		
Physician:						
Allergist ..	0	0	1	1	2	0.3
Cardiologist ..	3	3	0	0	6	0.9
Dermatologist ..	0	4	15	15	34	5.3
Endocrinologist ..	0	0	1	3	4	0.6
General physician ..	11	7	12	9	39	5.9
Infectious diseases ..	7	8	1	1	17	2.7
Neurologist ..	4	5	0	3	12	1.8
Psychiatrist ..	4	4	14	28 (14)	50	7.3
Tropical diseases ..	1	0	0	0	1	0.2
Venereologist ..	0	0	2	1	3	0.5
Total ..	30	31	46	61	168	25.5
	61		107			
Surgeon:						
Dental ..	0	0	15	26	41	6.2
Ear-nose-throat ..	9	4	39	32	84	12.7
General surgeon:						
Casualty dept. ..	0	0	12	26	38	5.8
Specialist ..	15	17	40	44	116	17.5
Genito-urologist ..	5	0	13	4	22	3.3
Gynaecologist ..	—	3	—	33	36	5.5
Ophthalmologist ..	0	0	7	21	28	4.2
Orthopaedist ..	2	0	46 (7)	79 (8)	127	19.3
Total ..	31	24	172	265	492	74.5
	55		437			100

Figures in parentheses denote number seen on domiciliary consultation.

males is practically 1:1 for medical referrals, and nearly 2:1 for surgical referrals, where the referral is for treatment.

The commonest cause for admission for in-patient treatment is acute appendicitis (10 female and 6 male), and a further 11 female and 6 male referrals were made to surgical out-patient departments for consideration for interval appendicectomy where there had been recurrent appendicitis.

The largest number of referrals for medical treatment were psychiatric, and consisted mainly of cases of severe psychoneurosis and of psychosis (see Table XIII).

The next two largest groups referred for medical treatment were for general medical conditions (including chest affections) and dermatological complaints. The latter referrals included most of those patients who were referred to specialists in response to their own request—a valid reason for referral in those illnesses known to be chronic and difficult to treat successfully.

Among the surgical referrals for treatment the largest group were for orthopaedic conditions, although many of them could have been referred direct to a department of physical medicine for the required physiotherapy had this been available. Fortunately there has been a change since this survey was completed, and patients may now be referred direct for physiotherapy in this district.

It is perhaps surprising how many patients consult their doctor when they require dental attention, although they often present with acute submandibular adenitis and require the combined attention of dental surgeon and doctor.

Referral for Special Investigation

The second most common reason for referral was for special investigations in order to confirm a provisional clinical diagnosis, or in many cases to exclude possible underlying physical disease when the diagnosis was a psychoneurosis. Often the real reason for this latter type of referral is one's own anxiety—it is so often said that "organic disease" may be missed if patients are "labelled" neurotic, and as this is one of the most common diagnoses it is hardly surprising that it becomes necessary "to make sure" nothing is being overlooked.

There is no doubt that the standard of general practice will be improved only by allowing the family doctor full facilities for properly investigating his patients in order to reach an accurate diagnosis. It is only by this means that adequate treatment may be started. This means there must be open access to pathological laboratories and radiological depart-

ments, and although some hospitals have shown their willingness to co-operate with the general practitioner there are many that have not. The argument usually put forward is that there is not the room or the staff to deal with the extra work involved. This is nonsense, as shown by this investigation. Table IX shows the number of referrals for pathological investigations, and Table X shows the number of referrals for radiological investigation. In both cases the majority had first to be referred to a consultative out-patient department.

TABLE IX.—Number of Referrals for Pathological Investigations

	Male		Female		Total
	Out-patient	Dom. Consn.	Out-patient	Dom. Consn.	
Surgical condition ..	12	—	14	—	26
Medical ..	38	—	66	—	104
Total ..	50	—	80	—	130

TABLE X.—Analysis of 252 Referrals for Radiological Investigation, According to Sex and Type of X-ray Examination Requested

Type of X-ray Examination Requested	Male	Female	Total
Barium meal ..	17	2	19
" enema ..	2	1	3
Chest ..	47	51	98
Cholecystogram ..	2	0	2
I.V. pyelogram ..	3	3	6
? Multiple pregnancy ..	—	1	1
Orthopaedic conditions and ? fractures ..	43	37	80
Sinuses ..	23	20	43
Total ..	137	115	252

Hunt (1951) described a diagnostic unit he had built in the first five years after the war, and his discussion of the work carried out during that time shows the high standard of practice made possible by having available the facilities for pathological and x-ray investigations. This unit was outside the National Health Service, but its excellence should be the aim of the general practitioner within the National Health Service. During the years 1948, 1949, and 1950 7,020 pathological investigations were carried out, and 1,476 sets of x-ray films taken. Hunt had consultants in pathology and radiology to advise him. The number of patients seen in the three years is not stated, but in five years 3,864 patients were treated. This implies a high incidence of investigations per patient, but the standard of practice was such that he wrote: "This unit has enabled work to be done in general practice which would have been very difficult without these facilities."

Since the present survey was completed one hospital in the area in which I practise has opened its pathological and x-ray departments to general practitioners; my referral rate to consultative out-patient departments has dropped because of this, as might be expected from the results of this study. There are other hospitals, however, also serving this area, whose pathological and x-ray departments are still closed to general practitioners, so that there is a tendency to overburden the special departments of the hospital with open access. Clearly it is necessary for all hospitals to play their part in co-operating with the general practitioner—and the teaching hospitals should lead the way.

Referral for Consultant's Opinion

During the three years under review out of the 1,225 referrals only 183 were for a consultant's opinion about the diagnosis or for advice and guidance with regard to further management of the patient. An analysis of these 183 referrals is shown in Table XI.

These figures show almost equal numbers of surgical and medical referrals, but with a ratio of nearly 2:1 of females:

It will be noticed that nearly one-third of these referrals for an opinion took place on domiciliary consultation—a

TABLE XI.—Analysis of 183 Referrals for Opinion

Referred to	Male		Female		Total	%
	Out-patient	Dom. Consn.	Out-patient	Dom. Consn.		
Physician:						
Allergist ..	1	0	0	0	1	0.5
Cardiologist ..	6	2	2	1	11	6.0
Dermatologist ..	1	0	2	0	3	1.6
Endocrinologist ..	2	0	4	0	6	3.3
General physician ..	4	2	18	4	28	15.3
Geriatrician ..	0	0	0	1	1	0.5
Infectious diseases ..	0	3	0	1	4	2.2
Neurologist ..	5	1	4	0	10	5.5
Paediatrician ..	1	3	2	2	8	4.4
Psychiatrist ..	2	6	2	6	16	8.7
Tropical diseases ..	1	0	0	0	1	0.5
Venereologist ..	3	0	2	0	5	2.7
Total ..	26	17	36	15	94	51.2
Surgeons						
Ear-nose-throat ..	9	1	7	1	18	9.9
General surgeon ..	0	2	15	4	21	11.5
Genito-urologist ..	4	3	5	1	13	7.1
Gynaecologist ..	—	—	19	4	23	12.6
Ophthalmologist ..	1	0	5	0	6	3.3
Orthopaedist ..	2	1	3	2	8	4.4
Total ..	16	7	54	12	89	48.8

method which I think is of the utmost value to all concerned. It permits a proper consultation to take place between the family doctor and the consultant; the patient is often saved a long wait for an out-patient appointment, or indeed he may avoid being admitted to hospital; the family have the opportunity of seeing the specialist, and are able to ask their questions; finally, the consultant gains by seeing the patient in his own home environment—a sick person among his family in his own home, and not a patient in hospital.

Domiciliary Consultations

Analysis of the 80 domiciliary consultations is shown in Table XII. There is here a majority of females, due mostly to the number seen by a psychiatrist. Perhaps in this branch

TABLE XII.—Analysis of 80 Domiciliary Consultations

	Male		Female		Total	%
	Out-patient	Dom. Consn.	Out-patient	Dom. Consn.		
Medical:						
Cardiologist ..	2	1	3	—	3	3.7
General physician ..	2	4	6	—	7.5	
Geriatrician ..	0	1	1	—	1.2	
Infectious diseases ..	3	1	4	—	5.0	
Neurologist ..	1	0	1	—	1.2	
Paediatrician ..	3	2	5	—	6.2	
Psychiatrist ..	6	20	26	—	32.5	
Total ..	17	29	46	—	57.3	
Surgical:						
Ear-nose-throat ..	1	1	2	—	2.6	
General surgeon ..	2	4	6	—	7.5	
Genito-urologist ..	3	1	4	—	5.0	
Gynaecologist ..	—	4	4	—	5.0	
Orthopaedist ..	8	10	18	—	22.6	
Total ..	14	20	34	—	42.7	

of medicine more than in any other is the domiciliary consultation of value. So often the patient cannot be persuaded to go to hospital to see a psychiatrist, but he can be helped by the psychiatrist coming to see him. Again, there is the advantage of the psychiatrist seeing the patient in his normal environment, and also of being able to discuss the case with the family.

Apart from the 26 referrals by domiciliary consultation with a psychiatric consultant, 34 other patients were referred to psychiatrists, some of them more than once each. Table XIII shows the diagnosis in the 60 patients referred to psychiatrists, the majority of them being for severe psychoneuroses and psychoses. The small number admitted is to the credit of the consultants concerned, as out-patient treatment was arranged for many cases in spite of the difficulty in getting a patient adequate psychotherapy under the National Health Service. Because of this I have taken on a

TABLE XIII.—Analysis of 60 Patients Referred to Psychiatrists During 1951-3

Diagnosis	Male	Female	Total
Asthma	2	2	4
Anxiety state	2	4	6
" hysteria	0	3	3
Children:			
Behaviour difficulty	1	0	1
Enuresis	0	1	1
Truancy	0	1	1
Dementia, arteriosclerotic	1	1	2
Depressive states	2 (1)	12 (3)	14 (4)
Dyspareunia	—	2	2
Hysteria	1 (1)	7 (1)	8 (2)
? terminate pregnancy	—	3	3
Impotence	2	—	2
Mania, acute	1 (1)	0	1 (1)
Mental deficiency	0	1	1
Obsessional states	3 (1)	0	3 (1)
Psychopathy	2	0	2
Schizophrenia	3	2	5
Ulcerative colitis	0	1	1
Total	20 (4)	40 (4)	60 (8)

Figures in parentheses denote immediate admissions as in-patients.

much larger number of patients for psychotherapy than I referred, and I have discovered that in fact, contrary to the opinion of some psychiatrists, the family doctor is exceptionally well placed to treat patients by this method. Not only does he know his patient's home background, he already has the trust and confidence that is so necessary if psychotherapeutic methods are to succeed. Even those patients who say they do not "believe" in psychology can be treated without their even realizing it—and later, when they come to see how they have responded to this type of approach, their gain in insight is often remarkable.

The largest group of patients seen on domiciliary visits by the surgical consultants was the orthopaedic one; mostly the referral was for a patient with severe acute back pain, the most frequent cause being a disk lesion. Occasionally a plaster-of-Paris jacket helps the patient get about; more often, however, it is useful as a means of setting the wheels in motion for routine x-ray examination of the back in order to estimate the extent of spondylosis—and to exclude any other possible pathological condition. Also, arrangements can be made for suitable physiotherapy to be started at the optimum time during the period of recovery. In this way the delay (which may be as long as four to six weeks) in waiting for an out-patient appointment is avoided.

Table XIV shows the numbers of referrals according to sex, and whether for medical or surgical conditions, for each of the four main reasons for referring patients to hospital. It will

TABLE XIV.—Numbers of Referrals According to Sex, and whether for Medical or Surgical Conditions, for each of the Four Main Reasons for Referring them

Reason for Referral	Male		Female		Total	%
	Medical	Surgical	Medical	Surgical		
Treatment	76	203	92	289	660	53.88
Radiological investigation	55	82	67	48	252	20.57
Pathological investigation	38	12	66	14	130	10.61
Opinion	43	23	50	67	183	14.94
Total	212	320	275	418	1,225	100

be seen that just over 50% are for treatment, usually by some special technique which the general practitioner is not normally expected to do. The ratio of out-patients to in-patients for males is 3.5:1, and for female referrals it is 6:1. The ratio of surgical:medical referrals is 3:2 for males, and nearly 2:1 for females.

Other Reasons for Referral

There are lesser reasons for referral which may be recognized. One is the doctor's own anxiety to "make sure" no physical disease has been missed. Taylor (1954), in a report of a survey, states: "Claims that as many as a third of the

G.P.'s patients are suffering from neurotic illness appear to have arisen mainly because organic complaints have not been diagnosed." In fact, I have personally always been apprehensive lest this happen in my practice: perhaps this is why my referral rate is so high when compared with others (see Logan, 1953). Nevertheless, in spite of careful physical examination, together with special investigations, the incidence of neurotic illness found among my patients is over 40% when the generally accepted stress disorders are included (Hopkins, 1955).

A reason commonly claimed for many referrals to hospital is that the patient requested that he be x-rayed or that he should see a specialist. In my experience this is a very infrequent reason for referral—provided always that one can give the patient who makes this type of request the necessary time in which to express his fears and anxieties, and to make a thorough clinical examination in order to be certain of the diagnosis before embarking on any form of treatment.

One further reason not yet mentioned is to obtain help in the "disposal" of a patient. I have been fortunate in not having had to do this more than three times, and on each occasion the need for this action was entirely due to the patient being entirely alone in the world, having no family or friends to look after her.

Comment

In my experience there is quite clearly a simple answer to the first object posed at the beginning of this paper: I believe that the family doctor should play a major part in the care of his patients, and that only when they require treatment not available in general practice should referral to hospital for treatment be made. In the main, this applies to surgical illness. Here, then, is the first part of the answer to the second question set out above—the hospital should provide the staff and facilities for prompt and efficient treatment for those patients in need of it.

The second requirement is for adequate facilities for proper investigation of the patient in the pathological laboratory and in the x-ray department—without the patient needing to see any other specialist apart from the pathologist or radiologist. Taylor (1954) provides the answer for those who cry out that this is impossible: "As with pathological open access, it can be argued that radiological open access does not add to the total volume of work done. Indeed, if in a hospital inexperienced house officers are allowed to order x-ray films, it can be claimed that the more experienced G.P.s are likely to ask for less on the same patients."

An important point arises here, however, since the general practitioner must be prepared and able to continue treating his patients—so long as the treatment required is within his competence. The all-important factor therefore is time, and it is here that the possibilities for the doctor fall away if he has a large National Health Service list, even if he has ancillary help. Simple mathematics show how much time can be given to each patient when the numbers of patients and the available time are known.

Finally, the hospital's functions must include consultative facilities. Again time is all-important. If the huge numbers of out-patient attendances to consultative clinics for pathological and x-ray investigations were reduced, the consultants would more easily be able to see patients by appointment—and this in turn would make it possible for the general practitioner to attend the consultation. This fulfils the meaning of the word, which essentially is a consultation between the family doctor and the consultant-specialist about the patient. This is at present possible on a domiciliary consultation, as described above.

Of course, the hospital has its part to play in furthering the education of the family doctor, and keeping him abreast of modern advances, but this is not the place to discuss that.

Reference has been made to the incidental finding of fresh evidence of the high incidence of psychoneurotic illness and

NEW ACADEMIC YEAR UNIVERSITY COLLEGE HOSPITAL

The Doctor's Double Role

At the opening of the new session of University College Hospital Medical School an address was delivered by Sir ARTHUR FFORDE, headmaster of Rugby School, and the prizes were presented by Lady FFORDE. Sir CHARLES HARRINGTON, F.R.S., chairman of the school council, who presided, referred in fitting terms to the retirement of the vice-dean, Professor S. J. COWELL, who for sixteen years had been primarily responsible for the selection of students and the instruction of deans in their duties and responsibilities, and also to the retirement of Mr. ALAN SHEFFORD, the vice-dean for dental students, who had been at the school since 1913.

The Dean, Dr. J. D. S. FLEW, gave a brief account of the school year. During the session the total entry of undergraduate students taking the full course was 92; the total number of undergraduate students in attendance was 277, and of postgraduates 63.

Sir ARTHUR FFORDE said that no sensible person in these days could possibly be without a lively consciousness of and real gratitude for the enormous advances of medical science and the swift development of medical practice and technique. Nor could one fail to be aware of the degree of self-sacrifice and devotion with which in this country we were blessed in the general practitioner and nursing services. Yet it must be the case that, for anyone in present circumstances who was embarking upon the profession and art of medicine, it was the difficulties and responsibilities and restrictions of the task in its present framework that loomed larger at times than the vast accumulation of knowledge, skill, and prestige which he or she had to rely on at call. It was not so much the endless procession of examinations and the profound and detailed knowledge which it was necessary to acquire in order to pass them, but the sense that, as soon as one was beyond the beaten track and the well-practised techniques, one was holding in one's hand an individual life, and it was assumed by others that one knew precisely what one was doing, even though in one's own heart there was uncertainty. That was likely to be the burden and the challenge, as the discharge of it was truly the glory, of the medical vocation. It was this which distinguished it from all other vocations, with the possible exception of the priesthood.

"How much does it matter, do you think, to me personally as your prospective patient whether you did or did not win a particular prize on a particular occasion or whether you do or do not keep yourself abreast all the time of the latest developments in medical science? You will probably say that it matters a great deal more than you suspect me of thinking. . . . Nevertheless, prize winner or not, if it should turn out that I am later to be your patient, I am more than half inclined to say that the *sine qua non* of that relationship over and above your knowledge of modern techniques was expressed many centuries ago by Bianor, who indeed wrote in Greek, for that was his language, but who, if he had known English, might have put it something like this, 'Behold, I tell you a mystery. This, this nothing, this meanness, this indeed slave, even this man, is loved and is the lord of the soul of another.' I, your patient, am not a thing, but a person, and you must know it and remember it, and make me feel that you do."

Sir Arthur fford went on to say that in order to maintain this personal relationship, given as must be assumed the best and completest knowledge of the scientific side of medicine, the main difficulty that nowadays one was likely to encounter was what he called the Civil Service difficulty. The doctor had to be part of a large organization, not yet very fully and completely established, in which, in contradistinction to other forms of Civil Service, all the eventual actions were related to particular people rather than to classes of persons. But in relation to this problem he was an optimist. From the point of view of those people who in the past

stress disorders as a result of this study. It is reasonable to expect that among the number of referrals to hospital would be found the more seriously ill patients, and this was so. Nevertheless, when those who were referred for treatment (excluding the psychiatric referrals) are deducted from the total number of referrals 615 remain. Of these 615, over one-half—that is, 31.3% of the total number of referrals—were found to be suffering from psychoneurotic illnesses and stress disorders. In the time that has passed since this survey was planned and carried out a careful check has been made and only two patients have been found whose diagnoses were not correct. In both cases, however, referral to hospital had been made and full investigations carried out (in one case a barium-meal examination which was repeated twice, and still reported negative), but the physical disease was missed. It so happened that when, later on, the diagnosis was properly made and treatment completed, it was still obvious that there was serious psychoneurotic illness present. In short, even when physical disease is found there may be no connexion between it and the patient's symptoms, or even when treated for his physical illness the patient still retains those symptoms due to the coexisting psychoneurosis. These findings are at complete variance with Taylor's observation that: "There is a substantial element of truth in the hypothesis that the better the clinician, the less often does he diagnose neurosis."

Conclusions

In analysing 1,225 referrals to consultants and specialists over a period of three years (1951-3) from a single general practice certain facts emerge. Just over half of the referrals (53.88%) were for treatment requiring special techniques not within the general practitioner's competence. Of the remainder, the majority (31.1%) were for special investigations, in the pathological laboratory or the x-ray department. In only 15% of the referrals was there need for an opinion from a consultant, or advice and guidance for further management of the patient.

Arising from these facts it is possible to emphasize the need for provision of facilities to help the family doctor reach an accurate diagnosis and, where required, to provide consultative out-patient clinics where recommendations for further treatment by the family doctor can be obtained. To burden the hospitals with more than this is to increase the amount of unnecessary work for the staff, and also to deprive the family doctor of his responsibility for and to his patients.

In my experience the incidence of illness due to psychoneurosis and stress disorder is high—over 40% in my total practice and just over 30% of all referrals to hospital. This perhaps points to the need for more facilities for the treatment of large numbers of patients by psychotherapeutic methods—both at hospital and by the family doctor.

I would like to take this opportunity to express my grateful thanks for the ever-ready help that I receive from my consultant and specialist colleagues, and also for the co-operation of the many generations of residents at the hospitals I usually use.

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had the family doctor at call, the new system was in many ways a deprivation. But for the general run of the population of this country it was difficult to feel that the change had been anything other than of benefit. He supposed there had never been a time in the past when the medical services had been as available to the population in general as they were now.

The students before him were to become part of a body of men and women pursuing under various delegations of authority, some of them remote, a science and art and vocation the whole of which had to do with individuals one by one, and therefore with a person in the immediate proximate foreground. On the other hand, they could not forget that they belonged to an increasingly organized and very large undertaking. But, if they allowed that fact with its remoteness to destroy the essential proximity between themselves and their particular individual patient, then neither they nor the organization was doing the thing which the organization was set up to facilitate, and that they themselves, when they recognized their vocation, found themselves called upon to do.

The problem was not a new one, though it might be new to the medical profession. But just as a soldier when he became involved in an army, or a priest became involved in a church, was still concerned with the individual human being, and had to learn by experience how to combine the two duties, so the doctor had primarily all the time to do that same thing. To protect oneself, one had to adopt a certain detachment, a certain case-hardening, to dissociate oneself, emotionally at least, from those with whom one was concerned to deal. Yet such was the mystery of life that these combined yet dissimilar operations could in fact be accomplished without detriment to the wholeness of life itself.

ROYAL FREE HOSPITAL SCHOOL OF MEDICINE

The Vocation of Medicine

In his inaugural address to the Royal Free Hospital School of Medicine on October 5 Sir FRANCIS WALSH spoke on "The Vocation of Medicine." He returned to the eternal truth that the practice of medicine was a way of life with an ethos of its own, and that it transcended the making of a living or of a career. It was an exacting calling, demanding all one had to give of mind and heart, of knowledge and of wisdom.

Much criticism of medical education was misplaced and derived from a false notion of what could be taught by formal methods. There were things which could be learnt only in the hard school of responsible experience. The popular nostrum for the rapid seasoning of the young doctor was a course of lectures upon normal psychology—two dozen easy lessons in wisdom. This was completely silly.

Doctor and Patient

The doctor-patient relationship had been very much a weapon of debate in recent years, but it had won doctors no political victories, and it had perhaps emerged from their unequal struggle with the politicians a somewhat tattered notion. At its best it was a more complete human relationship and a more responsible one than any other profession or occupation was called upon to enter into. The conditions essential to the optimal development of this necessary confidence between patient and doctor were no longer so favourable as they were, for the State threw its long, interfering shadow over them, and there were many to-day who thought of the doctor as no more than another amenity in that vast day nursery called the Welfare State. But apart from all this there were essential elements of instability in the relationship. The doctor must keep emotionally independent to retain his freedom and avoid being hurt when those whom he had striven to help proved unreasonable, thankless, or even vindictive.

Doctors had been recently admonished by a learned judge that they must always tell the truth; but what, in the relevant connexion, was meant by "truth"? It generally meant telling the patient the full nature of the prognosis. Suppose the case was inoperable and the prospect of survival was to be measured in weeks or months. How much was it necessary or expedient to say? The patient's relatives would almost certainly be against giving the patient a realistic account of his situation. There were many patients with the courage and the wish to know the facts, but not all men and women might safely be assumed to wish to know the worst, or to react with prudence and fortitude if they were told.

The lawyer interpreted and applied a statute, and assumed it was the citizen's duty to know the law and obey it. Doctors lived in no such realms of simplicities but at the heart of human life, knowing that they could not act by rule of thumb but only with due respect for the individual human person and with appreciation of human weakness and limitations. It might often be, then, that an economy of truth was demanded on some occasions.

Apart from these grave situations there was a widespread tendency to-day not to tell the patient as much as one should about his illness. Time given in simple explanation was never wasted. Sir Francis warned, however, that doctors could not live other people's lives for them; he suggested, for instance, that it was wrong to tell a young woman showing initial signs of disseminated sclerosis that she must not marry and have children. Happiness in married life was not necessarily or usually shattered by the illness of one partner. Health and happiness were not always to be equated.

Each doctor, he concluded, must discharge his conscience according to a considered judgment of each particular case.

School Scholarships

In her report the Dean, Dr. KATHARINE LLOYD-WILLIAMS, discussing the quinquennial policy for 1957-62, said that the school and hospital were in complete agreement. The establishment of professorial units would involve additional building. The scholarships committee had introduced new schemes so that students who for one reason or another were not eligible for the large State grants now so readily available could compete for school scholarships, and in some cases awards had been combined to provide more valuable postgraduate awards, for which the need was urgent. An adviser to the men students had been appointed, an appointment made necessary by the increase in numbers from one in 1947 to over 100 at present.

The chair at the ceremony, which was held in Senate House, was taken by the chairman of the school, Sir FRANCIS LASCELLES, whose wife presented the prizes.

MEDICAL PROTECTION SOCIETY

The annual meeting of the Medical Protection Society was held on October 3 at Victory House, Leicester Square, with Sir ERNEST ROCK CARLING, the president, in the chair. In presenting the sixty-fourth annual report of the council, Sir Ernest said that the year had been entirely uneventful. The Society continued to prosper. The number of new members elected during the year was 1,529, and the total membership stood at 29,638. Over 2,000 members sought the advice and assistance of the Society during 1955. The council had been a little disturbed, as had other like bodies, at the continuance of such accidents as swabs left in the body after operation. It had occurred to him that possibly something more ought to be done about new residents. Perhaps there ought to be a more regular overhaul of the

human factor, just as the engineer made an overhaul of apparatus. He also touched upon the need for scrupulous hospital recording.

Mr. W. M. MOLLISON, honorary treasurer, said that the financial report showed a substantial increase in the reserves of the Society. The income for the year was up by nearly £4,000, and expenditure was less, indicating a reversal of the trend of the last few years of increasing expenditure, though it should be stressed that the full effects of inflation had yet to be felt, and also that there were many serious cases *sub judice* which might prove to be very costly. The funds available for the protection and defence of members' interests now exceeded £220,000, and the Society was reinsured with Lloyds underwriters for a considerable sum.

Mr. DOUGAL CALLANDER proposed the re-election of Sir Ernest Rock Carling as president, and this was carried unanimously. The vice-presidents and retiring members of council and other officers were also re-elected.

Claims against Hospitals

In a report which was presented to the meeting by the Society's solicitors (Messrs. Le Brasseur and Oakley) it was stated that the view expressed last year that the number of legal actions and claims against doctors, dentists, and hospital authorities had reached its peak was borne out by the most recent experience. Although actions and claims were still running at a disconcertingly high level compared with a decade or more ago, there were indications that the growth had been arrested at least for the time being. But the situation was still very serious and demanded the constant vigil of the professions and of those charged with the protection of their interests. The procedure agreed on by the three defence societies with the Ministry of Health for dealing with claims made or actions brought against hospitals or members of their medical staff continued, it was said, to work smoothly. It had to be emphasized that the new arrangement applied only to doctors who were members of, and whose defence was undertaken by, one of the three societies. Membership of one or other of them was therefore of particular importance to doctors employed by hospital authorities, since for doctors not so protected the Ministry's policy was that steps should be taken in appropriate cases to obtain contributions or indemnity from them.

CANNED FOODS

[FROM A SPECIAL CORRESPONDENT]

Several topics of importance to public health were discussed at the third International Congress on Canned Foods held in Rome from September 24 to 28. The most striking feature of the bacteriological session was a demonstration by Dr. D. A. A. MOSSEL (Utrecht) that in the examination of batches of cans for any particular condition only very large numbers of cans will give statistical significance to the results. This led inescapably to the conclusion that the absence of *Clostridium botulinum* from a batch of cans could not practically be assured by bacteriological examination, whether this took the form of direct search for the particular organism or for similar anaerobes whose occurrence would imply the possibility of its presence. The same arguments applied equally to all methods of examination or to any species of micro-organism. Hence the only really satisfactory solution was to rely on a canning process which would ensure the killing of all unwanted microbes in the product. This should be coupled with prevention of their re-entry by strict attention to the integrity of can seams and the use of sterilized cooling water. The real function of bacteriological examination was to provide the manufacturer with an assurance, with a particular confidence

limit, against the spoilage of the product, and this degree of confidence was a direct function of the cost of the examination, which might well exceed 25% of that of the product itself.

Safety in Acidity

This point of view reappeared several times. Discussing bacteriological classification of canned foods, Dr. R. BUTTIAUX (France) emphasized the difference between canned foods with a pH more acid than 4.5 and those less acid. In the former, as is well known, *Cl. botulinum* is inhibited by the acidity, so they are subjected to much less severe processing. Dr. Buttiaux suggested that, from the standpoint of public health, they might for the same reason be sampled on a system giving much lower degrees of confidence. Several speakers confirmed that this is in fact done in commercial practice. For example, Mr. T. E. BASHFORD stated that the percentage of cans examined was commonly only half as great for fruits as for meats. Dr. BUTTIAUX, however, complicated the argument by the assertion that, contrary to general belief, viable cells of *Salmonella* occurred not infrequently in acid preserves, citing citrus juices and jams in particular. Though the acidity prevented multiplication of these bacteria, they could remain viable. He suggested that they might be introduced after the heat treatment of the products. Other speakers contested these assertions strongly, notably Mr. P. H. LEFEBVRE (Belgium).

Such occurrences would place special emphasis on plant sanitation, and this topic was discussed in a separate section, most succinctly by Mr. J. M. HEINEN (U.S.A.). He listed the following as having, in recent years, helped to "make in-plant sanitation a reality": use of stainless steel and monel metal, welded crevice-free construction, organic detergents, improved fumigants and insecticides, ultra-violet light, and chlorinated water. The problems in designing equipment for the sanitary processing of food were considered more fully by Mr. C. K. WILSON (Costa Rica). Mr. HEINEN affirmed too the value of the U.S. Food and Drug Administration's system of resident plant inspectors; and it was interesting to hear this opinion confirmed by other representatives from the traditional land of unrestricted enterprise.

Disposal of residues, as one of the most serious problems of cannery operations, was also discussed by several speakers in a separate session. MM. MAILLET, HUGUES, and ENGINGER (France) described in detail the various by-products derived from the residues from meat canning. The only satisfactory way of dealing with the waste was to convert as much as possible of the organic content into useful by-products—for example, into cattle fodder, fertilizer, or fermentation products—and to dispose of the effluent liquor by irrigation of land and not by discharge into rivers. Professor R. S. INGOLS (U.S.A.), after comparing different irrigation systems, concluded that much the most effective was the irrigation of woodland, though it had the disadvantage of yielding no immediate cash return.

Antibiotic Dangers

The use of antibiotics as an aid to preservation was mentioned several times. Mr. HEINEN referred to numerous American experiments, covering a wide range of antibiotics, which had so far failed to reveal a method which was of practical value in canning. Dr. M. JUL (Denmark) thought that, though antibiotics might lead to improvement in the handling of fresh meat, they would not compete with canning. Most outspoken against their use in any foodstuff was Professor A. BASERGA (Italy), who thought that many antibiotics interfered with the mitotic processes necessary for the regeneration of the mucosa of the tongue and gut, causing damage which might not become evident for some time.

The undesirability of using chemical preservatives to stabilize preserves was emphasized by speakers from various countries, leaving the impression that such practices are much more common than is known or desirable. The impossibility in general of detecting the wide variety of such substances by chemical means was regarded as making it necessary to seek them by more generalized methods of biological assay; and it was suggested that positive results in such assay tests should now be regarded as sufficient legal justification to condemn the food, even though the preservative cannot be precisely identified.

MANAGEMENT OF THE GANGRENOUS FOOT

On October 3 the Section of Surgery of the Royal Society of Medicine met for the first time under its new President, Mr. ERIC A. CROOK, to discuss the management of the gangrenous foot.

In the opening paper Professor C. G. ROB spoke briefly first of gangrene due to venous thrombosis, a type seen usually in patients debilitated by other diseases such as carcinoma or ulcerative colitis. Anticoagulant therapy and elevation were indicated; amputation should be avoided as long as possible, since the line of demarcation tended to become more peripheral. But it was gangrene due to arterial disease which was much the more common and important. In 145 cases at St. Mary's Hospital seen since 1950 atherosclerosis had been responsible in 125. In 90 of these the occlusion had been in a large vessel (aorta, iliac, femoral, popliteal), and in a further 24 cases main trunk and small vessels were occluded. Turning briefly to gangrene in diabetic patients, Professor Rob said he did not believe in diabetic gangrene as such. Atherosclerosis, infection, and neuropathy were responsible for most cases, and these were much commoner in diabetics than normal people. Important among conservative measures for gangrene were cooling the affected part to room temperature, to reduce metabolic needs, while warming the rest of the patient to promote reflex vasodilatation. Alcohol had been found very useful, both to relieve pain and, by vasodilatation, to aid the collateral circulation. Means to improve the general health, such as the correction of anaemia, anticoagulants, and the prevention of deformities were further conservative measures.

Discussing the surgical treatment, Professor Rob said the essential thing was to diagnose the level of arterial block, and whenever possible to reconstruct the artery. Arteriography was an essential preliminary to an arterial reconstruction operation in these patients. In 30 cases—about 20% of the series—arterial reconstruction had been carried out, with a successful result in 20. The best type of reconstruction operation had been found to be the by-pass graft popularized in Britain by Cockett. Having reconstructed the artery, one should be conservative with the gangrenous part itself. Healing with minimal loss occurred following successful operations, and formal amputations could be avoided. Local removal of dead tissue was all that was required. It had been their experience, Professor Rob continued, that in cases in which the graft subsequently became blocked gangrene did not necessarily reoccur. This suggested that arterial reconstruction did not have the damaging effect on collateral circulations which had been claimed. Only in one case of thromboangiitis obliterans had he found it possible to do an arterial reconstruction for established gangrene (because usually small peripheral vessels were thrombosed), and it had been well worth while.

Sympathectomy had been carried out in 81 of the cases, with valuable improvement in 55. He believed that the level of the operation should be planned to fit the level of the arterial occlusion. For popliteal occlusions excision of the second and third lumbar ganglia was adequate, but the first should be included for mid-thigh blocks and up to the tenth dorsal ganglion for high occlusions such as the origin

of the common iliac arteries. After sympathectomy again, amputation should be as conservative as possible. The most satisfactory operation of all, though not often indicated, was thrombo-endarterectomy.

Amputations had had to be performed in 94 of the 145 cases. In 34 the level had been above-knee, in 26 below-knee, whilst in the remainder it had been successful at lower levels.

Diabetic Gangrene

Dr. W. G. OAKLEY confined his remarks to the lesions seen in diabetic patients. He agreed with Professor Rob that there was no demonstrable difference between diabetic and senile gangrene. Gangrene was, however, six times more common in diabetics than in other people, and in his clinic at King's College Hospital, in a three-year period, 146 cases had been seen. Age was an important factor, for none was less than 40, and the incidence of foot troubles increased steadily with advancing years. They had not been able to find any significant relationship between occlusive vascular disease and the duration of the diabetes. Where sepsis and perforating ulcers occurred in young patients the common defect was diabetic neuropathy.

Dr. Oakley said that the gangrenous lesions in diabetics were of four types, according to the cause—septic, neuropathic, ischaemic, and combined lesions. Sepsis required standard treatment, though it might complicate ischaemia or neuropathy. In neuropathic lesions it was the loss of appreciation of pain which was particularly important. A characteristic deformity of the toes, with dorsal dislocation, tended to occur, and local gangrene due to trauma might result, even in the presence of a good blood supply. There were two main manifestations of ischaemia in diabetes—pain and gangrene. Usually the patients were old and both feet commonly were affected. The painful feet were cold, pink, and very painful, especially at night. Vasodilator drugs had not been effective, and, though sympathectomy relieved pain in some cases, amputation was usually necessary. Indeed, it was often requested by the patient.

Turning to gangrene, Dr. Oakley said he was strongly opposed to waiting for natural separation. If the patient was kept in bed there was a danger of gangrene of the heel, and, if allowed up, of injury causing rapid spread, whereas amputation of a gangrenous toe often was followed by healing. Gangrene of the fifth toe presented special problems. It was difficult to obtain skin cover on the outer border of the ischaemic foot, and this lesion often led to below-knee amputation. The big toe was less of a problem, and local disarticulation often gave good results. If two or more toes were affected, it was usually wisest to amputate all five. Amputation through the tarsal and metatarsal regions had been disappointing, for it was rarely possible to obtain skin closure without tension. When gangrene in diabetic patients spread beyond the toes, below-knee amputation was necessary.

Concluding, Dr. Oakley described a method for preventing heel gangrene in recumbent patients. The legs were suspended just off the bed in canvas slings, lined by orthopaedic felt, by means of springs. He had found it most effective.

Condition Before Gangrene

Mr. G. E. MAVOR read a paper dealing chiefly with two matters—the pathological anatomy of the disease, and some aspects of by-pass operations. An analysis he had made of 223 cases of peripheral ischaemia of the lower limb showed atheroma with secondary thrombosis to be the cause in 203. It was important, he said, to consider the events which preceded the onset of gangrene. In 92% of cases the disease affected a main vessel. Initially thrombosis was limited in extent and in 83% of cases occurred in the femoral artery, most commonly in the region of the opening in the adductor magnus muscle. From here it spread proximally to be halted at the orifice of the profunda femoris artery. In 10% it was the popliteal artery which

was affected, and the initial thrombosis then occurred in the proximal part of the vessel, whence it spread downwards to the bifurcation. In main vessels thrombus propagation was the principal method of spread, thrombosis at a fresh site in a main artery being uncommon. It had occurred in only 3% of his cases.

Mr. MAVOR discussed then the role of the lower leg vessels. While rarely the site of initial thrombosis, they became thrombosed secondarily. It was the extent of main vessel thrombosis which largely determined the manifestations of the disease. In 60% gangrene was the culmination of years of increasing peripheral vascular insufficiency, and surgically the problem was often best dealt with before its onset. Once the stage of femoro-popliteal thrombosis was reached, the time for surgery was limited, as most patients with pain at rest and skin changes in the foot developed gangrene within six months.

Mr. MAVOR then described experiences with the by-pass graft. Its greatest advantages were that the anastomosis could be made of reasonable size and that the best points for insertion of the graft could be selected. At the same time collateral branches were preserved. Arterial homografts were to be preferred. In cases with femoral artery thrombosis the proximal anastomosis should be made proximal to the origin of the profunda femoris; the distal could be made to the proximal popliteal artery, if it were healthy, but was probably better fashioned to the terminal segment of popliteal artery at or below knee-joint level, as this segment of vessel was generally healthy and free of inconvenient branches. But in femoral-popliteal thrombosis there was no choice in the siting of the anastomosis. So far the longest follow-up he had made of a by-pass graft had been 11 months, and Mr. MAVOR thought the justification for grafting procedures for limited thrombosis was still open to question. Collateral channels might be reduced and the long-term future of arterial homografts was still unknown. However, he felt there was adequate justification for interference in cases with femoral-popliteal thrombosis.

In Nigeria, "active opposition to vaccination, particularly by local vested interests such as a gerontocratic oligarchy of 'juju' priests, fetish men and witch doctors, is, happily, a thing practically of the past; and, thanks largely to the efforts of that great Nigerian physician and pioneer in maternity and child welfare work, Dr. O. Sapara, the menace of dangerously hostile smallpox secret societies, such as the 'sopono' cult of the Yoruba country in Western Nigeria, now no longer stalks the land as it did two or three generations ago. The story of this feat is interesting and perhaps worth retelling. Dr. Oguntola Sapara, I.S.O., L.R.C.P.&S.Ed., was a medical officer in the Nigeria Medical Service from 1896 to 1927. The 'sopono' cult (now proscribed by law) was a powerful and dreaded secret society of the large and influential Yoruba tribe. The method of operation of its members was to infect with smallpox virus a person or household whom they had unsuccessfully attempted to blackmail: this they did by the application of scrapings of the skin of actual smallpox cases, or of other fomites. Previous vaccination would of course protect the prospective victim from attack from smallpox as intended—hence the cult's opposition to vaccination. Often also, by deliberately disseminating infective variolous matter, they artificially created epidemics of smallpox in order to increase their clientele and produce numerous patients for them to 'cure'—and vaccination would stop all that! At great personal risk Dr. Sapara, himself a Yoruba, joined the cult incognito, learnt their secret, and later helped Government to introduce legislation which banned the cult as an illegal organization. Our problem, now, is different: it is not so much one of opposition by the people to vaccination as the need to find a thermo-stable smallpox vaccine which will retain its potency for long periods under 'bush' conditions, and particularly in the dry and hot climatic conditions of our most northerly territories."—*Annual Report on the Medical Services for the Year 1953-4*, Federation of Nigeria.

Correspondence

Because of heavy pressure on our space, correspondents are asked to keep their letters short.

Treatment of Intracranial Metastases

SIR—I read the article on adrenalectomy for intracranial metastases from carcinoma of the breast, by Mr. Allan-Clain and Mr. Alan H. Hunt (*Journal*, September 15, p. 627), with much interest. I am, however, in some doubt about their conclusion that the "operation of bilateral gonadectomy and adrenalectomy is at present the only possible treatment of value for patients with intracranial metastases from cancer of the breast." The following case history shows that radiotherapy in conjunction with hormone therapy may also cause regression of an intracranial metastasis.

A woman aged 45 had a radical mastectomy in April, 1953, for an anaplastic small duct carcinoma of the left breast. She remained well until the autumn of 1955, when she began to suffer from pain in both groins. She was admitted to hospital in December, 1955, complaining of headaches, inability to concentrate, a feeling of pressure on top of the head, pain in the upper part of the back encircling the chest, in the lower part of the back and in both groins, and also of severe thirst. She looked ill and pale and was unable to move without severe pain. She was passing large

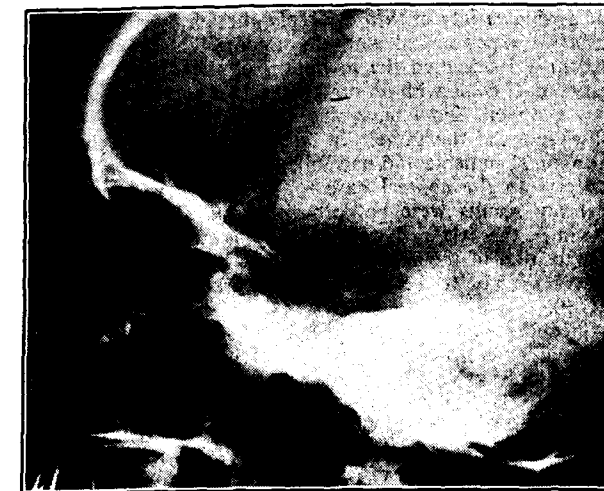


FIG. 1



FIG. 2

amounts of urine. An x-ray of the skull (Fig. 1) showed expansion and almost complete destruction of the sella turcica. The most painful lesions in the dorsal spine and pelvis and also the region of the pituitary gland were treated with x-ray therapy. Four weeks after the beginning of the x-ray treatment to the pituitary gland the thirst became less severe; ten days later it was completely relieved and she was passing a normal amount of urine. When the patient was discharged three weeks later the headaches and the feeling of pressure on top of the head had subsided, the power of concentration had improved, and the pain in the back and groins was less severe. She was then given methyl-androstanolone for five months. There was a steady improvement in her condition, she put on 1½ stones (9.5 kg.) in weight, and an x-ray of her skull (Fig. 2) showed recalcification of the sella turcica. When the patient was seen last month, her general condition was good and there were no further symptoms of diabetes insipidus.—I am, etc.,

London, W.C.1.

GWEN HILTON.

Glycyrrhetic Acid

SIR,—Correspondence regarding glycyrrhetic acid ointment reveals a difficulty which often attends the introduction of new remedies. Extracts of liquorice were shown to have certain cortisone-like properties when given internally, though not sufficient to be of much therapeutic value. Early this year a circular from a manufacturer informed us that glycyrrhetic acid was an active principle and that local application was effective in diseases of the skin. Ointment and lotion containing glycyrrhetic acid were recommended for a wide variety of skin disorders, though there was apparently no experimental work to support this claim. About this time I accepted the invitation of the makers to carry out clinical trials with an ointment and a control base which they supplied, and I have since learned that several of my colleagues did the same. In June I had assessed the ointment in 22 patients and had failed to show that it was at all superior to the control base. The makers were informed that my results were not promising but that I wished to continue the trial. However, they informed us that the composition of the ointment had now been altered and that it was shortly to be put on the market, prescribable on E.C.10.

Speaking generally, the effectiveness of a new ointment is usually very easily established if it is really much use. The astonishing value of hydrocortisone ointment can be strikingly shown in a very small series of suitable cases and leaves nobody in doubt. When an ointment such as glycyrrhetic acid fails to show convincing results in as few as 20 cases, one cannot of course say that it has proved to be inactive, and a series of this size with negative results seems hardly worth publishing; it is very much more difficult to prove a negative than a positive in this respect. But surely even such limited experience indicates that the ointment is not likely to be of much practical value. Certainly one wonders why glycyrrhetic acid was released for prescribing at public expense at a time when not a single favourable report on clinical trials had been published. This is not to argue that clinical trials with glycyrrhetic acid should proceed no further. The ointment may at last be shown to have some unexpected action or some slight clinical value, though it seems certain that this will be of only academic interest; but until larger series have produced some positive results it seems reasonable to confine prescribing to clinical trials.—I am, etc.,

London, W.1.

F. RAY BETTLEY.

Sickling in an African Community

SIR,—Dr. W. A. Wilson (*Journal*, August 25, p. 481) has criticized our article (*Journal*, August 11, p. 333) in which we discuss the mechanics of balanced polymorphism in the Baamba tribe. He differs in the calculation of the mortality of normal (non-sickling) homozygotes which he assesses at

27% as opposed to our 24.2%. Dr. Wilson's figure is based on the assumption that 157 deaths occurred in a "mean population"—i.e., one falling from 648 to 491. A cumulative death rate is, however, calculated upon the original population, and in our example is therefore 24.2% of the normal homozygotes born. We were concerned to show that in two situations the relative genetic fitness of the normal homozygote could be the same (in our example expressed by a loss in each case of 24.2% of the normal homozygotes exposed to the selective process), and yet the actual number of observable deaths from the selective factor could be quite different.

Dr. Wilson devises a formula for measuring malarial and non-malarial mortality at any given time. He assumes that the decline of population follows similar curves in both, and hence concludes that the proportional loss of life from malaria would be constant at any given mortality. Our argument is, however, based on the accepted view that at one period of childhood malarial mortality occupies far the greatest part of the total mortality, but that it is of less importance before and after that age (10–36 months).

Lastly, Dr. Wilson sees "a big gap to be closed between the 24% reduction in population needed by this hypothesis and the 7% or so which malaria can effect." The figure of 7% refers to all children, sicklers and non-sicklers alike, the 24% refers to non-sicklers only, and represents an observable loss of life from malaria between 6.9% and 15.7% of all children born. We gave reasons for expecting the actual death rate in Bwamba to be nearer the lower limit. Thus there is indeed little "gap" left, barely enough for Dr. Wilson to extract his "red herring."—We are, etc.,

London, E.C.1.
Kampala, Uganda.H. LEHMANN.
A. B. RAPER.

Medical Education

SIR,—May I please beg space in your columns to reply to the letter by Mr. John B. Williams (*Journal*, September 29, p. 767)? He suggests that there is an element of "unrealism" about my scheme for the education of the "compleat doctor," in that such a scheme would mean that a doctor would be in his thirties by the time he was established, and he implies, I think, that this is in part due to my recommendation in respect of the statutory period of National Service.

Several points arise. First, I would question whether being in one's thirties on becoming established is necessarily evil: there is nothing new in this, and I feel that to fulfil a family doctor's role adequately before the age of 30 is unusual. Secondly, I would question whether this is in fact demanded by my recommendations: my own experience was to become established as a principal at 31, in spite of more than six years' war service, but I quite realize that this was in exceptional circumstances. But if a man qualifies at 24 he should be in a position to enter practice at 28, and he would do so very much better fitted to his task than is now customary. Thirdly, on entering practice as either principal or assistant, the young doctor would have been earning for a full four years, so that the question, "Who pays?" scarcely arises. Fourthly, marriage really cannot be considered in the production of good family doctors: again I quote from experience—I married at 25, still a junior student, with no capital whatsoever, and I would hesitate to suggest that this has in any sense impeded my professional career. Finally, I would stress that the reasons for my recommending the early undertaking of National Service were twofold; not only to use it as a ready-made course in "lifemanship," but to avoid the likely waste of time and frustration accompanying its intrusion into his professional life at a later date; and the time at which he does his National Service will not affect its duration, so that it can have no bearing on his age at entry into practice. I trust none of your readers read into my words any suggestion that manhood could be achieved in no other way.—I am, etc.,

Upton, Hunts.

JOHN K. PATERSON

History of Medicine in Medical Education

SIR,—In all the recent discussions on medical education the importance of the history of medicine in the building up of the physician has been sadly neglected. History is, however, a vital factor, as much for the understanding of scientific principles as for developing the ability of independent thinking, of spiritual steadfastness, of constructive criticism and moral courage. The old saying *Historia vitae magister* applies to medicine as well as to life in general. I am not advocating new chairs, or matter for examinations, but an attitude of mind.

History of medicine allows us to understand thoroughly our contemporary medical problems. In the original Greek, history means "investigation" and not the recording of things past, which is only an aid to investigation. History of medicine is therefore investigation of our medical problems in the light of what has been thought about them in the past, and this allows for the perfect understanding of these problems. In science, to repeat the words of Benedetto Croce, the highest form of knowledge is historical knowledge.

History gives to the physician the general unified view of medicine and thus counterbalances the negative effects of specialization and ultra-technology that threaten to disrupt our great science. It thus plays a great role in the integration of medicine, which is dominating contemporary medical thinking. A most important aspect of this integration consists in the link between the natural scientific basis of medicine—physiology, pathology, nosology—and its cultural scientific basis—psychology, sociology, history and philosophy. Medicine is not only a natural science but also a cultural science, because we have to deal with man, and man is not only body but also mind and spirit. History shows us medicine in its humanistic and social aspect as well as in its scientific aspect and thus helps us towards an effective practice.

The growing interest in history of medicine shows that medical men feel the need of the historical attitude of mind. We have, however, to distinguish the real history of medicine from the philology of medicine, which consists of the study of the lives and works of the physicians of the past. This is a necessary discipline, but it is the investigation of medical problems in the light of those who have thought about them in the past that constitutes the real historical attitude of mind. It is not a matter of special chairs or examinations but an attitude that should permeate clinical teaching, as it has permeated the teaching of a William Osler, of a Clifford Allbutt, and of many Continental teachers at whose feet I have sat years ago.—I am, etc.,

London, W.1.

A. P. CAWADIAS.

Abuse of Antibiotics

SIR,—I was most interested to read Dr. A. Fry's letter (*Journal*, September 1, p. 551) on the abuse of antibiotics. I fear we are often little better in this country. I have for some time tried to make my registrars and housemen realize that antibiotics are dangerous and risky drugs and should only be used if there is some real indication and a safer treatment is not available. My specialty is urology, and in cases of this sort antibiotics are frequently misused. I consider that antibiotics should never be given to a case of urinary infection until the urinary tract has been shown to be free of any abnormality which could cause persistence of the infection, the only exceptions being if a patient's life or a kidney is in danger.

In the *Lancet* there appeared recently¹ a leading article on the increasing incidence of bacterial resistance to antibiotics. Routine prophylactic treatment with antibiotics and indiscriminate and inadequate administration are the chief cause of resistant strains. There are other grave disadvantages to antibiotics. In the *Journal of Urology* of June this year² a case is reported of fatal moniliasis after prophylactic antibiotics to newborn caesarean babies at a clinic in the U.S.A. There have been many other reports of fatal moni-

liasis in American literature. It would appear that since the advent of antibiotics many organisms previously practically non-pathogenic are causing fatal infections. I have had a fatal case of septicaemia with proteus following the treatment of a urinary infection with antibiotics.

I believe that the medical profession are not the only abusers of antibiotics. Farmers feed them to livestock, and lately I hear that meat and fish have been preserved with antibiotics. Is this wise? I would be the last to deny their value, but I do feel that unless we are more careful in their use they may cease to be effective and may do more harm than good. I cannot condemn too strongly their routine prophylactic use and indiscriminate administration, and I do hope that the medical profession in this country will set an example in the proper use of these drugs, which have been one of the greatest blessings to mankind.—I am, etc.,

S. HENRY C. CLARKE.

Hove, Sussex.

REFERENCES

- ¹ *Lancet*, 1956, 2, 293.
- ² Davis, J. B., Whitaker, J. D., Bing, L. K., and Kiefer, J. H., *J. Urol.*, 1956, 75, 930.

SIR,—For some time now I have watched with interest the views of your contributors and correspondents on the abuse of antibiotics. The recent attack by Dr. E. O. Evans (*Journal*, September 22, p. 712) on the policy of many of our American colleagues would seem to warrant a reply. There is much to be said for those American doctors who supply their patients with oxytetracycline or other broad-spectrum antibiotics to take should they get a cold, cough, sore throat, or other readily curable condition of this type, because it is quite clear from our journals that their patients will not receive them from most general practitioners in this country for complaints of this nature.

Only a few of us on this side of the ocean seem to realize that parenteral administration of drugs is undesirable when an oral route is possible and patients do not like feeling ill unnecessarily, therefore penicillin and the sulpha drugs are as out of date as leeches. One of the greatest assets of some of the newer antibiotics (particularly the tetracyclines) is that they can be used with little or no inconvenience to the patient to achieve a rapid cure of many minor ailments, to prevent the onset of major illnesses, and to reduce the number of patients needing hospitalization. The small doses (often no more than 750 mg. a day for not more than three days) generally prescribed for this method of self-treatment are frequently successful if begun at the first sign of an illness.

I will answer in advance the numerous critics who will assert that this line of treatment is likely to give rise to resistant strains of staphylococci by saying the bulk of the literature shows clearly that resistant strains are carrier spread in closed communities and that their occurrence among the general public in America is not excessive.—I am, etc.,

Droitwich.

G. B. LEYTON.

SIR,—Dr. Joan M. Curtis (*Journal*, September 29, p. 767) is very much against the abuse of antibiotics, but apparently has different views about the abuse of general practitioners. It seems to me that no good can come of this miscalling of one section of the profession by another. We all make our mistakes, not only with antibiotics, but surely tolerance and understanding are preferable to reviling our fellows in print. When all is said and done there are those in the ranks of the consultants who are not averse to prescribing vast quantities—one thinks of patients in some wards receiving penicillin routine no matter what is wrong—but no good will come of bickering among ourselves about it.

There is no question that all branches of our profession must consider the problem more from the financial aspect than from any other, because economy now rules the day. Recently, having become involved in the problem of over-prescribing, I have been cutting down on all prescribing in my practice and I have been watching to see what the effect is. To my surprise there has been no marked change at all. No patients have died of lack of drugs and none

has suffered from no antibiotics—except for some of the septic hands, which obviously would have benefited if I had given a suitable drug at the beginning instead of later on when I was forced to do so. Apart from these cases, there appears to be no disadvantage in practising the methods I used before the war when antibiotics had not been discovered, but I cannot help feeling that to go back 18 years cannot be considered progress, even although it is cheaper.

We must find some solution to this problem, some set of rules or recommendations that will enable us to work out when an antibiotic is needed and when it is being wasted. Would it not be a good idea for some young registrar to analyse the results of treatment in representative surgical and medical wards to show the length of treatment, the incidence of complications, and the final results of treatment, comparing a pre-war year with perhaps the past twelve months? In this way we might be able to evaluate the effects of antibiotic treatment, other circumstances being equal. We might even discover that the liberal use of these drugs in hospital has saved vast numbers of man-hours by returning patients to their work earlier than before, and perhaps it might transpire from a similar inquiry in general practice that vast numbers of men return to work without ever being near a hospital, where formerly weeks were spent draining septic tendon sheaths and healing the stumps of amputated fingers, making disfiguring incisions for breast abscesses, and guiding the critically ill patient through the dangers of lobar pneumonia.

If such inquiries are held and do prove these suggestions of mine, we should point out to the Minister that solid gain has been made, that the health of the people has improved, and that economies made in this way must be placed beside the increased cost before a balance is drawn. In addition, we must remember that we are a great and noble profession, that the vast majority of us, in all sections, are honest men and women striving to do our best for our patients and our Government—in that order—and that it is a mistake to conclude that all men are fools because one meets an error from a hard-pressed practitioner, probably overworked, and doubtless underpaid as well.—I am, etc.,

Tarbert, Argyll.

A. C. MAYER.

Watery Eye Drops

SIR.—The recent incident at an eye clinic emphasizes the dangers inherent in the use of watery eye drops in children. In this case hyoscine hyd. 2% was dispensed instead of the 2% homatropine hyd. which had been ordered. The drops were made up in distilled water.

Watery solutions rapidly pass into the nose and nasopharynx and are soon absorbed. Fatal cases of atropine poisoning have been reported in babies who had been treated with regular instillations of a 1% solution of the sulphate in water. Drugs incorporated in an oily or ointment base are retained in the conjunctival sac; absorption is local and so limited that systemic symptoms do not occur. This retention has the additional advantage that the ocular effect is more profound and prolonged.—I am, etc.,

London, N.4.

E. M. G. GALTON.

Speech Therapy

SIR.—The last sentence of Mr. H. St. John Rumsey's letter (*Journal*, September 29, p. 768) suggests malpractice by speech therapists. If that was the meaning, it is a serious charge which I hope will be withdrawn.

One has to agree that it is a pity that there are not more mature women entering the profession, and that in the U.K. there are so few male speech therapists. In other countries the proportion of men in the profession is much higher. As to the rest of the letter, it is largely based on an old gentleman's misapprehensions. Stammerers are not crowded out of speech therapy clinics in favour of cases of very minor defects, such as "slurred" s; sometimes patients are taken on "first come, first served" principles, at others priority is given to the more urgent and serious cases—but

never preference to the so-called easy ones. A sigmatism can be related to other conditions; schoolteachers and parents cannot always do the job on the strength of a single explanation; and as to the cost of training, it costs as much to train as a teacher of speech training as it costs to train as a speech therapist.

Mr. Rumsey seems to be unaware of the existence of aphasics, laryngectomized patients, recurrent laryngeal nerve palsies, high frequency deafness, and the numerous other disturbances of speech and voice to be dealt with, if he believes only backward speakers, stammerers, and spastics come into the picture.—I am, etc.,

London, N.W.11

JOAN H. VAN THAL,
Speech Therapist,
St. Bartholomew's Hospital.

SIR.—I was glad to see that Mr. H. St. John Rumsey in his letter (*Journal*, September 29, p. 768) endorses the view that stammering cannot be treated as if it were merely a matter of correct enunciation. His assertion that boys of 12 should not be treated by a "young woman" gives the weight of his reputation to my view that a stammer is essentially a symptom of, or a form of, neurosis. I often have cause to notice the extent to which damned-up aggression, usually against the father, contributes to the inhibition of speech.

This raises the point as to whether the average speech therapist, in spite of her long and difficult training, is the best person to deal with stammerers, or whether we should not make yet another specialty and train men for that specific purpose. The rare female stammerer can usually adjust herself to either male or female therapist. In every case, unless the stammerer is leading an independent life away from home, the domestic atmosphere must be inquired into and the parents' responsibility for the condition brought home to them. In many cases (as often happens with married couples) the wrong person is brought for treatment, and it will be found that one or both parents exhibit some serious personality defect to which the stammer is the reaction.—I am, etc.,

Scarborough.

R. MACDONALD LADELL.

SIR.—Mr. H. St. John Rumsey (*Journal*, September 29, p. 768) states that it is "extremely difficult to be really conscientious about wasting time when working by paid sessions" and thus seems to arraign in principle the world economic system, but since he is here attacking speech therapists may I be allowed to reply on their behalf?

We are accused of wasting time on the lighter kind of case. Case selection in a speech clinic presents great difficulties because of the different amount of time allotted to each type of defect, and when a single short appointment time is vacated only one demanding a similar time for treatment can be taken in. This is the only likely reason for jumping any case on the waiting-list even temporarily, but the opposite is more likely to be true, that complicated adjustments are made to allow a severe case demanding a longer treatment time to be brought forward. There are, of course, many other categories of case, mild and severe, than those mentioned by Mr. St. John Rumsey, but speech therapists have the needs of stammerers very much in mind. Minor defects, however, have major consequences, and most people would agree that we are not wasting our time in treating them.

Let me now face the other way and meet the charge that, after all, the greater number of speech therapists, who happen to be women, should not treat stammerers at all. It seems that the patient-therapist relationship is a very individual matter, and the scientific management of this aspect apart, one boy of 12 might respond better to a man (the right man) where another would respond better to a woman even if young. An eminent psychiatrist recently expressed surprise at the "excellent results achieved by these young girls." In any case the "bossing about" mentioned would be a very faulty technique. The one generalization about stammering seems to be that no generalizations are possible. Mr. St. John Rumsey scatters them broadcast.

Sir, human frailty is common to all mankind, but, apart from that, let me assure you that speech therapists are trying to do conscientious and honourable work in relieving suffering, and would do whether they were paid for it or not. They are, of course, paid very, very little, which is no doubt the reason why we have so few male therapists to carry out the valuable work that Mr. St. John Rumsey would like them to undertake.—I am, etc.,

London, W.2.

PEGGY CARTER,
Press Officer,
College of Speech Therapists.

Clinical Psychologist in the Mental Hospital

SIR.—Dr. Ralph Hetherington, in his plausible advocacy (*Journal*, September 22, p. 708) of the significance of a psychologist—as psychotherapist—"based on the ward," cites a postulate which he deems favours his contention. On page 709 he writes, "Whereas the doctor and nurse are inevitably in positions of authority, the psychologist is not so. He is not required, nor is it necessary, for him ever to give orders to the patient or to anybody else. His advice may often be sought, but he never assumes authority. This often provides opportunities for the patient to work out his problems when he needs some non-authoritarian figure to consult."

A doctor and a nurse, working in a ward, are responsible: they are not authoritarian. It is a medical adage that clinicians and nurses who look after patients, and specialists who practise a particular technique—as for instance psychotherapy—should be held directly responsible for the care and treatment they provide. Dr. Hetherington's identification of an age-honoured tenet of responsibility with authoritarianism provides him with an untenable postulate; and the consequent standpoint, as to the function of doctor and nurse, is founded on such a false premise as to render his contention, so far as this aspect of the argument is concerned, *eo facto*, invalid.—I am, etc.,

London, W.1.

MURDO MACKENZIE.

Prefrontal Leucotomy

SIR.—Will you allow me some comments on the article on prefrontal leucotomy by Drs. A. Elithorn and E. Slater (*Journal*, September 29, p. 739) and also on your annotation on that subject (p. 760)? My experience is based on personal observations on some 230 cases on whom I carried out—I hope you will forgive the term for want of a better one—psycho-surgical operations. Unlike the series described by Elithorn and Slater, the vast majority of our cases were certified chronic psychotics. The material is now undergoing analysis, but I can support wholeheartedly the statements made by the two above-mentioned authors. To speak, in the case of chronic psychotics with "disintegrated" or "dilapidated" personalities, of undesirable post-operative changes shows that those who say so do not appreciate the extent of the problem as it exists in our mental hospitals. To speak of exaggerated fear of the operation reflects merely the fact that the procedure has not been adequately explained to either the patients or the relatives, and is more often than not based on rumour. It rarely takes more than two or three days for any one patient to recover from the immediate post-operative effects, which are no different from any other minor surgical procedure.

There appears to exist amongst many doctors the belief that a violation of the integrity of the skin must cause serious damage; they forget that procedures such as electro-convulsive therapy also have their effects on tissues, which I have been able to inspect and trace over months and years with the E.E.G. machine. The "personality defects" so often described are, I am sure, frequently due to inadequate rehabilitation or re-education: after many years of institutional certified life it is surely expecting too much that the patient should, when returned home early after the operation, behave with perfect manners. In our experience at this hospital it is not unknown to find that a stable state in which there are no further mental changes, favourable or

unfavourable, is not needed until 18–24 months after operation.

Finally, one word about your annotation. It is my impression that leucotomy and kindred operations should be advised and carried out in the light of a careful selection of the cases and that each operation should be fitted to the case. A fair range of modifications has now been practised and associated adequately with individual needs. This attitude, I venture to suggest, would be a better one than to consider leucotomy a last straw when everything else has failed; the duration of the illness and any other treatment the patient has had during his illness has a marked effect on the prognosis. The very fact that other means of physical treatment have failed makes it doubtful that the last straw will prove to be a life-saver. I believe it was Dr. Slater himself who stated at a meeting on leucotomies at the Royal Society of Medicine that the proper diagnosis and selection of each case should determine therapy rather than try each method in turn and leucotomy last.—I am, etc.,

Colchester.

S. L. SHERWOOD.

SIR.—I do not want to add fuel to the controversy for or against leucotomy. The article by Drs. Alick Elithorn and Eliot Slater (*Journal*, September 29, p. 739) gives a very practical approach to the assessment of results, though it might be asked whether leucotomized patients and relieved relatives would show penetrating judgment. It seems to me that part of the doubt in the minds of the critics is due to the frank difference in approach between psychiatrists interested in "depth" psychology and psychiatrists studying the more widespread field of symptoms. The annotation on response to leucotomy (p. 760) is a case in point, though admittedly what is quoted has a special reference. It is stated: "Many neurotic illnesses turn out to be atypical depressions . . . and most neurotic illnesses have high remission rates whatever the type of treatment given." This last may be statistically true, but could well imply an attitude which overlooks the individuality of the patient.

Is it really suggested that with any given case of neurosis a competent therapist could equally well use long-term analysis, hypnosis, support and sedation, relaxation exercises, or a variety of physical methods? Perhaps not, but the implication to the general reader might be that it does not much matter. Equally, because the majority may tend towards self-cure—which after all is a tendency noted in many illnesses—is there no importance in trying to assess which patients are liable to become chronic? Certainly the bane of the therapist's life is to be constantly receiving cases which should have been treated years back, before the situation is complicated by secondary elaborations and ingrained psychosomatic disturbances, which may even have led to operation. By that it is not implied that all such would have been curable.

To my mind there is no doubt that in certain cases prefrontal leucotomy offers far the best chance. But the expert in leucotomy may fail to understand the point of his critics, because he is not primarily interested in the quality of human experience. As leucotomy so often is only resorted to in order to save a psychiatric disaster, the pros and cons are perhaps better argued in each special case, rather than as a matter of principle. Nevertheless, it is fundamentally slipshod not to face the philosophical implications involved, in what is, at least potentially, a maiming of the personality. Lastly, if it is really true that most neurosis tends toward recovery, why is such satisfaction still felt at the early treatment of war neurosis, often largely by physical means, in the second world war, compared with the more delayed treatment in the first world war?—I am, etc.,

London, W.1.

ALAN MASON.

SIR.—The paper by Drs. A. Elithorn and E. Slater (*Journal*, September 29, p. 739) and your annotation (p. 760) show the very doubtful results to which some statistical approaches in psychiatry can lead. A brain operation of ill-defined physiological and psychological effect is carried out on 103 patients who suffer from a diversity of symptoms such as intractable

pain, inability to bear tinnitus or involuntary movements, anxiety states, depression, and schizophrenia. Some patients are apparently mentally healthy, others obviously mentally ill to a varying degree. They are all lumped together, and the opinions of patients who feel that they are better or worse after the operation, and the opinions of relatives, are given *en bloc*. Then the authors, and you in your annotation, come to certain conclusions on the basis of those findings.

The many questions that such an investigation must arouse are not answered, nay, they are not even asked. What do mentally healthy and mentally sick people mean by, "I have or have not noticed a change in my personality"? To what extent has the pro-leucotomy attitude of the physicians influenced the answers of the patients and of the relatives? What do we know of the family setting of the 103 patients, of the attitudes of the relatives to the patients? What values and meanings are attached to the relatives' statements that the patient is or is not better? We all know that there are some patients who demand and some who apparently benefit for a while from punitive measures of a social, medicinal, or surgical kind. How far have such traits influenced the result of the investigation? Little doubt, there will be patients who feel better after leucotomy. Many patients say they feel better after taking valerian mixtures. Neither statement adds to our understanding of the patient, the illness, or the therapeutic procedure, except in the very crudest pragmatic sense.

Any views whatsoever on the hotch-potch of opinions on superficial label diagnoses with which we are presented can hardly be called an empirical approach to leucotomy, as you call it in your annotation. All we have really learned is that some people who thought they were a nuisance to themselves, who probably were a nuisance to their doctors, and who were a nuisance to their relatives, think now that they are either less or more of a nuisance to themselves, and some of the relatives do or do not think on similar lines. An operation that might be defensible in a moribund patient in intractable pain might not be desirable at all in patients to whom we attach the label of "chronic anxiety or tension state," a label that is hardly more of a fundamental medical diagnosis than "chronic pyrexia." Maybe we are not able yet to formulate our psychiatric diagnoses better. But then we cannot usefully evaluate statistically groups of patients under that heading any more than we could evaluate treatment methods for groups of patients under the headings of "fever," "cough," or "headache."

Any method of treatment which might alleviate human suffering and reëstablish health deserves to be studied without bias. The opinion of the patient on the effect of treatment is of vital importance, and the opinion of a relative may be of value in this connexion, too. But the patient must know what we are talking about, and we must understand what the patient is talking about. To draw conclusions from the opinions of an undifferentiated mixture of mentally healthy and mentally disturbed patients, without distinction and without investigating what exactly the questions and answers mean to the patient, can hardly throw any light on the value of leucotomy or on our conceptions of mental illness or mental processes. Such pseudo-scientific and pseudo-statistical studies, under whatever aegis they may be issued, will certainly not "stop scare stories about this operation" (your annotation), and can hardly give confidence to doctors or patients.—I am, etc.,

Southall, Middlesex.

M. B. CLYNE.

Medical Evidence at Inquests

SIR,—Dr. W. Maxwell Penny (*Journal*, September 29, p. 767) does not appear to have much confidence in the pathologists in the county of Kent, nor does he appear to think coroners are interested in obtaining a precise and exact cause of death in cases submitted to them. As a county coroner, to whom 800-odd cases per annum are reported, I am of the opinion that a coroner's certificate based upon a pathologist's report is of much more value to the Registrar-General than the average death certificate.

May I take this opportunity of putting on record that I always receive a great deal of willing co-operation from every pathologist I call upon, and I am quite certain this is true of the coroners in the county of Kent? Furthermore, I would suggest that Dr. F. M. Rose (*Journal*, August 11, p. 356) acquaint himself with the facts before he writes about coroners being unwilling to obtain and/or pay for reports, etc., from general practitioners and house officers. By far the majority of coroners—if not all—are reimbursed for all witness expenses paid by them; many coroners are in fact provided with an imprest account for such expenses. It is, of course, the general custom of a coroner to acquaint himself with information from all sources, and he is only too willing to hear the point of view of the general practitioner—that is, if he has something material to say. Whether he can pay for such information or not depends on the schedule issued by the county or borough authority—not on the personal inclination of the coroner.—I am, etc.,

East Grinstead, Sussex.

A. C. SOMMERVILLE.

SIR,—I read with some surprise the experiences of your correspondent Dr. W. Maxwell Penny (*Journal*, September 29, pp. 767) with regard to coroners' necropsies. In view of recent trends in forensic pathology, I felt it necessary to make inquiries into the circumstances of the cases and found that, in fact, the later two incidents took place some 20 years ago. One can only hope that Dr. Maxwell Penny's more recent experiences have been less unhappy.—I am, etc.,

London, W 1.

FRANCIS CAMPS.

Doctors in Hungary

SIR,—During the past two and a half months I have spent a total of seven weeks investigating political, social, and economic developments in Hungary. On the evening of September 26 Mr. Marosan, a deputy Prime Minister of the Hungarian Parliament, drew my attention to an item of medical news in your September 8 issue headed "Doctors in Hungary" (p. 611).

It said that professionally educated persons in Hungary who prior to the present regime elected private practice rather than Government employment, were now reduced to a status of extreme poverty and many of them are literally starving to death. The fact is that every doctor receives a salary from the State. He may then increase his income in a number of ways, such as an appointment to a hospital, clinic, or factory. But by far the most lucrative way is to establish a private practice. The number of people able to obtain a doctor's services through the national insurance scheme has increased from approximately 1 million before the war to 5 million. The rest of the population requires doctors' services in a private capacity. A doctor in Hungary is not only able to work privately but in any case has a basic State salary. It is true to say that doctors are among the most highly paid, and, indeed, in our hotel (the best in Hungary) more than half of the Hungarian residents were in the medical profession. Should a student doctor, having qualified, decide to do intensive research in order to become a specialist later on, he may well take no other job and live on the State salary. He would not live well in making the same sacrifices as are made by similar-minded students in any country in the world. But nobody starves in Hungary, and my family and I saw no sign of poverty.

Incidentally, we have good reason to know something of Hungarian health services. One of my sons was ill in our hotel and was seen by three doctors on holiday there and two local doctors. My youngest son was taken to a hospital seriously ill. There are 20 doctors in the hospital, all receiving a State salary. Before the present regime only five of the twenty were paid.

I am assured by the professor who attended my son that no longer do young doctors have to take jobs as bus conductors through lack of remunerative professional practice. Maybe the case-history mentioned in the article is dated pre-1939.—I am, etc.,

House of Commons.

RON LEDGER, M.P.

Obituary

Dr. J. L. KYDD died in Glasgow on September 13 at the age of 55. James Lowdon Kydd was born at Falkirk on July 16, 1901, and was educated at Stirling and Wishaw High School, before proceeding to Glasgow University, where he graduated M.B., Ch.B. in 1926. After a short time in Newcastle and Wales, he went to Easington, County Durham, in 1928, where he married and remained as an assistant until 1931. At the beginning of that year he returned to Scotland, to Bellshill, where he succeeded to the practice of Dr. J. H. Clifford, and began what was to be a quarter of a century of hard, unremitting work. The early years were marred by trade recession and bad times in the district, rendering his task a difficult and uphill struggle. In the late 'thirties conditions improved, but, as if fate were against him, he and his whole family contracted scarlet fever, and this severe illness affected his heart. On return to work he found that he could no longer carry on alone. To his first assistant, who stayed with him for nearly three years, Dr. Kydd's devotion to his patients became more and more obvious. Nothing that was for their welfare was too much trouble, and at this time too he instituted and built up a very fine electrotherapeutic practice, which he ran in conjunction with the ordinary every-day work of his general practice. When the second world war came along he became senior medical officer of the first-aid service in the area and also medical officer to the Home Guard. This extra work entailed many sleepless nights and worry, and there is no doubt that it told on his health. After the war he was appointed factory doctor for the Bellshill area, and he also became active in the Lanarkshire Division of the British Medical Association, of which he was chairman in 1944-5. In the last three years his health had not been good, and latterly it required a great effort of mind and body to overcome his disability so that he might continue to help and treat his patients. Indeed, at times he was so ill that those who knew him best marvelled that he was able to go out at all. Only his great determination and strength of purpose kept him alive, because he refused to ease the strain on himself. In the end his death was sudden and came as a great shock to all his patients and friends. He is survived by his wife and four children, to whom our deepest sympathy is extended in their great loss.—A. Y.

The tragic death on September 19 of Dr. D. R. SYRED, after a short illness, has come as a shock to his medical colleagues. He was 41 years of age. Deryck Ralph Syred was born at High Wycombe on September 4, 1915, and was educated at Caterham and at St. Bartholomew's Hospital, qualifying M.R.C.S., L.R.C.P. in 1940. With just over a year's hospital experience, he joined the R.N.V.R. in July, 1941. His active service was only too short. His destroyer was torpedoed in the second battle of the Java Sea, and after 24 hours in the water he was picked up by the Japanese, in whose hands he remained as prisoner of war for three and a half years. His native ingenuity was severely taxed to improvise and extend his miserable medical supplies to the utmost benefit of his fellow prisoners. Close contact has been maintained with a number of the survivors of those years, and his good work under difficult circumstances earned a mention in dispatches in 1946. On discharge from the Navy he trained in radiology at the Middlesex Hospital, obtaining his D.M.R.D. in 1948. Dr. Syred then went to Northampton as senior registrar, and since 1951 had held a consultant radiodiagnostic appointment with the Northampton and Kettering Hospital Groups. His work was characterized by diligent application to detail, and careful questioning appraisal of the clinical problems presented. His prisoner-of-war experiences had left their mark, but his assurance and confidence were gradually restored, reflecting the increasing respect shown for his opinion. His main outside interest was sailing, with swimming as a necessary

associated accomplishment. Withal we shall remember him for his sincerity, his hard work, his quiet charm, and occasional more boisterous outbursts of laughter, and we deeply regret his untimely death. He leaves a widow, two sons, and a daughter, to whom we extend our heartfelt sympathy.—G. H.

Dr. WILLIAM CUTHBERTSON died on September 19 at his home at Leyton, after a long and tedious illness. He was 59 years of age. William Cuthbertson was born on June 17, 1897, and studied medicine at Glasgow University, graduating M.B., Ch.B. in 1924. He entered into partnership with a fellow Scot in 1927, and conducted a very busy general practice in the Walthamstow, Leyton, and Woodford districts, running the practice single-handed during the second world war. He leaves a widow, a son, who is a final-year medical student, and a daughter.

Dr. N. A. THORNE writes: William Cuthbertson was a practising Christian and a good man in the true sense of the word. As one who had known him for almost thirty years, both as a patient and then as a colleague, I am certain that he will be truly missed. His patients have lost a tireless friend and comforter, as well as a most competent general practitioner. He always put his duty to his patients before his personal convenience. His special interest was in children, and for many years he acted as honorary physician to the Walthamstow Child Welfare Society, doing pioneer work in the days when the public health service was less highly organized than it is now.

By the death of Dr. D. W. A. BULL on September 24 Stony Stratford, Buckinghamshire, has lost a prominent townsman and a highly respected medical practitioner. He was 76 years of age. Douglas William Anderson Bull was born at Stony Stratford on April 7, 1880, the son of Dr. W. H. Bull, and was educated at the old St. Paul's College, Stony Stratford, and Lancing College. He then went on to Gonville and Caius College, Cambridge, receiving his clinical training at St. George's Hospital. He qualified M.R.C.S., L.R.C.P. in 1906, obtaining the degrees of M.B., B.Chir. two years later, and proceeding to the M.D. in 1915. After qualification he held a number of house appointments at St. George's before joining his father in practice. After the death of his father in 1921 he was joined in the practice by two other doctors, and was senior partner until he retired in 1950. From 1919 until last year he was medical officer of health for the Wolverton Urban District Council, and for some time he was a member of the Bucks County Panel Committee. Appointed a justice of the peace in 1924, he was chairman of the Stony Stratford Bench from 1945 until last year. His great interest was in the work of the St. John Ambulance Brigade, an interest encouraged by his father, who inaugurated the movement in Stony Stratford in 1886. For many years he was a lecturer and an examiner, and he coached the Wolverton Railway Carriage Works team which won the Railway Shield and the Dewar Shield on many occasions. In 1937 his team won a competition in which Dominion teams took part, the Wolverton team having the honour to be in Westminster Abbey at the coronation of King George VI. For his services to the St. John Ambulance Brigade he was appointed a commander of the Venerable Order of St. John of Jerusalem. A keen sportsman, he represented his college at tennis, hockey, cricket, and football, and he played tennis for Buckinghamshire for several years. He married Miss Eileen Waddell in 1909, and she survives him with one son, now consultant radiologist at St. George's Hospital, and one daughter, who is the wife of Dr. J. S. Minett.

Dr. L. M. V. MITCHELL, formerly honorary physician and bacteriologist to the Royal Northern Infirmary, Inverness, died suddenly at his home at Inverness on September 28 at the age of 69. Lachlan Martin Victor Mitchell was born on March 24, 1887, and was educated at Edinburgh University, where he graduated M.B., Ch.B. in 1909. After

graduation he settled in practice at Inverness, becoming also medical officer to the burgh tuberculosis dispensary and assistant surgeon at the Royal Northern Infirmary. Shortly before the outbreak of the first world war in 1914 he was appointed medical superintendent of Inverness Infectious Diseases Hospital. During the war he served as a captain in the R.A.M.C. with the 1/1 Highland Mounted Brigade Field Ambulance, and later attained the rank of major. For his war services he was appointed O.B.E. in 1919. On return to civilian life he obtained the Aberdeen D.P.H. with honours in 1920, and then became bacteriologist to the Royal Northern Infirmary. A member of the British Medical Association for forty-four years, he was chairman of the Inverness Division from 1926 to 1928 and again in 1933-4, and president of the Northern Counties of Scotland Branch from 1949 to 1951. He leaves a widow.

Dr. J. RONALD writes: I would like to pay personal tribute to the late Dr. L. M. V. Mitchell, whose passing has deprived the Highlands of a physician of exceptional quality. "Dean of the Faculty" in the north, and a man of great personality and variety of gifts, he used his talents well and generously, combining innate kindness with knowledge and wisdom. Widely travelled, cultured, and uncompromisingly honest, he had an analytical mind and an intellectual curiosity which rendered his opinion of the utmost value to patients, colleagues, and friends. His shrewd clarity of expression had something in common with Voltaire's crispness and the irony of Anatole France, but was illumined and warmed by a very human, and sometimes Rabelaisian, humour. Though gifted and accomplished, he was yet gentle and tender; the wealth of kindness he gave to his fellows can never be fully known, but will never be forgotten. Warm-hearted and courageous, loving and loved, he was indeed *fortunae majoris honos, erectus et acer*.

Medico-Legal

MEDICAL EVIDENCE ON APPEAL

[FROM A CORRESPONDENT]

In a recent case in the Court of Criminal Appeal a man convicted of murder was acquitted on admission of new medical evidence. Apart from its considerable medico-legal importance, the case has raised a number of issues of far wider general interest.

At first sight the facts are simple enough. The victim was stabbed in the stomach during a fight in a café in Hull. He was taken at once to hospital, where an operation was performed, and after eight days died with bronchopneumonia. The man who attacked him was charged with murder and found guilty. After this trial, however, one of the doctors who had observed the victim's treatment in hospital said that in his opinion death would not have occurred if certain errors in treatment had not been made. On the strength of this evidence an appeal was allowed. The defence then sought to prove that death was in fact the result not of the original injury but of two errors in treatment—the incorrect use of oxytetracycline and the administration of excessive quantities of fluid. Two expert medical witnesses supported the defence. The appeal was allowed and the conviction quashed.¹ As a result of the suggestion that the patient had not been correctly treated in hospital, Leeds Regional Hospital Board set up a committee of inquiry, which included three independent medical assessors. They reported unanimously that they had no fault to find with the patient's treatment, which they in fact described as devoted and exemplary.²

So we are faced with two flatly contradictory views of the case. A conflict of medical evidence is nothing new, but in this case the differences between the experts are peculiarly subtle. No one would deny that death from fulminating

enteritis may occur after abdominal operations, especially though not uniquely following the use of broad-spectrum antibiotics, or that patients can be killed by administration of excessive amounts of fluid as well as by dehydration. Either of these treatments could have caused death, but the evidence that they in fact did so is by no means complete. There was apparently no evidence of infection by drug-resistant staphylococci, such as would be expected if oxytetracycline had really been responsible. Nor was there any oedema of the lungs or other evidence of overhydration such as would have been expected if excessive amounts of fluid had been given. So from the purely medical point of view the cause of the victim's death remains obscure.

But the fact remains that the victim was stabbed with a knife—and if he had not been stabbed he would probably still be alive. If an intention to kill could be inferred from the nature of the weapon and the wound, then the original charge of murder was right, as would have been a charge of attempted murder if the victim had survived. If the wound had been trivial or if it could be shown that there was no deliberate intention to kill, then the right charge was one of manslaughter, and the original conviction for murder was wrong. Common sense suggests that the rightness or wrongness of the original verdict should be treated on its own merits, and the question whether the medical treatment was right or wrong does not enter into it. The appeal, however, was allowed, apparently on the ground that if the evidence submitted later about the medical treatment had been available at the first trial the jury might not have been satisfied that death was due to the stab wound, and might have brought in a different verdict. If there had been any likelihood of that happening, then since a second trial was out of the question the appeal had to be allowed. But was there any likelihood of that happening? It is hard to see why technical arguments about the correctness of the medical treatment should have in any way affected the case for or against regarding the crime as murder.

Criticism of the treatment the patient received in hospital was a necessary corollary to the successful appeal. The appeal was allowed only because it was possible to argue that death was due not to the wound itself but to complications caused by incorrect treatment. This is especially unfortunate, since there can be little doubt that a great deal of care was devoted to the patient's treatment. The whole case leaves us with a feeling of confusion and incompleteness. We may perhaps have heard the truth and nothing but the truth, but where lies the whole truth?

THE SEXUAL OFFENCES ACT, 1956

[FROM OUR MEDICO-LEGAL CORRESPONDENT]

The statute law of England has grown piecemeal since Angevin times into a luxuriant jungle which is nearly as daunting to lawyer as it is to layman. Into this jungle light is being gradually admitted by the devoted efforts of the parliamentary draftsmen charged with the consolidation of the law into more logical and compendious statutory form.

A good example of the process is to be found in the Sexual Offences Act, 1956, which will come into force on January 1, 1957. According to its "long title" this is an Act to consolidate with corrections and improvements the statute law of England and Wales relating to sexual crimes, to the abduction, procurement, and prostitution of women and to "kindred offences," and to make the necessary consequential alterations to existing statutes. The object of the exercise is not to alter the law but to streamline it and make it readily accessible.

The numerous offences with which the consolidating statute deals are culled from some 16 statutes beginning with the Offences Against the Person Act, 1861. Six statutes are involved in consequential alterations. The second schedule to the Act consists of a table of the offences dealt with, showing how they are prosecuted and what penalties and alternative verdicts are available; this runs to 36 separate

items ranging from rape to the crime of tenants permitting premises to be used for prostitution. An attempt to commit most of these offences is an offence in itself, sometimes involving different prosecution procedures and always different penalties. The provisions enabling a landlord to get rid of a tenant who has been convicted of using the premises let to him as a brothel involve cross-referencing the Act with the flourishing thicket of the law of landlord and tenant.

Doctors should find it easier as a result of the new Act to find out what the law on sexual offences really is. When its reform has been achieved the statutory thicket, now neatly pruned, will at once start growing again.

Vital Statistics

Eire in Second Quarter

In Eire in the second quarter of 1956 the number of births registered was 16,840, giving a rate of 23.3 per 1,000 population, which was 0.4 above the corresponding rate last year. The number of deaths registered was 8,595, giving a rate of 11.9 per 1,000 population, and 1.4 below the rate for the second quarter of 1955. Deaths from respiratory tuberculosis numbered 155 and from other forms of tuberculosis 39; corresponding figures for last year were 198 and 38 respectively. Deaths from infectious diseases included 2 from streptococcal sore throat, 3 from diphtheria, 14 from whooping-cough, 2 from meningococcal infection, 2 from acute poliomyelitis, and 4 from measles; tetanus caused 3 deaths, rubella 2, and herpes zoster 1. The infant mortality rate was 33 per 1,000 registered births, and was 3 below the corresponding figure for last year.

Week Ending September 29

The notifications of infectious diseases in England and Wales during the week included: scarlet fever 447, whooping-cough 1,765, diphtheria 8, measles 1,396, acute pneumonia 292, acute poliomyelitis 131, dysentery 457, paratyphoid fever 9, and typhoid fever 5.

Infectious Diseases

The largest rises in the notifications of infectious diseases in England and Wales during the week ending September 22 were 150 for measles, from 932 to 1,082, 69 for dysentery, from 321 to 390, and 63 for scarlet fever, from 313 to 376; the only large fall was 423 for whooping-cough, from 2,271 to 1,848.

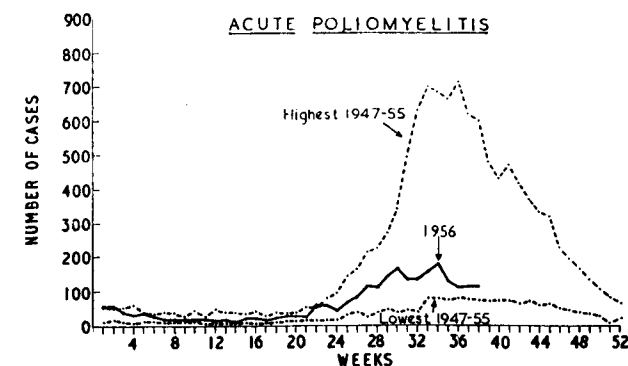
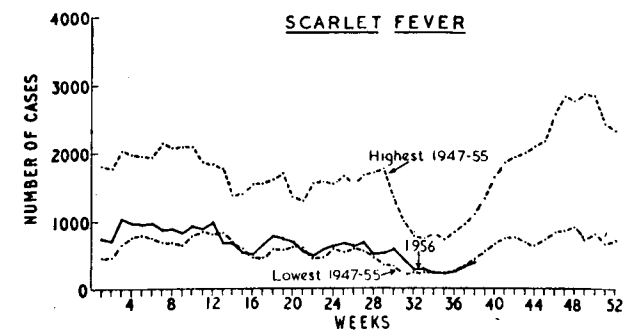
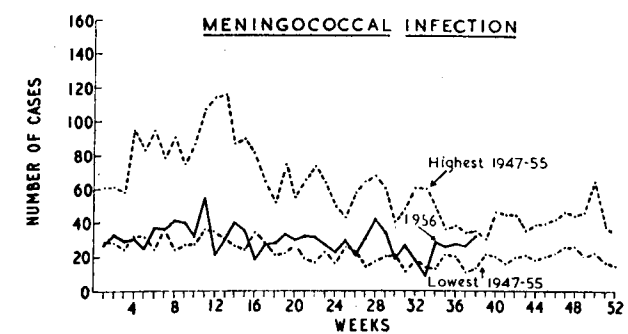
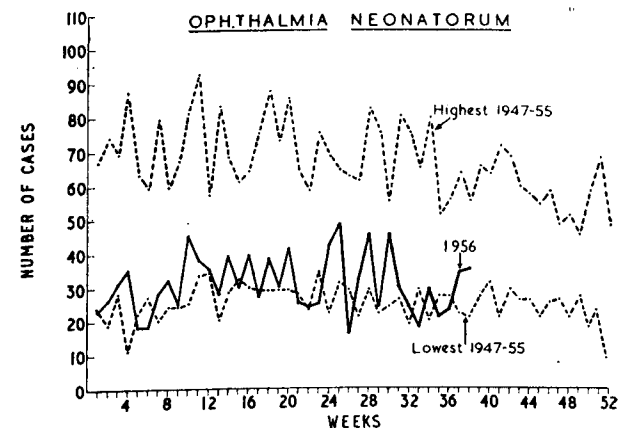
The rise in the incidence of scarlet fever was largest in London and the south-east counties, where 64 cases were notified compared with 37 in the preceding week. The incidence of whooping-cough fell throughout the country; the largest falls were 52 in Kent, from 140 to 88, 50 in Yorkshire West Riding, from 216 to 166, and 48 in Essex, from 200 to 152. Only small changes were reported in the local returns of measles. 6 cases of diphtheria were notified, being 1 less than in the preceding week; 2 of the cases were notified from Kingston-upon-Hull C.B.

111 cases of acute poliomyelitis were notified, and these were 7 fewer for paralytic and 7 more for non-paralytic cases than in the preceding week. The largest returns were Lancashire 26 (Manchester C.B. 17, Salford C.B. 2, Stretford M.B. 2); London 13 (Kensington 2, Paddington 2, Wandsworth 2); Cheshire 8 (Stockport C.B. 4, Macclesfield R.D. 2).

The largest centres of infection of dysentery were Yorkshire West Riding 78 (Leeds C.B. 25, Sheffield C.B. 16); Lancashire 77 (Manchester C.B. 13, Blackpool C.B. 11, Liverpool C.B. 10); London 39 (Fulham 13); Surrey 35 (Esher U.D. 22); Warwickshire 26 (Coventry C.B. 17).

Graphs of Infectious Diseases

The graphs below show the uncorrected numbers of cases of certain diseases notified weekly in England and Wales. Highest and lowest figures reported in each week during the nine years 1947-55 are shown thus -----, the figures for 1956 thus ———. Except for the curves showing notifications in 1956, the graphs were prepared at the Department of Medical Statistics and Epidemiology, London School of Hygiene and Tropical Medicine.



¹ *British Medical Journal*, September 1, 1956, p. 556.

² *Ibid.*, September 22, 1956, p. 716.

INFECTIOUS DISEASES AND VITAL STATISTICS

Summary for British Isles for week ending September 22 (No. 38) and corresponding week 1955.

Figures of cases are for the countries shown and London administrative county. Figures of deaths and births are for the 160 great towns in England and Wales (London included), London administrative county, the 17 principal towns in Scotland, the 10 principal towns in Northern Ireland, and the 14 principal towns in Eire.

A blank space denotes disease not notifiable or no return available. The table is based on information supplied by the Registrars-General of England and Wales, Scotland, N. Ireland, and Eire, the Ministry of Health and Local Government of N. Ireland, and the Department of Health of Eire.

CASES in Countries and London	1956					1955				
	Eng. & Wales	Land.	Scot.	N. Ire.	Eire	Eng. & Wales	Land.	Scot.	N. Ire.	Eire
Diphtheria ..	6	2	3	0	2	6	0	2	0	1
Dysentery ..	390	39	151	3		450	71	192	14	1
Encephalitis, acute	2	0		0		1	0		0	
Enteric fever: Typhoid ..	9	1	0	1	4	6	0	1	0	2
Paratyphoid ..	7	0	1 (B)	0		69	11	0	0	1 (B)
Food-poisoning ..	235	21		0		353	33		14	
Infective enteritis or diarrhoea under 2 years ..				14	13				29	104
Measles* ..	1,082	85	70	19	40	1,082	24	16	18	30
Meningococcal infection ..	32	3	10	1		15	0	14	1	2
Ophthalmia neonatorum ..	35	3	1	0		34	2	7	0	
Pneumonia† ..	195	7	136	2	2	171	7	87	1	2
Pol.omyelitis, acute: Paralytic ..	39	6		3	31	201	20		44	6
Non-paralytic ..	72	7				44				3
Puerperal fever§	281	31	7	1		204	20	11	1	
Scarlet fever ..	376	30	75	19	9	426	27	82	27	23
Tuberculosis: Respiratory ..	548	61	101	18		556	50	116	38	
Non-respiratory ..	66	7	10	3		97	5	21	5	
Whooping-cough ..	1,848	141	204	10	16	1,113	58	45	34	73

DEATHS in Great Towns	1956					1955				
	Eng. & Wales	Land.	Scot.	N. Ire.	Eire	Eng. & Wales	Land.	Scot.	N. Ire.	Eire
Diphtheria ..	0	0	0	0	0	0	0	0	0	0
Dysentery ..	1	0		0		0	0		0	
Encephalitis, acute		0			0		0			0
Enteric fever ..	0	0	0	0		0	0	0	0	
Infective enteritis or diarrhoea under 2 years ..	1	0	1	0	1	2		2	1	4
Influenza ..	3	0	1	0	0	6	0	1	0	2
Measles ..		0	1	0	1		0	1	0	0
Meningococcal infection ..		0	0				0	0		
Pneumonia ..	152	28	22	9	8	132	22	12	12	6
Pol.omyelitis, acute	4	0			0	7	0	4		0
Scarlet fever ..		0	0	0	0		0	0	0	0
Tuberculosis: Respiratory ..	56	5	5	1	4	56	4	9	2	1
Non-respiratory ..	2	2	0	0	1	1	1	0	0	2
Whooping-cough ..	2	0	0	0	0	0	0	0	0	
Deaths 0-1 year ..	216	21	35	8	4	185	23	22	8	9
Deaths (excluding stillbirths) ..	4,560	679	532	104	139	4,582	677	490	91	146
LIVE BIRTHS ..	7,813	1,162	900	213	350	7,145	1,088	835	245	419
STILLBIRTHS ..	186	15	22			204	25	22		

* Measles not notifiable in Scotland whence returns are approximate.
† Includes primary and influenza pneumonia.
§ Includes puerperal pyrexia.

Medical News

Smoke Control.—Regulations prescribing authorized fuels to be used in areas of smoke control are being prepared, and the Minister of Housing and Local Government intends to interpret strictly the section of the Clean Air Act which enables him to exempt from control methods of firing, industrial or domestic, which are either not producing any smoke or not producing a substantial quantity of smoke. Mr. ENOCH POWELL, Parliamentary Secretary of the Ministry of Housing and Local Government, said this when he addressed the National Smoke Abatement Society's conference at Southport on October 3. Although the provisions for the prevention of dark smoke, grit, and dust—provisions mainly affecting industry—would not come into force until the spring of 1958, people must not suppose that they could wait until then to do something about their problems. Neither should they assume that the seven-year period of grace allowed any general exemption from the prohibition of dark smoke during the period. It would afford only a limited defence—limited in scope and limited in time. To establish the defence it would be necessary to prove that the emission of dark smoke was due to the nature of the building or its equipment, and not to lack of maintenance or improper use, and that the necessary alterations or new equipment could not have been completed by the time the contravention occurred.

Pneumoconiosis.—A new edition of the booklet first issued in 1952 by the Ministry of Pensions and National Insurance, *Pneumoconiosis: Procedure for Claiming Benefit*, has been sent to all doctors in coalmining areas. The booklet explains what to do to help patients suffering from pneumoconiosis (including silicosis and asbestosis) to claim the benefits to which they are entitled. Doctors in England and Wales who would like a copy of this booklet should apply to the Ministry of Pensions and National Insurance, 10, John Adam Street, London, W.C.2; doctors in Scotland should apply to the Central Office for Scotland, 39, Drumsheugh Gardens, Edinburgh, 3.

Chartered Society of Physiotherapy.—The annual congress dinner of the Chartered Society of Physiotherapy was held at the Café Royal, London, on October 5, with the president of the Society, Sir CECIL WAKELEY, presiding. Sir ARTHUR PORRITT, proposing the toast of the Society, recalled Hippocrates' dictum that "a physician must be experienced in rubbing," and quoted the great man's views on the art of massage. The audience's amusement was clear enough evidence that some at least of them were not outdated. After congratulating the Society on the fact that all three fighting Services had now adopted the Society's training as the standard for their physiotherapists, Sir Arthur spoke of the relationship of doctor and physiotherapist. Both were members of a team, he said. It was the doctor's legal, ethical, and moral right to be captain, but the doctor would be quite useless without the team, in whose skill he trusted completely. It seemed to the speaker unnecessary therefore to squabble over precise definitions of status. The profession of physiotherapy had other more important things to think of and one of them was research. Miss PEGGY BARRON, vice-chairman of the Chartered Society, responded, and the toast of the guests, proposed by Sir CECIL WAKELEY, was wittily replied to by the principal guest of the evening, Air Marshal Sir JAMES KILPATRICK. The Founders Lecture, given the following day by Sir RUSSELL BRAIN, P.R.C.P., brought to a close a full three-day programme of lectures and demonstrations.

Cathedral Service for Disabled.—The Provost of Southwark, The Very Reverend H. E. ASHDOWN, has co-operated with the Disabled Persons' Choral and Musical Society (Harrow) to enable them to hold for the first time a special service for disabled persons at Southwark Cathedral on Sunday, November 11, at 6.30 p.m. The Provost will

conduct the service and the choir taking part will be composed entirely of disabled persons, who after the service will give a programme of songs in the Chapter House lasting half an hour. Those wishing to attend should communicate before November 1 with Miss ROSE TAAFFE, 57, Grant Road, Wealdstone, Middlesex.

Medical Research Council Members.—The Committee of Privy Council for Medical Research, after consultation with the Medical Research Council and the President of the Royal Society, has appointed as members of the M.R.C. Professor G. PAYLING WRIGHT, Sir William Dunn professor of pathology in the University of London at Guy's Hospital Medical School, and Dr. DENIS HILL, senior lecturer in clinical neurophysiology, Maudsley Hospital, London, and physician and lecturer in psychological medicine at King's College Hospital. The committee has reappointed the Earl of LIMERICK and Sir GEOFFREY VICKERS, V.C., to the Council for a further term of office.

Manchester Northern Hospital.—The Manchester Northern Hospital, which celebrates its centenary this year, as described in the *Journal* of January 7, p. 42, has published an illustrated booklet giving a brief history of the hospital and details of the work of the various departments. To mark the centenary, verandas on two of the wards have been converted into day rooms, which were officially opened by the Earl of DERBY on October 9.

Medical History.—A new quarterly journal, *Medical History*, is to be published from January next by Messrs. Wm. Dawson and Sons (4, Duke Street, Manchester Square, London, W.1). The journal will be international in scope and is intended to provide a medium for papers on all aspects of the history and bibliography of medicine and related sciences. It has already been adopted as the official organ of several medico-historical societies, both in Britain and abroad; it will be edited by Mr. W. J. Bishop, formerly Librarian of the Wellcome Historical Medical Library. Annual subscription is £2 10s. (£2 to society members).

Christmas Seals.—The National Spastics Society has produced an attractive booklet of Christmas seals for sticking on parcels and envelopes. By charging a penny per seal the society hopes to raise £350,000 to maintain its centres and to society hopes to help spastic children and adults. The open new ones to help spastic children and adults. The seals are being put on sale in different kinds of shops and are obtainable from the society at 28, Fitzroy Square, London, W.1.

Postgraduate Education at R.C.S.—A useful pamphlet describing the exceedingly varied postgraduate activities of the Royal College of Surgeons has been prepared by its deputy secretary, Mr. W. F. DAVIS, from whom further information may be obtained. The pamphlet, which is illustrated, begins with a summary history of the College and then goes on to describe the various departments for research and teaching, the scholarships offered, and the courses of instruction held.

Medical Golfing Society.—The winners at the society's autumn meeting were as follows: Canny Ryall cup, Dr. C. CARRON BROWN; Lindsay Rea cup, Dr. A. J. MAY; Creasy salver, Dr. M. J. HEALY; Milsom Rees cup, Dr. J. G. H. McNabb; Bathurst cup, Mr. NILS L. ECKHOFF and Dr. A. WINGFIELD.

COMING EVENTS

Television.—First of three television outside broadcast visits to St. Mary's Hospital, London, W.2, will take place on October 18 at 7.30 p.m.

U.C.H. Medical School.—A series of postgraduate demonstrations will be held on October 18-19, followed by the annual dinner for past and present students at 7.30 for 8 p.m., on October 19, at the Savoy Hotel, Strand. A symposium on the management of advanced malignant disease will be held on the Friday afternoon at 2.15.

St. Luke's Day Catholic Service.—Mass will be celebrated in the crypt of Westminster Cathedral on Sunday, October 21, at 8.45 a.m.

French Scientific Films.—A programme of French scientific films will be held at the French Institute, Queensberry Place, London, S.W.7, on Wednesday, October 24, at 8.15 p.m. Synopses of films in English.

John Matheson Shaw Lecture.—Dr. W. FERGUSON ANDERSON will deliver the John Matheson Shaw lecture at the Royal College of Physicians of Edinburgh on November 9 at 5 p.m. His subject will be "The Care of the Elderly Sick in General Practice."

Maudsley Lecture.—Dr. JOHN R. REES, Director, World Federation for Mental Health, will deliver the thirty-first Maudsley lecture at the Royal Society of Medicine, 1, Wimpole Street, London, W.1, on November 16 at 2.15 p.m. His subject will be "Psychiatry and Public Health."

NEW ISSUES

British Journal of Pharmacology and Chemotherapy.—The new issue (Vol. 11, No. 3) is now available. The contents include:

PHARMACOLOGICAL STUDIES ON HEMLOCK WATER DROPWORT. H. F. Grundy and F. Howarth.
THE ACTION OF ATROPINE AND HEXAMETHONIUM IN COMBINATION ON GASTRIC SECRETION AND MOTILITY. A. W. Kay and A. N. Smith.
EFFECT OF ANAESTHETICS AND HAEMORRHAGE ON THE RELEASE OF NEUROHYPOPHYSIAL ANTIDIURETIC HORMONE. Michael Ginsburg and Lucy M. Brown.
ANTIDIURETIC ACTIVITY OF POSTERIOR PITUITARY PREPARATIONS. Michael Ginsburg.
THE SPERM-SHEDDING RESPONSE OF MALE TOADS AND TREEFROGS AFTER THE INJECTION OF TWO TYPES OF GONADOTROPHIN. J. F. D. Frazer.
EXPERIMENTAL DESIGN FOR BIOASSAY OF A MATERIAL INDUCING STRONG TACHYPHYLACTIC EFFECT (ANAPHYLATOXIN). M. Rocha e Silva and A. M. Rothschild.
THE EFFECT OF ACETAZOLEAMIDE, AN INHIBITOR OF CARBONIC ANHYDRASE, ON GASTRIC SECRETION. L. Poller.
THE PHARMACOLOGY OF BENZOYLCHOLINE DERIVATIVES AND THE NATURE OF CARBONYL RECEPTORS. W. E. Ormerod.
THE MODE OF ACTION OF SOME NON-SPECIFIC ACETYLCHOLINE ANTAGONISTS. A. R. Timms.
ASSESSMENT OF DEPRESSOR ACTIVITY AND MYDRIATIC ACTIVITY OF HEXAMETHONIUM ANALOGUES. J. G. Blackman, F. N. Fastier, C. M. Patel, and L. C. K. Wong.
THE EFFECTS OF 5-HYDROXYTRYPTAMINE AND ITS ANTAGONISTS ON TIDAL AIR. H. Konzeit.
CHEMICAL REACTIVATION OF PHOSPHORYLATED HUMAN AND BOVINE TRUE CHOLINESTERASES. F. Hobbiger.
ACTION OF COMPOUND 48/80 ON THE MAST CELLS AND HISTAMINE CONTENT OF GUINEA-PIG TISSUES. I. Mota and I. Vugman.
THE SPECIFICITY OF BRAIN CHOLINE ACETYLASE. A. S. V. Burgen, G. Burke, and Marie-Louise Desbarats-Schonbaum.
THE ANTAGONISM BETWEEN 5-HYDROXYTRYPTAMINE AND CERTAIN DERIVATIVES OF LYSERGIC ACID. E. C. Savini.
ANTAGONISM BETWEEN CHLORPROMAZINE AND NORADRENALINE IN BLOOD VESSELS OF THE HANDS. Robert S. Duff and Jean Ginsburg.
OCCURRENCE OF A SUBSTANCE P-LIKE POLYPEPTIDE IN FISH INTESTINE AND BRAIN. U. S. von Euler and E. Ostlund.
THE EFFECT OF CORTISONE ALONE AND IN COMBINATION WITH ISONIAZID ON EXPERIMENTAL MURINE LEPROSY IN MICE. M. Naguib and J. M. Robson.
TRYPANOCIDAL ACTION OF PHENANTHRIDINE COMPOUNDS: EFFECT OF CHANGING THE QUATERNARY GROUPS OF KNOWN TRYPANOCIDES. G. Woolfe.
TRYPANOCIDAL ACTION OF PHENANTHRIDINE COMPOUNDS: FURTHER 2:7-DIAMINO PHENANTHRIDINIUM COMPOUNDS. G. Woolfe.
SOME ACTIONS OF CHLORPROMAZINE. R. W. Ryall.
THE EFFECT ON RESPIRATION OF INFUSIONS OF ADRENALINE AND NORADRENALINE INTO THE CAROTID AND VERTEBRAL ARTERIES IN MAN. D. R. Coles, F. Duff, W. H. T. Shepherd, and R. F. Whelan.

Issued quarterly; annual subscription £4 4s.; single copy 25s.; obtainable from the Publishing Manager, B.M.A. House, Tavistock Square, London, W.C.1.

Thorax.—The new issue (Vol. 11, No. 3) is now available. The contents include:

PERCUTANEOUS LEFT VENTRICULAR PUNCTURE IN THE ASSESSMENT OF AORTIC STENOSIS. Sir Russell Brock, B. B. Milstein, and D. N. Ross.
AN INVESTIGATION INTO THE LYMPHATIC AND VASCULAR SPREAD OF CARCINOMA OF THE BRONCHUS. H. C. Nohl.
THE SURGICAL TREATMENT OF PULMONARY TUBERCULOSIS IN CHILDHOOD AND ADOLESCENCE. D. W. Huish.
BASAL PLOMBAGE. J. K. Clarendon and W. P. Cleland.
MULTIPLE SPUTUM CULTURES IN THE ASSESSMENT OF PULMONARY TUBERCULOSIS. D. R. Hay.
SUBPHRENIC ABSCESS. Geoffrey H. Wooler.
THE DIRECT INTERPRETATION OF THE FAST VITAL CAPACITY RECORD. R. J. Shephard.
RHEUMATOID ARTHRITIS WITH LUNG LESIONS. T. M. L. Price and M. O. Skelton.
THE RADIO-THERAPEUTIC AND RADIOLOGICAL ASPECTS OF RADIATION FIBROSIS OF THE LUNGS. William M. Ross.
ACQUIRED AND CONGENITAL OESOPHAGO-BRONCHIAL FISTULAS. A. Duprez, F. Wittek, and A. Dumont.

Published quarterly; annual subscription £2 2s.; single copy 12s. 6d.; obtainable from the Publishing Manager, B.M.A. House, Tavistock Square, London, W.C.1.

SOCIETIES AND LECTURES

A fee is charged or a ticket is required for attending lectures marked ●. Application should be made first to the institution concerned.

Monday, October 15

- HUNTERIAN SOCIETY.—At Talbot Restaurant, E.C., 7 for 7.30 p.m., dinner meeting. 8.30 p.m., Presidential Address by Dr. C. D. Coyle: The Changing Hospital.
- MARLBOROUGH DAY HOSPITAL.—8.15 p.m., Dr. J. L. Moreno: Psycho-drama and Sociometry.
- POSTGRADUATE MEDICAL SCHOOL OF LONDON.—4 p.m., Dr. I. C. Gilliland: Exophthalmos.
- ROYAL COLLEGE OF SURGEONS OF ENGLAND.—5.15 p.m., Mr. B. N. Brooke: Colitis; 6.30 p.m., Professor B. W. Windeyer: Malignant Tumours of Bone.

Tuesday, October 16

- BRISTOL UNIVERSITY.—At Wills Physics Building, 8.15 p.m., 45th Long Fox Memorial Lecture by Dr. A. M. MacLachlan: A Doctor's Visit to the U.S.S.R.
- BRITISH POSTGRADUATE MEDICAL FEDERATION.—At London School of Hygiene and Tropical Medicine, 5.30 p.m., Dr. K. M. Smith, D.Sc., F.R.S.: Electron Microscope in the Study of Viruses.
- ILFORD MEDICAL SOCIETY.—At King George Hospital, 8.45 p.m., Dr. Horace Joules: Air Pollution and Prevention of Chest Diseases (with film). Members of Stratford Division, B.M.A., are invited.
- ROYAL COLLEGE OF SURGEONS OF ENGLAND.—5.15 p.m., Mr. J. M. P. Clark: Treatment of Poliomyelitis; 6.30 p.m., Mr. J. P. Hosford: Cholelithiasis.
- ST. MARY'S HOSPITAL MEDICAL SCHOOL.—At Wright-Fleming Institute Theatre, 5 p.m., Mr. J. Suchet: Appraisal of the Results of Treatment of Infertility.
- SOUTH-WEST LONDON MEDICAL SOCIETY.—At Bolingbroke Hospital, Wandsworth Common, S.W., 8.30 p.m., Dr. J. Tudor Lewis: Prevention of Poliomyelitis.
- WEST END HOSPITAL FOR NEUROLOGY AND NEUROSURGERY.—5.30 p.m., Dr. N. G. Hulbert: neurological demonstration.

Wednesday, October 17

- BRITISH ASSOCIATION OF SPORT AND MEDICINE.—At Charing Cross Hospital Medical School, 5.30 p.m., Mr. K. S. Duncan: A Layman Looks at Athletics.
- EUGENICS SOCIETY.—At Royal Society, 5.30 p.m., symposium: Artificial Insemination (Donor). Speakers: Dr. Margaret C. N. Jackson, Dr. P. M. Bloom, Dr. C. P. Blacker, Dr. A. S. Parkes, Sc.D., F.R.S., and Mr. Cecil Binney, M.A.
- GLASGOW OBSTETRICAL AND GYNAECOLOGICAL SOCIETY.—At Royal Faculty of Physicians and Surgeons of Glasgow, 5 p.m., William Smellie Memorial Lecture by Professor S. J. Cameron.
- INSTITUTE OF DERMATOLOGY.—5.30 p.m., Dr. J. S. Pegum: Hair Growth.
- INSTITUTE OF DISEASES OF THE CHEST.—5 p.m., Dr. R. W. Riddell: Fungus Infections of the Lung.
- INSTITUTE OF UROLOGY.—4.30 for 5 p.m., Mr. Harland Rees: Differential Diagnosis of Frequency of Micturition.
- LONDON ASSOCIATION OF THE MEDICAL WOMEN'S FEDERATION.—At Middlesex Hospital Medical School, 8 p.m., Mr. T. Holmes Sellors: Surgery in Diseases of the Lung.
- POSTGRADUATE MEDICAL SCHOOL OF LONDON.—2 p.m., Professor A. Neuburger, F.R.S.: Proteins of Connective Tissue.
- ROYAL COLLEGE OF SURGEONS OF EDINBURGH.—3.30 p.m., Professor C. A. Wells: Conservation of Renal Function.
- ROYAL COLLEGE OF SURGEONS OF ENGLAND.—5.15 p.m., Mr. H. Osmond-Clarke: Treatment of Osteoarthritis of the Hip Joint; 6.30 p.m., Mr. R. H. Franklin: Non-malignant Conditions of the Oesophagus.
- ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE.—3 p.m., Bengué Memorial Award Lecture by Dr. Peter M. F. Bishop: The Problem of Obesity.
- ROYAL MICROSCOPICAL SOCIETY.—5.30 p.m., Dr. R. Barer: Further Developments in Quantitative Microscopy.
- WILLESDEN GENERAL HOSPITAL MEDICAL SOCIETY.—At Department of Physical Medicine, 8.45 p.m., Dr. Freida Young: The Haemorrhagic Diseases and Coagulation Defects.

Thursday, October 18

- BRITISH INSTITUTE OF RADIOLOGY.—7.30 p.m., special general meeting; 8 p.m., Dr. R. I. Roberts: Mechanism of Pharyngeal Deglutition in the Normal; Dr. G. M. Ardran and Dr. F. H. Kemp: Swallowing Defects After Poliomyelitis.
- BRITISH POSTGRADUATE MEDICAL FEDERATION.—At London School of Hygiene and Tropical Medicine, 5.30 p.m., Dr. F. H. C. Crick, Ph.D.: Structure and Function of Small Viruses.
- HYPNOTHERAPY GROUP.—At Royal Society of Medicine, 8 p.m., annual general meeting. Dr. W. Moodie: Planned Research in the Future of Hypnototherapy.
- LIVERPOOL MEDICAL INSTITUTION.—8 p.m., Dr. A. W. Howel-Evans: Tylosis and Oesophageal Cancer—A Family Study; Dr. A. H. Cruickshank: Diagnostic Difficulties in Buccal Facial Biopsy.
- LONDON JEWISH HOSPITAL MEDICAL SOCIETY.—At Medical Society of London, 8.30 p.m., Presidential Address by Dr. I. Gordon: Hazards of Drug Therapy.
- NORTH-WESTERN TUBERCULOSIS SOCIETY.—At Clinical Theatre, Manchester Royal Infirmary, 5 p.m., Dr. V. Cotton-Cornwall: 1945, 1955, a Comparison.
- NUFFIELD ORTHOPAEDIC CENTRE.—At Wingfield-Morris Orthopaedic Hospital, 8.30 p.m., Professor J. Trueta: Study on the Aetio-pathology of Perthes' Disease.
- ROYAL EYE HOSPITAL.—5.15 p.m., Dr. T. H. Whittington: Aspects of Refraction Work—(2) Formation of the Images.
- ST. ANDREWS UNIVERSITY.—At Physiology Department, Queen's College, Dundee, 5 p.m., Professor Dorothy S. Russell: Hormonal Activities of the Pituitary in Relation to its Cytology.
- ST. GEORGE'S HOSPITAL MEDICAL SCHOOL.—5 p.m., Dr. D. J. Williams: neurology demonstration.

Friday, October 19

- BRITISH INSTITUTE OF RADIOLOGY.—3 p.m., meeting of medical members.
- FACULTY OF RADIOLOGISTS.—At Royal College of Surgeons of England, 5 p.m., Radiodiagnosis Section Meeting. Dr. J. Sutcliffe: Hypophosphatemia; Dr. L. J. Sandell: Congenital Insensitivity to Pain; Dr. J. W. Laws: Dissection of the Aorta as a Complication in Lumbar Aortography; Dr. M. Simon: Pulmonary Veins in Mitral Stenosis.
- INSTITUTE OF DERMATOLOGY.—5.30 p.m., Dr. R. T. Brain: Skin Diseases in Children.
- INSTITUTE OF DISEASES OF THE CHEST.—5 p.m., Dr. E. H. Hudson: clinical demonstration.
- INSTITUTE OF OBSTETRICS AND GYNAECOLOGY.—3 p.m., Mr. D. M. Stern: Pre-eclamptic Toxaemia.
- KENT AND CANTERBURY HOSPITAL.—8 p.m., clinical meeting.
- POSTGRADUATE MEDICAL SCHOOL OF LONDON.—10 a.m., Mr. J. P. Hosford: Experiences in Biliary Surgery; 4 p.m., Sir Stanley Davidson, P.R.C.P.: Changing Views of the Clinical Picture and Treatment of Blood Diseases.
- ROYAL MEDICO-CHIRURGICAL SOCIETY OF GLASGOW.—At Royal Faculty of Physicians and Surgeons of Glasgow, 8.30 p.m., combined meeting with Edinburgh Medico-Chirurgical Society. Discussion to be opened by Mr. K. Paterson Brown, Dr. H. Kennedy, and Mr. F. H. Roberts: Abdominal Emergencies.

Saturday, October 20

- WEST MIDLANDS PHYSICIANS' ASSOCIATION.—At Dudley Road Hospital, Birmingham, 10.45 a.m., autumn meeting.

APPOINTMENTS

- HYND, ROBERT STEWART, M.B., Ch.B., D.P.H., Divisional Medical Officer (South Hertfordshire Division), Hertfordshire County Council.
- NORTH-WEST METROPOLITAN REGIONAL HOSPITAL BOARD.—A. M. Jelliffe, M.D., F.F.R., M.R.C.P., D.C.H., D.M.R.T., Consultant Radiotherapist, Middlesex Hospital and Mount Vernon Hospital (joint appointment with Board of Governors of Middlesex Hospital); S. Catterall, M.D., D.P.M., Consultant Psychiatrist and Deputy Medical Superintendent, Hill End Hospital; S. Mattingly, M.B., B.S., M.R.C.P., D.Phys.Med., Consultant in Physical Medicine, Mid-Herts and Luton and Hitchin Groups and Garston Manor Rehabilitation Centre; T. O. Garland, M.D., D.P.H., Consultant Physician to organize and develop a Department of Industrial Medicine based on Central Middlesex Hospital; D. M. Foubister, M.B., Ch.B., F.F.Hom., D.C.H., and W. T. Walker, M.D., F.F.Hom., Consultant Homoeopathic Physicians, Royal London Homoeopathic Hospital; I. Sutton, M.D., D.P.M., Consultant Psychiatrist and Superintendent, Friern Hospital; A. de B. Joyce, M.B., B.Ch., D.O.M.S., Ophthalmologist (S.H.M.O.), Nottingham School Treatment Centre; G. E. B. Scott, M.R.C.S., L.R.C.P., D.P.M., Assistant Psychiatrist (S.H.M.O.), Cell Barnes Hospital, including duties of Deputy Medical Superintendent.
- SOUTH-WESTERN REGIONAL HOSPITAL BOARD.—M. G. Thorne, M.D., M.R.C.P., Consultant Physician, Torbay Hospital, Torquay; Brenda Grant, M.B., Ch.B., Registrar in Psychiatry at Bristol Mental Hospitals.

BIRTHS, MARRIAGES, AND DEATHS

BIRTHS

- Camac.—On September 20, 1956, at Burton Nursing Institution, to Joyce (formerly Swift), wife of Dr. J. C. Camac, a daughter—Ailsa.
- Craig.—On October 2, 1956, at Southmead Hospital, Bristol, to Jean (formerly Simpson), wife of Dr. R. A. Craig, a daughter.
- Donohoe.—On September 29, 1956, at the Maternity Hospital, Loveday Street, Birmingham, to Dr. Ursula Donohoe (formerly Wilkin), wife of Dr. T. W. G. Donohoe, a third daughter—Rosemary Ailsa.
- Fleischl.—On September 11, 1956, at Napier, New Zealand, to Charmian (formerly Quinton), M.B., B.S., wife of Peter Fleischl, M.B., M.R.C.P., M.R.A.C.P., a daughter.
- Hirst.—On September 25, 1956, in Trinidad, British West Indies, to Anne (formerly Jordan), M.B., B.S., wife of Major David Hirst, a son—David Richard Jordan.
- Mann.—On September 28, 1956, at Aberdeen Maternity Hospital, to Dr. and Mrs. A. B. Mann, of 458, King Street, Aberdeen, a daughter.
- West.—On September 27, 1956, at the General Hospital, Sault Ste. Marie, Ontario, Canada, to Kathleen (formerly Stanhope), wife of Michael H. West, M.D., M.R.C.P., of 125, Simpson Street, Sault Ste. Marie, a daughter.

DEATHS

- Chapman.—On September 14, 1956, at his home, Trederwyn, Heatherdune Road, Bexhill, Sussex, Philip Francis Chapman, C.I.E., M.B., C.M., Colonel, I.M.S., retired, late of Fanans, Taynuilt, Argyllshire, aged 86.
- Edwards.—On September 21, 1956, Dennis Raymond Edwards, M.B., Ch.B., of 47, English Coombe Lane, Bath, Somerset, formerly of Darlington, Co. Durham.
- Gotelee.—On September 21, 1956, at his home, "Chalcots," Fleet, Hants, Hugh Evelyn Gotelee, M.R.C.S., L.R.C.P., D.P.H., aged 74.
- Hutchesson.—On September 23, 1956, at Pinetrees, Braidley Road, Bournemouth, Hants, David Albert Hutchesson, M.D., D.P.H., formerly of Aberdeen.
- Kydd.—On September 13, 1956, at Victoria Infirmary Annexe, Glasgow, James Lowdon Kydd, M.B., Ch.B., of Bellshill, aged 55.
- Langhorne.—On September 20, 1956, at his home, Burfield, Bosham, near Chichester, Sussex, Douglas Alfred Langhorne, M.B.E., T.D., F.R.C.S.Ed., aged 51.
- Mathieson.—On September 21, 1956, in a nursing-home, Dumfries, Alexander Lewis Mathieson, M.B., C.M., late of Viewmount, Moffat, Dumfriesshire.
- Murray.—On September 20, 1956, at Raigmore Hospital, Inverness, Andrew Rowand Murray, M.B., Ch.B., of The Anchorage, Bruchladdich, Isle of Islay, Argyll.
- Romanes.—On September 9, 1956, at Noys End, Brockham Green, Betchworth, Surrey, Jean Lauderdale Romanes, M.B., B.S., aged 34.
- Worger.—On September 20, 1956, at Suva, Fiji Islands, William Worger, M.R.C.S., L.R.C.P., late of Radstock and Burnham, Somerset, aged 67.
- Yavagal.—On September 9, 1956, Shivalingappa Shivappa Yavagal, M.B., B.S.

Any Questions?

We publish below a selection of those questions and answers which seem of general interest. It is regretted that it is not possible to supply answers to all questions submitted.

Pica in a Child

Q.—What are the causes of pica in children? How should an intelligent and apparently happy girl of 8 be managed who has been eating dirt and earth from the garden all her life? When indoors she will even scrape the bottoms of shoes to satisfy her appetite. The home is good, the mother understanding, and the child does well at school and seems free from anxiety.

A.—It is an unusual problem that an intelligent and happy girl of 8 years should be so persistently wanting to eat dirt. Tradition has it that this condition often goes with worms, but, as intestinal worms are such a common infestation, it is difficult to know whether the connexion is real or apparent. However, it would obviously be a sensible precaution, and quite a simple one, to see that no such infestation is present. It might even be helpful to take the child into hospital for a week—provided she went into a happy ward where well children are catered for and understood—to see if the habit persists, and to observe her ordinary behaviour with food, her appetite in a general sense, and her attitude towards other children. If this confirms her apparent normality, and if the habit persists in all circumstances, I would have thought it merited careful investigation from the psychological point of view at a child guidance clinic.

Perverved appetites very commonly symbolize a need for love, and are a sort of substitution for more normal gratifications. A child guidance clinic would want to know about her early habit training, about whether the normal baby's interest in excreta was present to any marked extent, how it was satisfied, and how she was helped to pass from it to other kinds of creative play with her hands. I would be surprised if such an investigation did not suggest some way of relieving the condition.

Alcoholic Excess and Mucous Colitis

Q.—After over-indulgence in spirits, a man of 40 has attacks of diarrhoea in which patches of intestinal mucous membrane are passed. How seriously should this be regarded? Is the condition due specifically to the excessive intake of alcohol, or could some other predisposing factor account for it? Short of cutting out alcohol, which would be difficult in this case, what management is advised?

A.—It seems most unlikely that patches of actual intestinal mucosa are being passed when this patient suffers from diarrhoea after heavy spirit-drinking. It is much more probable that the patches are composed of mucus, which in may occasionally be passed in sheets, as, for example, in the so-called "muco-membranous colitis." Microscopical study of the material would settle this point.

Mucus may be passed per rectum in liquid gobs or as strands or flecks of coagulated mucus which appear white or greyish. Large membranes of coagulated mucus may occasionally be passed, as mentioned above. The passage of excessive mucus, either with faeces or on its own, is commonly met with in nervous diarrhoea. It may also occur in constipated patients following the taking of a purge, and in patients who are sensitive to particular foodstuffs, and in patients with ulcerative colitis in a very mild stage. Strong alcoholic drinks damage the surface epithelium of the stomach and are very apt to cause a gastro-enteritis, so that transient diarrhoea is a fairly common feature on "the morning after the night before." The passage of mucous flecks or sheets has no special significance beyond this fact. A kaolin or bismuth mixture may be found helpful in relieving

the symptoms, although it is questionable whether a physician should acquiesce in the patient continuing to over-indulge in spirits to the extent that his gastro-intestinal tract obviously rebels. One possibility might be to put the patient in touch with Alcoholics Anonymous (BM/AAL, London, W.C.1).

Effect of Truss on Subsequent Herniorrhaphy

Q.—As an industrial medical officer I am perturbed by the long interval between the diagnosis of inguinal hernia and operation. Such patients are often recommended for light work during the whole of this waiting period and until six months after operation. Is it not possible for these men to wear a truss until operation, or does this increase the surgeon's difficulties?

A.—The wearing of a truss for long periods certainly induces local atrophy of fat and a degree of fibrosis of the muscles in the area where the pad has been pressing. In long-standing cases, therefore, this may make the operation a little more tedious and the result less certain and permanent. It would not apply, however, in cases where a truss had been worn for shorter periods of, say, six months to a year; the writer has not met with any additional difficulties in such cases and can see no reason why a truss should not be worn during the waiting period. So far as aftercare goes, if the operation has been quite straightforward and satisfactory, three months' abstention from really heavy work should be all that is needed. There will obviously be exceptions to this, especially in the case of direct herniae, and then the surgeon's knowledge of the conditions found at operation will be the best guide.

Long-distance Cycle Racing

Q.—What food is advised for a competitor in a long-distance cycle race? Are stimulants advised? The race is 150 miles (about 240 km.).

A.—In long-distance cycle racing the physiological factor limiting performance is the rate of supply of glucose, the substrate for oxidative breakdown to provide energy. If adequate supplies of glucose are available, then nervous fatigue is the ultimate limiting factor. Hence the food taken during the race should be glucose, which provides carbohydrate in the most easily assimilated form. If the amount which it is necessary to take (about a pound—0.45 kg.—spread over the second half of the race) is nauseating, then the equivalent should be taken in the form of some other carbohydrate food. Fruit juice makes the glucose mixture more palatable.

Other dangers of long-distance racing are dehydration and salt depletion, due to excessive sweating. Thirst is a safeguard against undue dehydration, but 2–3 g. of sodium chloride, as salt pills, should be taken before the race, in addition to the normal dietary intake of salt.

I am not in favour of taking stimulants during a race, because their use cannot be repeated without danger of ill effects.

Procaine Sensitivity and Heart Block

Q.—Signs of sensitivity to procaine amide have developed in a patient being treated for partial heart block. There is swelling of the right eye and irritation each time the drug is used. What should be done in this case?

A.—There are two points to be considered in this question. The first is that no anti-fibrillatory drug such as procaine amide or quinidine should be used in the treatment of heart block. There is no indication for it and the results are nearly always disastrous. The administration of quinidine or oral procaine amide will depress spontaneous rhythm and result in the onset of idioventricular rhythm. This may well take the form of ventricular tachycardia or fibrillation. In partial degrees of heart block the effect of these drugs is usually to increase the degree of block. In conditions such as bundle-branch block procaine amide may be used, but with great caution, because the heart in these

4998

A young woman was admitted on account of haematemesis and the amount of blood lost reported as having been about two pints (1.14 litres). The diagnosis on admission was gastric ulcer. Her excessive degree of drowsiness, lack of restlessness, and forceful cardiac impulse rang no warning bell in the minds of those who first saw her. A physician with a sense of smell and mental acuity undimmed by tobacco recognized uraemia as the causative disease.

My third example illustrates the danger of incomplete viewing of the body merely because the diagnosis appears to be firmly established. A middle-aged woman who had seen several practitioners and a consultant for anaemia had been treated for seven years as a case of pernicious anaemia. The somewhat unusual fluctuations of the disease in spite of liver treatment were attributed to faulty extracts. It appeared that intractable ulcers on the legs had not been observed by those she consulted, and she had come to regard them as part and parcel of her general ill-health. When they became extremely painful she sought further advice, which promptly led to the diagnosis of acholuric jaundice. Failure to expose fully the body of the patient is a relic of Victorian prudishness.

I have stressed the value of visual appraisal of abnormalities, but there is a reverse side to be considered. Two pitfalls come to mind which have caught the unwary; they are the lack of plumpness and yellowness in the aged with pernicious anaemia, and the rarer absence of abnormal pigmentation in Addison's disease. The former often presents as a case of cryptic fever; the latter as gastro-intestinal disease by virtue of vomiting and diarrhoea. The absence of abdominal pain and tenderness is a warning signal both of this disease and of uraemia.

That efficiency demands that the diagnostician should be possessed of the senses unimpaired would seem to be a self-evident proposition. So indeed it is if we consider the case of the general physician, but increasing specialization has made him a rarity. For the more specialized physician, some bodily infirmities may determine his sectional interest, in which he can excel. Most of us can recall instances of severe deafness which, though barring the doctor from detailed study of the diseases of the heart and lungs, may coexist with great achievement in other branches of medicine. Disabilities acquired later in life are more apt to lead to diagnostic errors than those which are already present at the beginning of the career. I well remember a consultation which threatened to become heated on the question of whether there was or was not an aortic systolic thrill. To one it was obvious, to the other it did not exist. The puzzling difference of opinion was not explained until six months later, when the negatory physician was found to have cervical tabes.

Percussion; Auscultation; Palpation

Percussion is rapidly becoming a lost art; in fact, one must admit that even in its heyday it often provided an impressive though unreliable accompaniment to the overall appreciation of probabilities already clear to the acumen of the physician. The widespread use of x-ray films is responsible for its perfunctory performance, and it cannot be denied that, especially in the realm of cardiology, this form of examination has often proved inaccurate. On the other hand, percussion will reveal clearly the presence of pulmonary disease where x-rays fail or only hint at the true state of affairs. Early pulmonary collapse, lobar pneu-

monia, and small pleural effusions provide a more reliable percussive response than do the more complex, expensive, and disturbing examinations by Roentgen rays.

A yet stronger claim can be made with justice for auscultation. It still holds its own in examination of the heart, but there is a dangerous tendency to place little faith in it when it comes to diseases of the lungs. This swing away from older methods was started by the realization that, especially in tuberculosis, the x-ray appearances gave far more information than could be gained by clinical examination. On the other hand, lobar and bronchopneumonia, bronchiectasis, and bronchitis are recognizable with certainty by the traditional methods of examination, whereas the x-ray picture may reveal remarkably little. It is strange to note the readiness with which some announce a diagnosis of bronchopneumonia on the strength of x-ray films in the face of apyrexia and signs consistent with severe bronchitis only.

Even the simple procedure of palpation, so far as the thorax is concerned, seems to be treated with contempt. Candidates for higher qualifications probably do not know that their failure is rarely due to their lack of knowledge of the complexities of disease but more often to inability to elicit straightforward physical signs.

For how many centuries have we failed to palpate the carotid artery in search of a cause of focal cerebral disturbance? How many such simple manoeuvres still elude us?

Radiology

Radiology, which has taught us much and which has corrected many false beliefs, is nevertheless a dangerous master. There are few branches of medicine in which it has not added appreciably to our knowledge of pathological processes and our powers of diagnosis.

The commonest radiological pitfall is provoked by the radiologist's report. This to the majority of doctors and all laymen is infallible. It is noteworthy that the more skilled the radiologist the more cautious he is in stating his conclusions. He will report on what he sees, but he will state that his findings are so-and-so, and suggestive of this or that but nothing more. In the other and more heavily loaded scale are those who have embraced the specialty without adequate grounding in medicine and surgery. It is from these that we receive lengthy documents detailing normal and allegedly abnormal appearances, diagnoses sometimes correct and often utterly wrong, and, worst of all, advice as to treatment. There are still many practitioners who were brought up in the days when x-ray films were used but rarely except for surgery, and have had no experience in their interpretation. They are necessarily dependent on the report, but their number is steadily diminishing. To counteract this, however, a deplorable form of officialdom has arisen since the inception of the National Health Service, for this seems to put every possible obstacle in the path of the practitioner to seeing the films of his patient taken at a hospital. Harassed, overworked, and discouraged, it is not surprising that he gives up the unequal struggle.

Even highly skilled radiologists share with physicians and surgeons a liability to make mistakes. They are often unaware of the limitations of their craft. For instance, visible peristalsis, a succussion splash, and copious vomiting led, in an instance which I witnessed, to the not improbable diagnosis of obstruction due to chronic duodenal ulceration. A highly skilled radiologist reported that there was no obstruction because the emptying rate was normal. He claimed that there was no ulcer, although in fact, owing to its backward direction, the duodenal cap could barely be seen. Three months later the emaciated patient was induced with difficulty, because of the report, to have his much-needed operation. Extreme duodenal stenosis and an extensive ulcer were revealed.

It is not perhaps as widely known as it should be that in such cases a barium meal encourages the stomach to exhibit powerful peristalsis, so that it ejects the meal at normal speed, especially in the first hour of observation,

even though there may be quite well-marked stenosis. On the other hand, a fractional gruel test-meal, which approaches much more closely to the normal stomach content, will nearly always confirm the clinical appraisal of the symptoms and signs I have mentioned.

Although increasing alertness has led to the discovery of hiatus hernia in ever-increasing numbers, a new hazard has arisen in that it is often found that a sliding hernia through the diaphragm is confused with the normal ampulla of the oesophagus. The actual x-ray appearances are remarkably similar, and in some perfectly normal people the dilatation of the lower end of the oesophagus is well marked. A single picture, therefore, may be most misleading, and there are many who are not aware of this point of differential diagnosis. In fact, the ampulla fills up in full inspiration, and will therefore have disappeared in x-ray pictures in other phases of respiration.

Dysphagia, that most ominous of symptoms, should alert both physician and radiologist to the most intensive search for an organic cause. In hundreds of hospitals the so-called "barium swallow" observed in the erect patient is regarded as a satisfactory examination, and so the early growth is missed. The mucosal pattern should be viewed in the recumbent patient with the same care as that of the stomach, and a solid opaque bolus should replace emulsion if this has revealed no abnormality. It is only with such care that we can hope to detect disease early enough to give the surgeon the opportunity to cure.

There is an area of radiological romance which is bounded above by the pylorus and below by the ileocaecal valve. This stretch of gut, as yet inaccessible to even the most determined endoscopist, provides material for the doubtful claims of duodenitis, jejunitis, and ileitis. Once these labels have been accepted by doctor and patient the incentive to search for a rational explanation of symptoms wanes and search for a condition which seldom exists. Not many years ago gastritis was confidently diagnosed on radiological observation of the mucosal pattern, but it was fortunately put into right perspective by the advent of the gastroscope and mucosal biopsy. In short, it takes many years for us to find the limits of normal in respect of any new mode of assessment, be it radiological or biochemical.

Specialization without extensive knowledge of general medical and surgical diagnosis endangers efficiency, and no more so than in radiology. The leaders of this specialty, already men of wide culture, are crying out for recruits with higher medical and surgical qualifications. This should be encouraged with all the influence we can command to ensure financial support. Only thus will the country be provided with physicians or surgeons who have specialized in radiology to replace the many who as yet see through a glass darkly.

Biochemistry

The enormous increase in our knowledge of biochemistry is, alas, providing pitfalls in the diagnostic path. Few practitioners can be expected to grasp the significance of all the reports they receive. It behoves the less experienced pathologist to avoid the flattering invitation to make a diagnosis, or even to suggest treatment, on the strength of blood analyses of patients whom he may not even have seen. I have seen three such reports bearing a confident diagnosis of pancreatitis because of high serum amylase figures. In each case the cause of the abnormality was morphine addiction, with consequent spasm of the sphincter of Oddi. This as yet little-known effect has led to fruitless laparotomy followed by further morphine administration; pethidine may also act in this way.

Anamnesis

The more experienced physicians devote a greater time to the taking of history than to physical examination. Failure to do so leads to more mistakes than any other error of approach. But even this must be guided by experience, which alone allows us to sift the relevant from the irrelevant. That process cannot be taught but must

be achieved afresh by each succeeding generation. Above all, the initial symptoms of disease are so important. They may be transitory and thus omitted from the account, especially if there be a sense of hurry at the consultation. For that reason, the study of symptomatology is often best carried out in the peaceful atmosphere of the consulting-room rather than in an out-patient department, where the silent pressure of an overfilled appointment list exerts a sense of urgency which is incompatible with clear thought. Pyrexia of unknown origin which has at times brought humiliation to most of us exemplifies the value of the premonitory symptom.

For instance, a man of 40 had been admitted to hospital on two occasions on account of pyrexia lasting for a week at intervals of three months. Reading through the notes, it appeared that his only symptom had been a feeling of feverishness and slight nausea. Physical examination had been unhelpful. A polymorphonuclear leucocytosis was, however, observed. Spontaneous recovery led to his discharge on two occasions. The third attack, six months later, drew to him a physician who took a history in which he covered hour by hour the development of each bout. He elicited that in fact on each occasion the bowels had been copiously evacuated on the first day. Arguing that there must be an inflammatory lesion and this presumably within the abdomen, and that in all probability it involved the large gut, he diagnosed the most common lesion in an uncommon position—namely, an inflamed retrocaecal appendix. And so it proved to be; in fact, an abscess here, giving rise to no tenderness or guarding, was evacuated and cure followed. Like Columbus's egg, it is all so simple, but it is the ability to recognize the signposts which places some men in the upper ranks of diagnosticians.

Others with more knowledge of diseases may for ever flounder in the morass of differential diagnosis. To consider at length the diagnostic possibilities of a case is academically interesting but laudable only if at the end the physician commits himself to a firm opinion. Intellectual dishonesty is easily acquired. It is so facile to say later, "I did mention that as one of the possibilities." This is, after all, no help to a general practitioner and receives no credit from the patient. Furthermore, the physician is establishing a precedent for himself, and he may go through life as a differential diagnostician, albeit with an exiguous practice.

One of the great advantages of being on the staff of a teaching hospital is that the consultant is constantly liable to be subjected to criticism by his colleagues, his registrars, house officers, and students. We have not allowed, as yet, the development of the teutonic professorial infallibility supported by sycophantic juniors whose only hope of preferment lies in bowing to the pontifical utterances of the great chief. We should not allow ourselves to pass from one bed to the next without pronouncing a diagnosis, or saying quite frankly that we do not know. If we prove to be wrong we must learn to eat our words and try again, but the words must be recorded by the ward clerk so that there shall be no escape. In this way we learn. "Experience," wrote Oscar Wilde, "is the name everyone gives to his mistakes."

A useful exercise in the wards is to take the students step by step through the history of a patient and limit the initial examination to inspection. It is remarkable how often the correct diagnosis can be reached. Such training helps to emphasize the relative importance of the clinical approach to the innumerable special investigations which are used so prodigally at this time.

The difficulties which beset the general practitioner are in many respects different from those which await the consultant. In the case of the former there is lack of time, the wider field of knowledge to be embraced, and a year-long familiarity with the patient. There are but few occasions on which a general practitioner can devote twenty minutes or more to history-taking, yet most mistakes in diagnosis are due to inadequate anamnesis. In the last few years this obstacle has been increased to an alarming

extent by the paramedical duties inflicted on him by the Health Service. To the consultant this difficulty does not exist in private practice. The general practitioner, has, furthermore, to exercise reasonable knowledge and skill in medicine, surgery, and obstetrics. In thus doing, his overall efficiency is greater than that of the consultant or specialist. It is to be hoped that Her Majesty's judges will not fail to make this clear to juries in the litigation which threatens to deter our young men from acceptance of responsibility.

Familiarity with a patient, especially if she be of neurotic temperament, tends to lower one's guard. Even a hypochondriac may develop a carcinoma of the stomach, and indeed the fable of crying "Wolf" too often might have been written for our benefit.

Difficult Relatives

Consultants have less excuse for making mistakes, yet we all make them, and it behoves us to find out why. In our case it is not perhaps so much a matter of scamping the taking of a history as failing to attach importance where it is due. We are often hampered by the presence of relatives, and indeed that worst pest of all, the uxorious husband. He is the most difficult of relatives to expel from the waiting-room, yet his answers to every question addressed to his wife, even on the most intimate matters, are often useless apart, of course, from the light they shed on the domestic background. It comes as a surprise to many a young consultant to find that patients of good upbringing, and allegedly excellent educational training, can be as muddled in their thinking and in their answers as the most exasperating out-patient from the lowest social stratum.

We have also to cope with that strange state of mind which deliberately withholds symptoms for fear of learning the truth. Others, we must remember, genuinely fail to understand questions which to us appear to be clear enough. A very human reaction is to truncate the history-taking in despair and to proceed to examination. Unfortunately so many diseases present no physical sign in their early stages that the diagnosis may well escape us through impatience. I have already said that a scamped history is the commonest cause of failure. One of the most important influences leading to this pitfall is fatigue. In the intensely interesting and full life we lead, fatigue is apt to pass unnoticed, yet it insidiously undermines our efficiency. We tend to think, as spoke Bismarck, "I have no time to be tired." But if we find that our quota of mistakes is expanding, or if we hear ourselves issuing platitudes on a ward round, that is an indication for rest which can only be disregarded at peril to our patients and to our reputation.

Although it is clear that with increasing experience a consultant is likely to gain more from a history than he did in his formative years, yet he runs a risk of a certain rigidity of his mental associations. Think of the centuries during which countless doctors had studied case histories before a flash of insight exposed the hazards of German measles to the unborn child and the, in retrospect, so obvious mechanical cause of sciatica. There is no reason to suppose that we are not still shutting our eyes to the obvious in many of our present-day problems. Just as thirty years ago the advance of medicine was arrested by the theory of focal sepsis, so to-day the search for truth may be imperilled by the parrot-cries of "adaptation reactions" and "collagen diseases." It is so easy to slip into unhelpful pseudodiagnoses such as "cerebral catastrophe" or "acute abdomen," or the latest futility, "cardiac episode."

Mistakes of the Experienced

Paradoxical though it may be, experience may at times hamper a physician in coming to a correct conclusion. He is tripped up, as it were, by the vast impedimenta of his knowledge, whereas his junior may see the goal clearly. Bias, produced by specialized knowledge, may play havoc with a physician's reputation. It disturbs at once the ability to assess the relative importance of all the features of the

diagnostic problem, which is the hall-mark of the sound clinician. Many recent examples of this have been seen since the importance of a lesion of an intervertebral disk has been revealed. The pathology and symptomatology of this new conception impressed those who studied it most, and for this very reason threw them off their balance. It has been said that any man may make a mistake once, but only a fool makes the same mistake twice. I doubt if this is true, for often the making of the same mistake is an indication of a logical train of thought diverted from the path of truth by the attachment of undue importance to perhaps one symptom.

For instance, malignant metastases of the spine were wrongly attributed to prolapse of an intervertebral disk on the strength of sudden onset of pain, normal x-ray appearances, and no obvious primary growth. But the interrogation had not gone far enough. Carcinoma of the uterus and of the prostate would, in many instances, have been revealed if a biased approach had not diverted attention from the pelvis.

There are vogues of bias in which large sections of the medical world lose their balanced judgment and go chasing after false diagnostic gods. Thus we have seen peaks of diagnosis of focal sepsis, intestinal intoxication, disk protrusion, and polyarteritis nodosa, to quote but a few of the fashions of the last thirty years. In some instances the rise in diagnostic incidence has been justified by a true increase in the disease or a sudden understanding of its nature, but even then there is always an over-swing of its application due to prejudice and mental laziness.

A Constant Danger

There is, however, one constant danger which besets us, and that is to attribute to the mind diseases of the body; in short, to label as neurotic a patient with organic disease. On analysis, I suppose it is evidence of conceit; a feeling that if no cause of symptoms has been found then the physician cannot have missed anything and thus the patient's symptoms are imaginary. The trouble is that they often are so, but the gravest mistakes are being made by all of us no matter how experienced we may be. There are but few patients whose history may not reveal unreasonable obsessions, phobias, and anxieties in the course of their life which in the last resort cannot be called in to explain apparently otherwise inexplicable symptoms. Perhaps we are all potential neurotics.

A woman whose outrageous behaviour and revolting gluttony had led to years of domestic unhappiness eventually consented to in-patient treatment for her obesity. A stream of complaints that she was starved, failing in strength, and suffering from headache was unimpressive when it was found that she was bribing menials to smuggle food into her locker. Six months after discharge, as uncooperative, she died of an expanding Rathke pouch cyst.

A middle-aged man developed depression and backache after his son committed suicide. The backache was constant. No investigation was spared to find its cause, but all to no avail. Three months later he developed jaundice from the spread of a carcinoma of the body of the pancreas to its head.

The tragedy is that carcinoma stands very high in the list of mistakes of this sort. Some of them are no doubt unavoidable; others might be averted by constant preoccupation with the fact that one may be wrong. Metastases in the spine, though giving rise to excruciating pain aggravated by all movements of the trunk, by sneezing, or by coughing, may yet for many weeks produce no abnormality in the x-ray picture. The reason is clear in that the deposits may occupy the cancellous centre of the vertebrae, causing pain by expansion, and it is only later that the cortex undergoes erosion. To give an illustration, of which I see many examples: A man of 60 years of age was subjected to prostatectomy. Sections of the prostate showed benign enlargement. Six months later he was seized by intense pain in the upper lumbar region. After

being treated as a case of acute lumbago for three weeks, he was finally x-rayed and a normal spinal picture obtained. In increasing agony he turned to a medical manipulator, whose onslaught caused such horrible pain that the man thought he must die. In the next week he saw a physician who, appreciating the nature of the pain and the fallibility of prostatic microscopy, passed his finger into the rectum and found that the prostatic bed was stony hard. Fresh x-ray films now revealed extensive metastases in the spine and there was elevation of the serum acid phosphatase. Six years have since passed, and the patient is in good fettle, thanks to stilboestrol, the outcome of the genius of a Fellow of this College.

This case illustrates to perfection the dangers of relying on two of the most exact ancillary sciences in the face of symptoms pointing to the truth, but only for those who have ears to hear.

In May, 1954, a woman aged 75 developed pain in her left thigh and lumbar region. In June the spine was x-rayed and showed widespread osteoporosis, with no evidence of the malignant deposits which had been suspected. The blood count, erythrocyte sedimentation rate, and serum calcium at that time were normal. With rest and treatment for senile osteoporosis, the pain subsided and she again became mobile but never completely lost the backache. Early in October of 1955 the pain became more intense and was felt in both buttocks. A month previously an x-ray film again showed osteoporosis but also partial collapse of the fifth lumbar vertebra. The pain being intense, yet another x-ray film was taken, and this showed the same diffuse osteoporosis, but now there was extensive collapse of the fifth lumbar vertebra, much of which had in fact disappeared. She was strikingly anaemic, with a leucocyte count of 15,000, and the sedimentation rate by the Westergren method was 106 mm. at one hour. From that time the course of events was steady emaciation, pain which could be controlled only by large doses of suitable drugs, and death in December of 1955.

The remarkable feature of this case was that for over a year, although the woman must have had a carcinoma involving the spine, there was no unequivocal radiological evidence of it, yet there was temporary and appreciable improvement simply as the result of treatment for osteoporosis. This is the longest period I have heard of in which malignant disease has been masked in x-ray films of the spine, but six to nine months is by no means unknown, at a point which should be more widely appreciated, as lack of knowledge of it has led to a large number of mistakes in diagnosis.

We may ask ourselves how far does our duty compel us to carry out special examination of patients in our care.

To the symptomless patient asking for a routine overhaul, do we do our duty by confining this to a thorough clinical examination, or should he be subjected to extensive x-ray examination, or should he be subjected to extensive x-ray search, blood examinations, and so forth which are popular in the U.S.A. and certain Continental countries? A dogmatic answer to this question would be unwise; such factors as age, occupation, and environment might well call for more extensive search. On the other hand, we can all recall the valetudinarian whose yearly dossier of investigations is proudly presented, and who is eventually found to be suffering from advanced carcinoma undetected at his routine overhaul only a few months previously. Yet apparently trivial symptoms such as unwonted lassitude must put us on our guard. I have notes, for instance, of five patients in whom this was the only symptom and in whom lymphatic leukaemia was discovered by blood examination and was revealed in no other way.

Iatrogenic Diseases

The therapeutic nihilism which characterized the turn of the century has given place to exuberant enthusiasm which, though laudable, in the main has brought a trail of iatrogenic diseases with it. The disastrous results which may arise from the use of various medical and surgical pro-

cedures, though by no means unknown to our forefathers, have gathered momentum with the appearance of chemotherapy, antibiotics, and active principles of the endocrine glands. Even the hitherto harmless oxygen has by improved efficiency of administration caused that most terrible of therapeutical diseases, retrolental fibroplasia. Generations of bacteria with ever-increasing resistance to our drugs are threatening to overwhelm the human race, which at the moment is only one step ahead in ingenuity to thwart the infinite adaptability of the microbial kingdom.

There is yet another danger, and that is to be taken in by a sudden inspiration, that flash of insight which sweeps away our difficulties and resolves our problems.

Those with mercurial minds are most likely to be granted such revelations, often in the still hours of the night. In that way are born such fancies as the psychogenic origin of ulcerative colitis, stress reactions as the cause of rheumatism, or degeneration of Auerbach's plexus as the prime factor in cardiospasm. The critical faculty wobbles, discordant facts are suppressed, and practitioners of ancillary sciences are hypnotized into finding supporting evidence, while medical literature is pressed into the service of an ill-conceived child born of ambition and unreason.

Further risks of failure are encouraged by coming to conclusions based on insufficient number of cases. I need hardly remind you of the claims for complete safety of various drugs which have ultimately proved to be dangerous to the few. Amidopyrine, pethidine, chloramphenicol, come to mind as examples of the risk of forming conclusions on a few hundred cases.

The explanation of symptoms may in fact suffer the same way. The best example of that is perhaps proctalgia fugax. When I first described this in 1928, I referred to the remarkable symptom of intense pain felt as it were in the rectum, its liability to come on in the early hours of sleep, its proneness to be provoked by extreme fatigue, sexual excess, sitting on hard seats, and constipation. Although I had listened to these symptoms from many patients at that time I had had the opportunity of obtaining information from only one in respect of investigation at the time of the attack. Examining the rectum in a bout, it was noted that it was contracted and the sphincter taut. I wrongly attributed the condition to rectal spasm. Since that time the literature on this peculiar and widespread malady has confirmed the precipitating factors, and it is generally agreed that the application of intense heat to the sacrum, or pressure upwards on the perineum, and the injection of air or warm water into the rectum will cut short an attack. But it is still widely held that it is due to spasm of some part of the lower bowel; this I believe to be untrue. Among the numerous examples which I have since collected, I have ten doctors who have examined at my request the rectum during a seizure, and not one has borne out the findings in my original report that there was any trace of unusual resistance on the part of the sphincter or any sign of contraction of the walls of the rectum. They all agreed, however, that on one or other side of the rectum a firm band was felt apparently lying outside the wall, which was tender, and heavy pressure here would often relieve the pain. The statement that the pain must be of alimentary origin because it disappears if the patient takes anything to eat or drink is, I know, incorrect. I have notes of several who have been seized with the pain during a meal, and who have been hard put to it to maintain their composure and their table conversation in the face of this deep-seated agony. It is to be remembered also that the substances which will relax spasm of unstriated muscle, notably the nitrites, have no effect on it. The evidence then suggests that it is produced by cramp of a portion of skeletal muscle, possibly a part of the levator ani, more likely the coccygeus.

It may seem strange to present as a hazard the discovery of some abnormality in the course of a search for diagnosis. The risk I am referring to lies in assuming that a structural departure from the normal is necessarily the cause of the illness being investigated. In this respect, I

think the surgeons are the greatest sinners. Most of us can recall instances of the removal of septic tonsils for rheumatoid arthritis with no benefit, or again the excision of a kinked and possibly infected appendix for symptoms which proved later to be due to duodenal ulceration.

Of recent years, I have noted two false linkages surprisingly frequently. In the one the finding of a true but mild hydronephrosis on the right side has led to the entirely unnecessary loss of the kidney in a psychoneurotic. The other is the exploration of the abdomen for pancreatic adenoma on the strength of low blood-sugar levels—for example, 50 to 60 mg. per 100 ml.—after an initial high peak in the glucose tolerance curve. These patients do not give the typical history of hypoglycaemia. They are often flabby, tired female psychoneurotics, rejoicing in the claim that their endocrine system is at fault and that they suffer from low blood pressure.

Their lassitude, low blood pressure, low blood sugar, and lag curve were in fact all due to too little food, no exercise, and barbiturate addiction. We are as a profession not nearly sufficiently alive to the mental and physical changes which are produced by the constant taking of therapeutic doses of barbiturate, an addiction which is doing far more harm to the efficiency of the upper social classes than are the more dramatic and better-known forms of addiction.

When we think of the multitude of impediments to our smooth passage along the road to diagnosis it may make us wonder at times that we are so often right. The patient's mental ability, his level of intelligence, his attitude towards his symptoms, his fear of disease, his inability to express himself clearly, the different meanings which people apply to the same word, the jumble of symptoms mixed up with irrelevancies, all produce a mountainous hazard to success. This is increased yet further by the vagaries of disease, often shown in most misleading guises, seldom reproducing itself faithfully in one patient after another, and liable to throw out symptoms and signs like sports in evolution. For instance, attacks of gall-bladder colic which are felt entirely in the left hypochondrium are rare, but when they occur they give rise to the greatest difficulty in diagnosis. I have met this condition twice only, the first in a young married woman of some 30 years of age who had had two children, and who had five attacks of acute abdominal pain, felt entirely on the left side and lasting for several hours. I witnessed the fifth attack and found that, although the pain was still in this position, tenderness was striking in the usual position of the gall-bladder. The usual investigations led to the discovery of gall-stones, and the removal of the gall-bladder terminated the attacks.

The second instance was in a woman of some 40 years of age whose pain was a little lower. It spread from the left hypochondrium towards the anterior superior spine. These bouts over many years had been attributed to colon spasm. Removal of her gall-bladder, full of stones, resulted in recovery.

What the mechanism is which gives rise to this anomaly has never, so far as I know, been discovered.

The layman has difficulty in understanding that the specialist or consultant can make a mistake; in fact, he goes further, and is only too apt to attack him and his general practitioner in the courts of law, not because he is necessarily aggressive but because he is ignorant in that he will compare the machine which can be taken to pieces with the infinite and variable complexity of the human body. However, we should not allow the criticism of fools to disturb us, provided that we preserve intact our mental discipline and self-respect. Mistakes are inherent in the pursuit of a progressive science, and not to admit them spells death to any hope of advancement in learning.

To be ruthlessly critical of one's own theories is one of the most difficult tasks we have to accomplish; for, as Bacon remarked, "A mixture of a lie doth ever add pleasure." In some walks of life, especially in politics, this does not matter, but in medicine it will not do.

[The second lecture will appear in our next issue]

DIAGNOSIS AND TREATMENT OF SARCOIDOSIS

BY

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It is difficult to dogmatize on the management of sarcoidosis, a disease whose cause is undetermined, whose clinical manifestations are protean, whose natural history is unpredictable, and whose specific therapy is unknown. The diagnosis rests on a combination of clinical, radiological, and histological features, which together provide the maximum information at present available.

This report is based on the findings in a series of 150 patients with clinical or radiological features of sarcoidosis supported by histological evidence of sarcoid tissue. Many patients with good clinical, radiological, and immunological evidence of sarcoidosis have been excluded because there was no accompanying histological confirmation. Likewise, patients with histological evidence of sarcoid tissue have been excluded if this was a local reaction unaccompanied by evidence of generalized involvement.

Clinical Features

The lesions caused by the granulomatous process or its fibrotic sequelae are so widespread that clinical manifestations may embrace any branch of medicine (Table I). Its

TABLE I.—Showing Widespread Clinical Manifestations

Chest Physician:	Routine chest x-ray changes
	Breathlessness
Dermatologist:	Nodules, papules, vesicles, scars
	Lupus pernio, keloid formation
Ophthalmologist:	Uveitis
	Enlarged lacrimal glands
	Sjögren-like syndrome
	Glaucoma
Cardiologist:	Pulmonary heart disease
Gastro-enterologist:	Splenomegaly
	Diagnostic liver biopsy shows granulomata
Neurologist:	Eye changes
	Meningitis
	Isolated cranial nerve lesions
	Space-occupying lesion
	Pituitary involvement
Surgeon:	Diagnostic lymph-node biopsy
E.N.T. Surgeon:	Nasal granulomata
	Laryngeal plaques
Obstetrician:	Should pregnancy continue?
Radiologist:	Chest x-ray changes
	Bone cysts
General Physician:	All the above referred for "sorting-out"
	Atypical mumps
	Acute rheumatism
	Lymphadenopathy
	Hepatosplenomegaly
	Nephrosis
	Hypercalcaemia
	Renal calculi

masquerades are reminiscent of those of syphilis in the pre-penicillin era. The modes of presentation indicate the diversity of onset (Table II). Further examination frequently revealed involvement of other organs or systems.

Sarcoidosis most commonly presents with intrathoracic involvement, either by routine radiography, possibly in a symptom-free and apparently healthy young adult, or,

TABLE II.—Major Presentations of 150 Patients with Histologically Confirmed Sarcoidosis

Erythema nodosum ± polyarthritides	34
Routine chest radiograph	29
Iridocyclitis	16
Splenomegaly and/or peripheral lymphadenopathy	15
Skin lesions	15
Breathlessness	13
Malaise	8
Bell's palsy	4
Salivary gland swelling	3
Lymph-node biopsy	3
Nasal lesions	2
Sjögren-like syndrome	2
Lacrimal gland swelling	2
Aspiration liver biopsy	2
Meningitis	1
Nephrosis	1

alternatively, because of breathlessness or signs of pulmonary hypertension and cor pulmonale due to long-standing fibrotic pulmonary sarcoidosis.

At some stage of the disease skin lesions developed in 67 (45%) patients. They may be transient lesions such as erythema nodosum and vesicular eruptions, or persistent bluish-red plaques, lupus pernio, or knee scars which may remain unchanged for years. Keloids, infiltrated with sarcoid tissue, may develop insidiously in operation scars, in vaccination sites, or simply following trauma.

Ophthalmic changes occurred in 42 (28%) patients. They may, like the pulmonary changes, progress relentlessly to fibrosis, with final blindness. The most pronounced early change is iridocyclitis. This may be acute and transient or insidious and persistent. Cells appear in the anterior chamber, and fine cellular deposits on the posterior corneal surface enlarge to form greyish keratic precipitates resembling mutton fat. Eventually the iris may adhere to the lens, and obstruction of the angle of the anterior chamber results in secondary glaucoma. In addition, involvement of the choroid and retina may signify a panuveitis. The fundus oculi should always be examined in addition to routine slit-lamp investigation; any chronic granulomatous uveitis suggests sarcoidosis. In two patients, lacrimal gland involvement causing keratoconjunctivitis sicca, with a dry mouth due to salivary gland involvement, presented a clinical picture resembling Sjögren's syndrome. In all, there was involvement of the parotid glands in seven and of the lacrimal glands in four patients, but these were not always the major presenting features. At some stage in the disease there were enlarged peripheral lymph nodes in 56 (37%) and a palpable spleen in 27 patients (18%). These tended to subside spontaneously unless the spleen was greatly enlarged.

On two occasions aspiration liver biopsy, undertaken for the diagnosis of hepatosplenomegaly, revealed miliary granulomata, and this was, in fact, the mode of presentation. The nasal mucosa was involved in three patients and sarcoid-like plaques were seen on the larynx in another.

The general surgeon may be confronted with a histological report of sarcoid tissue in the lymph nodes draining a carcinoma or Hodgkin's tissue. Since the sarcoid reaction is limited to the lymph nodes draining the cancer or malignant reticulosis, it is presumably a local reaction and should not be confused with generalized sarcoidosis.

Neurologists are most likely to see cranial nerve palsies, subacute meningitis, or pituitary lesions due to sarcoidosis. In this series, Bell's palsy, occurring in four patients, was always transient and cleared without treatment. It was associated with parotitis and/or uveitis.

To the general physician are referred many of the above problems for "sorting-out," and in addition he is liable to encounter acute polyarthritides preceding or accompanying erythema nodosum.

Circumstantial Evidence

The clinical features may be augmented by evidence which, although not specific, suggests sarcoidosis.

Serial Chest Radiographs.—These are indispensable (Table III). The changes include bilateral hilar lymphadenopathy and/or diffuse lung mottling, or, even at the

first examination, there may be a more advanced stage of pulmonary fibrosis with cavitation. The hilar lymph nodes are affected first, and they may be accompanied by paratracheal lymphadenopathy. These enlarged lymph

TABLE III.—Initial Chest Radiographic Changes (150 Cases)

Bilateral hilar lymphadenopathy	58
Bilateral hilar lymphadenopathy with diffuse pulmonary mottling	28
Diffuse pulmonary mottling	45
Pulmonary fibrosis ± cavitation	5
Clear chest radiograph	14

nodes may regress completely or they may be accompanied or followed by diffuse pulmonary mottling. This parenchymal involvement, in turn, may regress or progress to irreversible fibrosis. In view of the changing radiological features, any attempt at subdivision into different stages is therefore arbitrary.

Radiographs of Hands and Feet.—Jüngling (1920-1) drew attention to cystic bone changes, and radiographs of hands and feet became a popular ancillary investigation. These changes have been observed in only eight patients, all of whom had persistent cutaneous plaques or lupus pernio. X-ray films of bones did not give diagnostic information not afforded by examination of the skin.

Tuberculin Reaction.—The tuberculin test is almost invariably performed, tuberculin insensitivity being commonly regarded as a cornerstone of the diagnosis. Cutaneous anergy is not, however, confined to tuberculin sensitivity, since delayed skin-test reactions to various other antigens, including mumps virus, pertussis agglutinin, *Candida albicans* extract, and trichophyton are also depressed (Friou, 1952; Sones and Israel, 1954). Furthermore, depression of skin sensitivity to tuberculin is not restricted to sarcoidosis but is also observed in Hodgkin's disease and other reticuloses (Hoyle, Dawson, and Mather, 1954).

In this series the Mantoux reaction was negative in two-thirds of patients tested with 100 T.U. In positive reactors it was frequently negative at higher dilutions, and 100 T.U. was necessary to elicit a positive response. However, when 5 T.U. was incorporated in an oily delaying vehicle and injected intradermally, a further two-thirds of the negative reactors displayed tuberculin hypersensitivity (James and Pepys, 1956). This is of some practical importance in the interpretation of negative tuberculin tests in patients suspected of having sarcoidosis. A negative aqueous tuberculin test implies that the patient may be completely insensitive to tuberculin because he has never been infected with the tubercle bacillus or, alternatively, because he is suffering from sarcoidosis or Hodgkin's disease. A positive depot tuberculin with a negative aqueous tuberculin test suggests sensitivity and implies depression of the normal skin response.

Mumps Skin and Complement Fixation Test.—Although patients with sarcoidosis may fail to show skin sensitivity to various intradermal antigens, their ability to produce circulating serological antibodies remains unimpaired. This dissociation between cellular and circulating antibodies is the basis of an ingenious diagnostic aid (Quinn, Bunch, and Yagle, 1955). Mumps virus is chosen as the test antigen because most normal adults display both a positive complement fixation test and a positive skin test. Sarcoidosis is suggested when a negative skin test is associated with a positive complement fixation test. Similar results are encountered in Hodgkin's disease (Schier *et al.*, 1956). This test cannot therefore be used to distinguish sarcoidosis from other reticuloses with skin anergy.

Serum Globulins.—Since Salvesen (1935) drew attention to raised serum globulins in sarcoidosis this observation has been repeatedly observed and correlated with activity of the disease. Electrophoretic analysis of the serum proteins has shown that the involved fractions are the α - and γ -globulins. In this series, 14 of 50 electrophoretic patterns showed raised α and/or γ -globulins. This was of little diagnostic value because these fractions tend to be raised non-specifically in many infections; an increase, however, indicated activity of the disease.

(3) Patients with sarcoidosis do not require sanatorium treatment with its unwarranted exposure to tuberculosis and the associated psychological trauma. The patient should be speedily rehabilitated to his normal occupation even when receiving steroid hormones.

(4) The majority of patients enjoy a spontaneous and permanent remission without treatment. The cortisone group of drugs have undesirable side-effects and should be reserved for the minority with a definite indication.

(5) When sarcoidosis is suspected, histological confirmation should be sought by all available means. This applies especially to the patient with bilateral hilar lymphadenopathy in whom malignant reticulosis may be confused with sarcoidosis and unnecessary radiotherapy contemplated.

Summary

One hundred and fifty cases are described in which clinical or radiological features of sarcoidosis were supported by histological evidence of sarcoid tissue. Diverse modes of presentation include intrathoracic, cutaneous, ophthalmic, glandular, hepatic, renal, and cerebral manifestations. Radiological and immunological aids to diagnosis are discussed. Histological evidence of sarcoid tissue remains the most satisfactory confirmation of the disease. In 100 patients it was obtained by biopsy of lymph node, skin, liver, or other affected tissues, and the Kveim test was positive in 83 of 110 subjects examined.

Antituberculous drugs did not affect the course of the disease and need not be given routinely. In the early stages the cortisone group of drugs have a beneficial effect on the clinical, radiological, and histological changes. Results of treatment are disappointing in the chronic fibrotic stage. Steroid treatment is given only when specifically indicated and is directed towards the prevention of these late sequelae.

I am grateful to Dr. H. L. Marriott and Professor A. Kekwick for their constant support and advice and to other clinicians who have referred patients. I am indebted to Dr. Louis Siltzbach, New York, for drawing my attention to his technique for skin biopsy with the Hayes-Martin drill, and to Dr. A. D. Thomson, Bland-Sutton Institute of Pathology, for histological interpretations.

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RESPIRATORY SYMPTOMS AND PULMONARY DISABILITY IN AN INDUSTRIAL TOWN

SURVEY OF A RANDOM SAMPLE OF THE POPULATION

BY

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Interest is increasing in the prevalence and causes of chronic bronchitis. Bronchitis was the commonest cause of spells of sickness incapacity in males reported to the Ministry of Pensions and National Insurance during 1953-4 (M.P.N.I., 1955), and accounts for about 10% of all claims.

Diseases that are generally prevalent can be considered to be influenced by occupation only if their occurrence among workmen differs from that found in the general population. Respiratory symptoms and pulmonary disability are common in coal-miners, but before we can attribute them to mining we must first show that their prevalence is higher in miners than in non-miners. The ideal investigation would require a random allocation of school-leavers to mining and other occupations, and subsequent comparison of the incidence of respiratory diseases in the two groups. In default of this we can only study the prevalence in already constituted groups as comparable as possible in age and all environmental conditions except those associated with mining. It is then always necessary to remember that their comparability is but an assumption and that the voluntary choice of occupation may itself be related to the medical status of the men.

In November, 1954, the Pneumoconiosis Research Unit carried out a survey of the 55- to 64-year-old male population of Leigh in Lancashire. One of the objects of this survey was to compare the prevalence of respiratory symptoms and disability in miners with that found in men who had worked only in other occupations.

Leigh was chosen for a number of reasons, including the expectation of finding approximately equal numbers of miners and non-miners in the older age group. It is not an area where coal-miners' pneumoconiosis is a particular problem. It is 13 miles west of Manchester, about in the middle of the Lancashire/Cheshire conurbation of towns—a region with a high mortality from bronchitis (Lane, 1954). It is, however, relatively circumscribed and away from the area of heaviest pollution.

This paper gives the results of our investigation and suggests a possible approach to the difficult problem of controls.

The Sample

At the time the survey was planned the only information available about the age and sex distribution of the population of Leigh was that given by the Registrar-

General (1949) from estimates obtained from the National Register in December, 1947. According to these the male population of Leigh was 22,909, of whom 2,341 were between 55 and 64. A sample of about 250 men in this age group, or roughly one in ten, was considered adequate.

The only list from which sampling could be carried out was the Electoral Roll. This gives the names of those eligible to vote at the time of compilation. It appears as a list of streets, with the occupants of each house listed alphabetically within houses, in the order of the houses in the street. Within each ward the occupants of houses are given a serial number.

As a basis for a random sample of individuals the Electoral Roll is unsatisfactory, since the population of the town at the time of the survey may differ from that at the time of compilation of the list. However, it is satisfactory as a basis for a random sample of houses, provided a supplementary list of new houses is available. The procedure adopted was to sample at random from the serial numbers of individuals, to regard the selected numbers as selecting a house, and to include in the final sample all men in the chosen houses who were of the correct age. By this method the chance of selecting a house is roughly proportional to the number of its inhabitants, so that, again roughly, each individual has the same chance of being included in the sample. Each new house was arbitrarily allotted two serial numbers since the vast majority were in a new "residential neighbourhood unit" built by the borough council and occupied by young married couples.

The principal deviation from randomness to be expected in this method of sampling is that all relatives of the right age group living together in a chosen house were automatically included in the sample. Thus if there is any tendency for relatives to resemble each other in their sickness experience the sample would tend to be less diversified than a truly random one. In fact, it was seldom that more than one man of appropriate age was found in a chosen house. Samples of 100 houses from the whole of Leigh were chosen in this fashion in succession. The visiting in each sample was completed before the next was begun. After fifteen such samples had been visited 245 men between 55 and 64 had been found, and the sampling was stopped. Since 14% of males over 20 were aged 55-64 in 1947 it was expected that about 14% of houses would yield a suitable subject; in fact, 16% (245 in 1,500) did so.

Of the 245 men chosen, 24 (9.8%) refused to co-operate in the survey. The sample was divided according to occupation as in Table I. In different electoral wards the lapse rate ranged from 0 to 31%.

TABLE I.—Random Sample of Men Aged 55-64

Group	Examined	Lapsed	Total
Miners and ex-miners	135 (92.5%)	11 (7.5%)	146
Non-miners	86 (86.7%)	13 (13.1%)	99
Total	221 (90.2%)	24 (9.8%)	245

The difference in lapse rate is insignificant (0.30 > P > 0.20).

The wards differ in their level of prosperity. The proportion of electors entitled to be called for jury service (which has been suggested by Gray *et al.* (1951) and Corlett (1952) as an index of the economic status of a district) ranges in different wards from 1.4 to 62.3 per 1,000. The correlation between lapse rate and jury index was, however, quite insignificant.

Procedure and Method

Every male inhabitant aged 55-64 of the selected houses was interviewed personally by a member of the Field Survey team. He was asked to co-operate in an investigation into the effect of dust on the lungs. Each man who consented was given an appointment to attend at a central hall where the various investigations were carried out. Transport was offered. Whether or not he consented he was asked if he had ever worked for one year or more in mining or cotton, to enable a provisional occupational classification to be made. Any man who failed to keep his appointment was promptly revisited, usually on the same day. He was either persuaded to accompany the home visitor immediately, or was given another appointment. The following were the methods adopted.

1. Occupational histories from the time of leaving school were taken.

2. Respiratory symptoms were recorded, using a questionnaire (see Appendix). Particular attention was paid to a history of chest illness during the past three years, to the constant occurrence of cough and phlegm, and to wheezing and tightness in the chest. Breathlessness was graded, using the questions recommended by Fletcher (1952). In addition, questions relating to some aetiological factors thought to be important in causing bronchitis were asked. All the questionnaires were completed by one observer to avoid the differences in recording level that are known to occur between different observers (Cochrane *et al.*, 1951).

3. Sitting height to the nearest half-inch and weight to the nearest pound were measured.

4. Ventilatory capacity was measured by recording the volume of air expelled in the first 0.75 second of a forced expiration, using a modified Gaensler (1951) apparatus. The mean of three or four readings was taken (excluding the first) and the resulting volume was expressed in litres/minute as the maximum voluntary ventilation (M.V.V.) (indirect) in the way described by Kennedy (1953).

5. A postero-anterior x-ray film of the chest was taken of each man, using a mobile x-ray van. Duplicate x-ray readings were carried out according to the practice adopted at this unit.

Results

Exclusions.—We have excluded from the analysis those men whose chest x-ray films showed significant disease, other than coal-miners' pneumoconiosis and emphysema, that might be expected to affect the ventilatory capacity. There were five such men: three miners and two non-miners. The reasons for their exclusion and the mean value of various measurements are shown in Table II. The exclusion of these men makes no material difference to the general results.

TABLE II.—Mean Measurements of 5 Exclusions

Group	No.	Age (Years)	Sitting Height		Weight		M.V.V. (l./min.)
			in.	cm.	lb.	kg.	
Miners and ex-miners	3*	57.7	34.5	87.6	136.0	61.7	74.0
Non-miners	2†	61.0	33.3	84.5	152.5	69.2	69.5

* One case each of bronchial carcinoma, general cystic disease of the lungs, and extensive pleural thickening.

† One case each of extensive pleural thickening and category 2 simple pneumoconiosis in an engine-driver.

Men with Exposure to Cotton Dust.—24 miners and 28 non-miners had worked for one or more years in cotton (average period 16 years). The average working time of those who had worked only in cotton was 25 years, and all except two were spinners. Most of those with a mixed occupational history had worked in dustier parts of the mills, but their mean exposure was only six years. The mean values of the main measurements are given in Table III. The results do not differ significantly from those found in men who had never been exposed to cotton dust. It therefore seems justifiable to include them in their appropriate groups.

Prevalence of Pneumoconiosis.—Among the miners and ex-miners there were 31 men whose x-ray films showed

TABLE III.—Mean Values of Those Men who had Worked in Cotton

	No.	Age	Sitting Height		Weight		M.V.V. (l./min.)	Bronchitis
			in.	cm.	lb.	kg.		
Miners	24	59.4	34.0	86.3	142.4	64.6	71.5	7 (29.2%)
Non-miners	28	59.4	33.6	85.3	141.5	64.2	87.1	3 (10.7%)

pneumoconiosis, a prevalence of 23%: 21 (15.6%) had simple and 10 (7.4%) complicated pneumoconiosis. These figures may be compared with a prevalence of 30.3% simple pneumoconiosis and 21% progressive massive fibrosis found in the 55-64 age group by Cochrane *et al.* (1952) in the Rhondda Fach Valley, in South Wales. The miners with pneumoconiosis are analysed separately. There are therefore three groups for comparison: (1) 84 non-miners, (2) 101 miners or ex-miners without pneumoconiosis, and (3) 31 miners or ex-miners with pneumoconiosis. Their mean ages, weights, and sitting heights are given in Table IV.

TABLE IV.—Mean Anthropometric Measurements of the Three Groups (Aged 55-64)

Group	No.	Age (Years)	Sitting Height		Weight	
			in.	cm.	lb.	kg.
Non-miners	84	59.4	33.9	86.1	145.6	66.0
Miners without pneumoconiosis	101	59.1	34.2	86.8	147.8	67.0
Miners with pneumoconiosis	31	58.6	34.1	86.6	152.4	69.1

Prevalence of Respiratory Symptoms.—Table V shows the prevalence of respiratory symptoms found in each of the age groups (simple and complicated pneumoconiosis being differentiated). As the number of men with pneumoconiosis was small the results in this group should be interpreted with caution. The first two grades of breathlessness in Fletcher's classification require the subject to estimate his performance in walking uphill. In the flat country in and around Leigh answers to such questions are of doubtful validity. Only those men who were unable to keep up with other men of their own age on the level (Grade 3 or more) were therefore considered to be breathless.

Non-miners and Miners Without Pneumoconiosis.—In every case the miners recorded a higher prevalence of symptoms than the non-miners. The difference was greatest in the case of breathlessness, the miners recording a prevalence more than three times as high as the non-miners ($P < 0.01$). Cough and sputum and wheezing and tightness were recorded approximately twice as frequently among the miners ($P < 0.01$).

Miners With and Without Pneumoconiosis.—A similar prevalence of chest illness and of wheezing and tightness in the chest was found in these two groups. Cough and sputum, on the other hand, were recorded less often among those with pneumoconiosis and only slightly more frequently than among the non-miners. In the miners with simple pneumoconiosis the prevalence of breathlessness was only slightly higher than that found in the non-miners (9.5% compared with 7.2%); in those with complicated pneumoconiosis the prevalence of breathlessness was higher than in any other group—namely, 40%.

It is clear, therefore, that miners, irrespective of the presence of pneumoconiosis, had a higher prevalence of all symptoms and were more breathless than the non-miners.

TABLE V.—Prevalence of Respiratory Symptoms in the Three Groups (% in Parentheses) (Aged 55-64)

Group	No.	No Symptoms	Chest Illness	Cough	Sputum	Cough and Sputum	Yellow Sputum	Wheeze	Tightness	Wheeze and Tightness	Breathlessness
Non-miners	84	30 (35.7)	17 (20.2)	25 (29.8)	28 (33.3)	15 (17.9)	10 (11.9)	32 (38.1)	30 (35.7)	19 (22.6)	6 (7.2)
Miners and ex-miners category 0/-/-	101	20 (19.8)	32 (31.7)	49 (48.5)	57 (56.4)	38 (37.6)	22 (21.8)	59 (58.4)	53 (52.5)	43 (42.6)	25 (24.8)
Miners and ex-miners with pneumoconiosis	31	7 (22.6)	10 (32.3)	9 (29.0)	13 (41.9)	6 (19.3)	6 (19.3)	17 (54.8)	14 (45.2)	14 (45.2)	6 (19.3)
Simple pneumoconiosis	21	4 (19.0)	7 (33.3)	7 (33.3)	9 (42.9)	4 (19.0)	5 (23.8)	11 (52.4)	8 (38.1)	7 (33.3)	2 (9.5)
Complicated	10	3 (30.0)	3 (30.0)	2 (20.0)	4 (40.0)	2 (20.0)	1 (10.0)	6 (60.0)	6 (60.0)	5 (50.0)	4 (40.0)

Prevalence of Chronic Bronchitis

There is no generally accepted definition of chronic bronchitis, though cough, sputum, and disability are usually implied. German authorities reviewed by Worth and Schiller (1954) stress the importance of physical signs in the chest in addition to cough and sputum; but they also point out that added sounds may be evanescent. In view of the unreliability of physical signs in the diagnosis of chronic bronchitis (Schilling *et al.*, 1955), we omitted a clinical examination and based the diagnosis on answers to the questionnaire.

For this analysis we have defined chronic bronchitis as the constant production of phlegm and one or more chest illnesses during the past three years. Table VI shows that by this definition the miners had more than twice as much bronchitis as the non-miners—23.5% compared with 10.7%.

TABLE VI.—Prevalence of Chronic Bronchitis

	No.	Chronic Bronchitis
Non-miners	84	9 (10.7%)
Miners	132	31 (23.5%)
Without pneumoconiosis	101	27 (26.7%)
With	31	4 (12.9%)

The prevalence of bronchitis in the miners without pneumoconiosis (26.7%) was the cause of most of this difference. In those miners with pneumoconiosis the prevalence of bronchitis was only slightly higher than in the non-miners (12.9% compared with 10.7%). The difference between the non-miners and the miners without pneumoconiosis is highly significant ($0.01 > P > 0.001$); that between the non-miners and all the miners, irrespective of x-ray category, is also statistically significant ($0.05 > P > 0.01$).

The radiographs were classified for emphysema on the usual criteria—a low diaphragm, narrow vertical heart, abnormal vascular pattern, and bullous changes (Simon and Galbraith, 1953). The prevalence of emphysema was not significantly different in miners and non-miners; however, the detection of the early stages of emphysema radiologically is unreliable (Knott and Christie, 1951) and we had no lateral films.

Ventilatory Capacity

The ventilatory capacity measurements according to occupation and x-ray category are shown in Fig. 1. The mean value for the non-miners was 85 litres/minute, and for the miners without pneumoconiosis 76 litres/minute. The difference is highly significant ($0.01 > P > 0.001$). The mean M.V.V. of all miners irrespective of pneumoconiosis was 77.3 litres/minute, and the difference between this and the non-miners is also significant ($0.05 > P > 0.01$).

The effect of pneumoconiosis on the ventilatory capacity is also shown in Fig. 1. A reduction of 6 litres/minute for each category of simple pneumoconiosis was observed. A further reduction of 7 litres/minute was found in the mean M.V.V. of miners with P.M.F.

Fig. 2 shows the percentage frequency distribution of the ventilatory capacity for the non-miners and the miners without pneumoconiosis. The distribution in the miners is displaced to the left. Thus the percentage of men with values of less than 50 litres/minute was 7.1% in the non-miners, compared with 16.8% in the miners. It is our clinical impression that those with an M.V.V. of less than 50 litres/minute are usually definitely crippled by their respiratory insufficiency.

The men with chronic bronchitis are indicated by the black columns. Bronchitis is associated with a low ventilatory capacity. Thus the mean of the non-miners with bronchitis was 60 compared with the group mean of 85 litres/minute ($P < 0.001$); that of the miners with bronchitis was 65 compared with the group mean of 76 litres/minute ($0.01 > P > 0.001$).

Chronic bronchitis as we have defined it has a greater effect on ventilatory capacity than one category of simple pneumoconiosis (Table VII). The mean M.V.V. of miners with bronchitis was 65 litres/minute and for those without bronchitis about 80 litres/minute—a difference of 15 litres compared with the 6 litres/minute per category of simple pneumoconiosis.

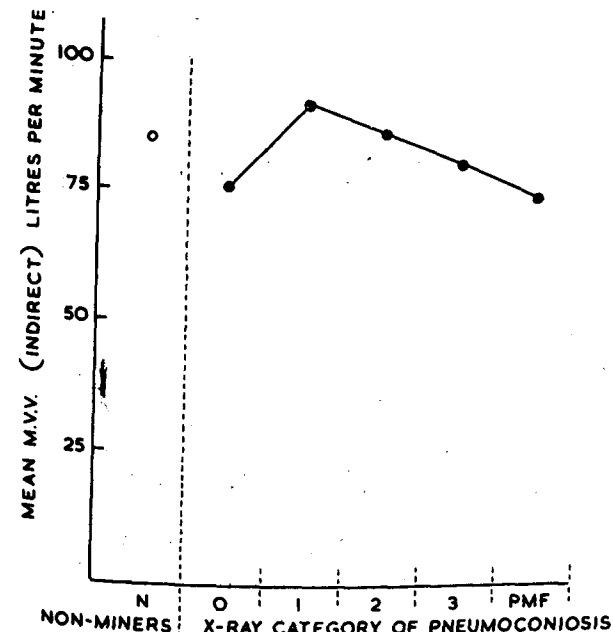


Fig. 1.—Relationship between x-ray category and maximum voluntary ventilation. (Age 55-64.)

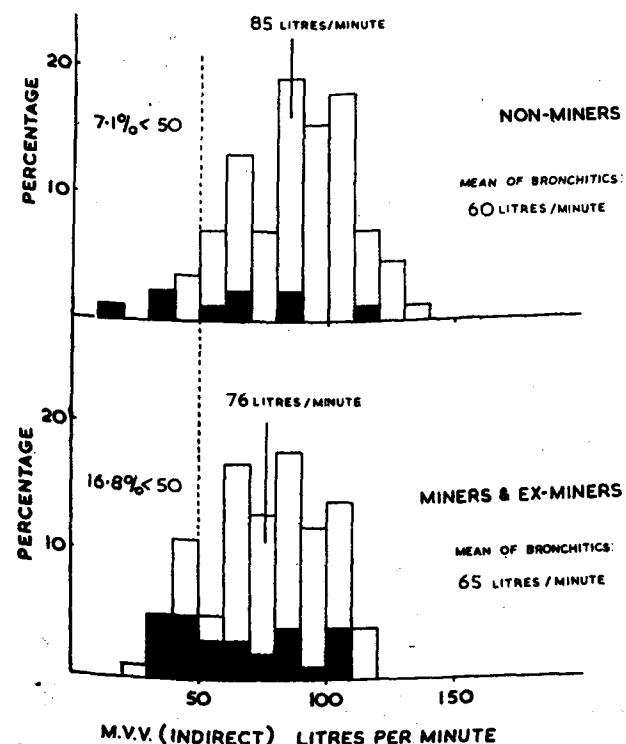


Fig. 2.—Frequency distributions of M.V.V. Men with chronic bronchitis are indicated by black columns.

TABLE VII.—Mean M.V.V. (Indirect) in Litres/Minute in the Three Groups, Showing the Effect of Bronchitis on the Ventilatory Capacity

	Group Mean	Without Bronchitis	With Bronchitis
Non-miners	85	88	60
Miners and ex-miners, category 0/-/-	76	80	65
Miners and ex-miners with pneumoconiosis	82	84	65

Analysis by Social Class, Smoking Habits, and Dust Exposure

Our survey also enabled us to investigate the possible aetiological importance of a limited number of other factors.

Social Class.—Table VIII shows the number of men in each group in each of five social classes. Social class as classified on the Registrar-General's scale was determined from the occupations in which a man had spent most of his working life. This may differ from that obtained by the Registrar-General based on occupation at the time of the census. This difference may be of some importance, because

TABLE VIII.—Social Class

	Registrar-General's Social Classes			Total
	III	IV	V	
Non-miners	56	11	9	76*
Bronchitis	5	2	1	8
Miners and ex-miners category 0/-/-	34	52	15	101
Bronchitis	14	10	3	27
Miners and ex-miners with pneumoconiosis	18	12	1	31
Bronchitis	1	3	0	4
Total	108	75	25	208
Bronchitis	20 (18.5%)	15 (20.0%)	4 (16.0%)	39 (18.8%)

* 8 non-miners were in classes I and II.

those with severe bronchitis may be in a lower social class on account of their disability. The miners' social class was lower than that of the non-miners. Furthermore, the social class of the miners without pneumoconiosis was lower than that of the miners with pneumoconiosis (66.4% compared with 41.9% in classes IV and V). A relation between the prevalence of bronchitis and social class might therefore be inferred. However, the overall prevalence of 18.5, 20.0, and 16.0% in classes III, IV, and V suggests that there was in fact little relation between chronic bronchitis and social class in the group studied.

Smoking Habits.—Men have been classified according to the quantity of tobacco smoked. A smoker is defined as one who at any period of his life had smoked 1 g. of tobacco a day for a year. One cigarette a day is equivalent to 1 g. of tobacco a day; 1 oz. (28 g.) of tobacco a week is equivalent to 4 g. of tobacco daily (Doll and Hill, 1950). The results are shown in Table IX. The proportions in each group among miners and non-miners were similar.

Smokers were compared with non-smokers irrespective of occupation and x-ray category; there were no bronchitics among 28 non-smokers but 40 bronchitics among 188 smokers. The numbers expected in the two groups, assuming that there is no association between smoking and bronchitis, are 5.2 and 34.8. The observed differences from those expected are statistically significant ($0.02 > P > 0.01$). For all groups together a clear relationship between the amount of tobacco smoked (above 1 g. a day) and bronchitis is disturbed by the lower prevalence in those smoking the largest amount.

Dust Exposure.—Only indirect measures of dust exposure were possible—namely, the number of years spent (1) underground, and (2) on the coal-getting shift. The bronchitics among the miners without pneumoconiosis had spent an insignificantly longer time both underground and on the coal-getting shifts. Those men with category 1 and 2 simple pneumoconiosis and bronchitis had spent only a short time

TABLE IX.—*Smoking Habits Classified According to Number of Grammes of Tobacco Smoked a Day*

Group	No.	Smoking Habits (g. of Tobacco)				
		0	1-	5-	15-	25-
Non-miners	84	12 (14.3%)	2 (2.4%)	42 (50.0%)	19 (22.6%)	9 (10.7%)
Bronchitis	9	0	0	3	5	1
Miners and ex-miners without pneumoconiosis	101	13 (12.9%)	3 (3.0%)	51 (50.5%)	24 (23.8%)	10 (9.9%)
Bronchitis	27	0	0	16	8	3
Miners and ex-miners with pneumoconiosis	31	3 (9.7%)	2 (6.5%)	18 (58.1%)	5 (16.1%)	3 (9.7%)
Bronchitis	4	0	0	3	1	0
All groups	216	28	7	111	48	22
Bronchitis	40 (18.5%)	0	0	22 (19.8%)	14 (29.0%)	4 (18.2%)

on the coal-getting shift. The numbers are, however, too small to draw any firm conclusions about the relation to dust exposure and bronchitis.

Discussion

Lapses

The homes of all those who lapsed from the investigation were visited. Some information was obtained either from the men themselves or from their wives. While information divulged through the crack of a closing door is of doubtful value, sufficient details were obtained to conclude that no great bias was introduced by the lapses.

Lapses could be reduced if the population sampled could be studied in their homes instead of having to attend at a central hall. Portable tests of ventilatory capacity now make this a foreseeable possibility. Radiography would, however, have to be omitted. Our results suggest that such an omission would not have affected our conclusions about miners and non-miners, but a diagnosis of pneumoconiosis would, of course, have been impossible.

Mortality Statistics

A high mortality from bronchitis for coal-miners was noted by Collis (1931), who also drew attention to the wide differences that occurred in different coalfields. In 1930-2 the S.M.R. from bronchitis and pneumonia for all coal-miners (ages between 20 and 65) working underground was 119, but for miners in Lancashire and Cheshire it was 165. In 1950 the S.M.R. for bronchitis in hewers and getters was 180; that in other mine-workers in coal was 98. It would appear, therefore, that the excess mortality due to bronchitis affects the former group. However, undoubtedly in the past deaths due to pneumoconiosis and even respiratory tuberculosis have been attributed to bronchitis (Cummins, 1935; Sen, 1937), and it is probable that some inflation of the bronchitis mortality statistics by faulty certification still occurs. Nevertheless, the figures do suggest that bronchitis may be more prevalent in miners than in the general population. It should, however, be noted that a high mortality due to bronchitis is found in those coalfields which are situated in areas where bronchitis death rates are high also in the non-mining population (Goodman *et al.*, 1953), and that the wives of coal-miners share this excessive mortality from bronchitis to a large extent (Registrar-General, 1938).

Morbidity Statistics

Remarkably few estimates of the relative prevalence of bronchitis in miners and comparable non-miners have been published. In 1924 Schurmann (quoted by Worth and Schiller, 1954) found that the prevalence of bronchitis in underground workers was double that of mine office workers who had never been exposed to dust. More recently Boehme and Lent (1951), in a large group of hospital patients, found an overall prevalence of bronchitis of 29.1% in miners compared with 15.5% in non-miners, the figures in the 50-60 age group being 32.6 and 14.6% respectively. Our findings in the 55-64 age group in a geographically defined community support these conclusions and indicate a close agreement in the magnitude of the difference found by Boehme and Lent.

Conflicting results have been obtained for the prevalence of bronchitis in miners with and without pneumoconiosis.

In this country Hart and Aslett (1942) found that among South Wales coal-workers aged 40-64 years the prevalence of chronic bronchitis increased with radiological category. In Germany, Trautmann (1949) found that in "silikose" stage I and II the prevalence of bronchitis was not especially high, but that in stage III it might reach nearly 60%. Beckmann (1951) found a higher prevalence of bronchitis in those with "silikose" than in those without; while Zorn (1949) and Worth and Dickmans (1950) noted an increasing prevalence of bronchitis with increasing grade of "silikose." On the other hand, Boehme and Lent (1951), in a group of miners who were no longer capable of full work, found a higher percentage of bronchitis in those without "silikose" than in those with stages I and II. The results of German investigations are reviewed by Frieboff (1952) and Worth and Schiller (1954). It is clear, as Boehme and Lent themselves realize, that the results may be greatly influenced by the population studied.

In the present survey chronic bronchitis was slightly commoner among the miners without pneumoconiosis than among those with pneumoconiosis, but the number of the latter was small and they mostly had simple pneumoconiosis. It is interesting to observe in this connexion that in their 55-year-old group Gilson *et al.* (1955) recorded a higher prevalence of cough and sputum in working miners without pneumoconiosis than in those with either simple or complicated pneumoconiosis.

The general prevalence of respiratory symptoms has seldom been published. Stuart-Harris (1954) reported cough and sputum in 55% of men aged 50-60 in an industrial population. Of these, 35.5% had a symptom group called the "triple complex," consisting of cough, sputum, and disability. An approximately comparable figure obtained from our results gives a prevalence of 26% for the three groups together, and 34% for miners and ex-miners without pneumoconiosis.

Ventilatory Capacity

Our findings of a significant reduction in ventilatory capacity in miners compared with non-miners are in agreement with the few other workers who have compared miners with men who have never mined (Vokac, 1950; Kadlec and Vyskocil, 1950; Salvini and Capodaglio, 1955). Significant differences in ventilatory capacity between miners without pneumoconiosis and non-miners of comparable age have been recorded previously at this unit (Gilson *et al.*, 1955).

The finding that miners with early simple pneumoconiosis recorded a higher mean M.V.V. than those without is discussed in detail in another paper (Carpenter *et al.*, 1956). Taken together with the observation that such miners appear to have fewer respiratory symptoms and less chronic bronchitis, the suggestion is made that the fitter men with the larger ventilatory capacities, who are more likely to work on the coal-face where the concentration of dust is highest, are consequently more liable to pneumoconiosis than their fellows.

The effect of simple pneumoconiosis on the ventilatory capacity of the sample studied was not great, and it seems unlikely that this form of pneumoconiosis *per se* causes much disability. The effect of chronic bronchitis and respiratory symptoms in reducing the M.V.V. were, how-

ever, more considerable. These findings support the conclusions of those workers who have found that disability in miners is related more closely to "emphysema" than to fibrosis (Wright, 1956; Lavenne and Belayew, 1953; Foubert *et al.*, 1954).

Aetiological Factors

Smoking.—Cigarette-smoking is generally regarded as aetiological important in the development of chronic bronchitis. Palmer (1954) found a significantly greater incidence of bronchitis in smokers than in non-smokers and noted an increase with increasing tobacco consumption. Oswald *et al.* (1953) considered that cigarette-smoking was an important aggravating factor.

Greene and Berkowitz (1954), using a "pre-operative test cough" of "proved sensitivity and reliability," recorded prevalences of "smokers' bronchitis" in 76-80% of people of either sex smoking 20 or more cigarettes daily. On the other hand, neither Fry (1954), in general practice, nor Gregory (1955), in a gas-workers' survey, was able to show a convincing relationship between smoking and bronchitis. Nor was there any association between the mortality rates of doctors due to respiratory disease other than carcinoma and their smoking habits (Doll and Hill, 1954). Differences may be due to the wide differences in diagnosis of bronchitis. Significant results are most likely to be obtained by those who include "smokers' cough" in their definition of bronchitis.

In a previous investigation in the Rhondda Valley we were unable to show a relation between smoking habits and bronchitis (Cotes *et al.*, 1956). In the present study, however, smoking appeared to be a possible factor. Smoking cannot, however, account for the differences either in respiratory symptoms of ventilatory capacity between miners and non-miners, since the smoking habits of the two groups were very similar.

Social Class

The relationship between bronchitis and social class is seen in the mortality statistics. These are considered in detail for 1930-2 by Goodman *et al.* (1953). The S.M.R.s for bronchitis in men aged 20-64 according to class in 1950 showed that there was no longer so great a difference between classes III and IV as there had been in 1930-2, and this was due to a reduction in the S.M.R. in class IV.

Oswald *et al.* (1953) were unable to show any close association between bronchitis and social class. Fry (1954) also failed to observe any relationship. Our findings indicate that the importance of social class could easily be exaggerated. Thus the higher prevalence of bronchitis among miners might be attributed to their lower social class. That this was not so is clear from the prevalence of bronchitis within the social classes, which showed no such relation.

Exposure to Dust

Since the main differences between miners and non-miners are life underground and exposure to coal-dust it is likely that one or both of these factors is associated with the differences that we have observed. Of the two, exposure to dust might perhaps be expected to be the more important. An association between dust exposure and bronchitis, based on the presence of rhonchi in the lungs, has been stressed by several authors (Dautrebande *et al.*, 1948; Lent, 1950; Dautrebande, 1952) but refuted by others (Beckmann, 1951; Pestiaux *et al.*, 1955; Worth *et al.*, 1955). In the present survey, no clear relation between bronchitis and dust exposure could be shown in the mining group. This may be because bronchitis is a condition in the cause of which many factors are involved. The interaction of these factors may tend to obscure the importance of any one of them. Alternatively, the general belief that dust is important in causing bronchitis may be mistaken.

The possibility that miners may be more apt than other members of the community to complain of symptoms has been suggested (Halliday, 1943; Heron and Braithwaite, 1953; Ross *et al.*, 1954). In a previous survey we observed a tendency for men who had been compensated to record a lower breathlessness grade than might have been expected

from their ventilatory capacity, and it seemed probable that other respiratory symptoms might be correspondingly exaggerated. In the present study, compensation issues were rarely raised and we had no evidence to suggest that miners were more symptom-prone than non-miners. Ventilatory capacity measurements supported the questionnaire findings.

Summary

A study of respiratory disability in 90% of a random sample of 245 men aged 55-64 in Leigh (Lancs) has been made.

Miners and ex-miners had significantly more "chronic bronchitis" and a lower ventilatory capacity than men who had never worked in the mines; and they also recorded a higher prevalence of all respiratory symptoms.

Miners without pneumoconiosis were on the average more disabled than those with early simple pneumoconiosis.

The differences between miners and non-miners could not be ascribed to differences in social class or smoking habits, and in the miners there was no obvious relationship between length of exposure to dust and bronchitis.

We are indebted to our colleagues at the Pneumoconiosis Research Unit for their help, advice, and criticism. The chest radiography was carried out by Mr. W. G. Clarke and the radiographic team, and much of the home visiting by the epidemiological team. The ventilatory capacity measurements were made by Mr. A. J. Merrick. We also wish to thank the Mayor and inhabitants of Leigh, without whose active co-operation this survey would not have been possible.

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APPENDIX

RESPIRATORY SYMPTOMS

Name..... X-ray No.....

	Yes	No
I. During the past 3 years, have you been ill with your chest? If yes:— Once only? More than once? Did you have increased cough? Did you have increased phlegm?		
II. (a) Apart from chest illnesses, do you usually have a cough? If yes:— Do you suffer from a persistently troublesome cough? (b) Apart from chest illnesses, do you usually bring up phlegm? If yes:— In the winter? Throughout the year? Is the phlegm usually yellow? If not: Did it become so during your illness?		
III. Do you ever get wheezing in your chest? If yes:— Slight-moderate? Severe? With chest illnesses? Does your chest ever feel tight? If yes:— Slight-moderate? Severe? With chest illnesses?		
IV. Have you ever had:— Year: Pneumonia? Pleurisy? Acute bronchitis?		
V. Do you consider that you suffer from:— Chronic bronchitis? Asthma?		
VI. (1) Is your breath as good as that of other people of your own age at work, on walking, hurrying, climbing stairs, or hills? (2) Are you able to walk with normal people of your own age on the level, but unable to keep up on hills or hurrying? (3) Are you unable to keep up with normal people walking on the level but able to walk a mile or more at your own speed? (4) Are you unable to walk more than 200 yards on the level without a pause for breath? (5) Are you breathless on talking, after undressing, or at rest?		
VII. Have you had to change your job on account of being too short of breath when at work? If yes: Year changed..... Job at which you failed.....		
VIII. Smoking:— Have you ever smoked? Now? Amount smoked now:— Estimated average during past 10 years if different: Cigarettes per day..... Oz. tobacco/week (hand-rolled)..... Oz. tobacco/week (pipe)..... Age at starting:..... Age at stopping:.....		
IX. Does observer consider subject to be bronchitic?		
X. Are you getting a pension for any chest disease? Have you ever applied for a pension?		

IRRADIATION-INDUCED MALIGNANT
HYPERTENSION: CURED BY
NEPHRECTOMY

BY

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The following case is considered worthy of record as, to the best of our knowledge, it is the first example demonstrating the possibility of saving life by timely nephrectomy where renal damage produced by irradiation has resulted in malignant hypertension.

Case History

A man aged 33 had his left testis removed for seminoma in 1941. Soon afterwards he complained of abdominal pain and distension and began to lose weight. A mass was found in the upper abdomen, but nothing was done until May, 1943, by which time the mass had become very large, extending well across the midline. He was given deep x-ray therapy by one of us (W. M. L.) in May and June, 1943, following which the mass disappeared, and he returned to normal health and full work. The total dosage to the left renal region was under 3,000 r. He remained well and at full work until July, 1954, when he was seen by one of us (S. O.), complaining of severe splitting vertical midline headache which had begun about a year previously and which was relieved by aspirin after about half an hour. Some six months ago a second type of headache had appeared, which was associated with a bounding pulse. Two weeks prior to the consultation he had found difficulty with his vision.

Because of various medical examinations for insurance purposes his blood pressure in 1950 was known to have been 150/90 mm. Hg; in 1952 it was 160/90 and in 1953 165/95.

There was a history of scarlet fever at the age of 18, but this was not complicated by nephritis, and there was no past history of pyelitis or urinary infection. There was no family history of hypertension or cardiovascular disease, and both his parents were alive, his father aged 76 and his mother 74.

On examination on July 22, 1954, the positive physical signs were that his apex beat was 4½ in. (11.4 cm.) to the left of the midline in the fifth intercostal space, and a double thrust was visible and the cardiac impulse was forceful. A clear protodiastolic triple rhythm was audible, together with a faint systolic murmur at the apex. His aortic second sound was loud and musical. There were no aortic murmurs. His pulse was 78, of regular rhythm and large volume, but the vessel wall was not clinically thickened. His femoral, dorsalis pedis, and posterior tibial pulses were easily palpable. His blood pressure at rest was 215/130 mm. Hg.

On July 30 he was examined ophthalmologically by Mr. Ronald Crick, who reported some general retinal oedema with extreme attenuation of the arteries, which were hardly visible, and some dilatation of the veins. There was some deflection at the arterial crossings, with hard white exudate near the disk edges and more fluffy exudate farther out, with some flame-shaped haemorrhages. His disks showed a blurred margin, the right more than the left, with slight papilloedema. There was no nipping of the veins. The retinopathy was of Grade III-IV, and the whole process suggested a relatively acute and recent process.

There were no abnormal physical signs in the central nervous system, lungs, or elsewhere.

On clinical grounds, with knowledge of the gradual increase in blood pressure over the preceding three years, his

case was considered to be hypertension secondary to irradiation of the left kidney, rather than essential hypertension, and it was thought likely that he had suddenly entered a malignant phase over the previous six months.

In spite of complete bed rest and amylobarbitone sodium sedation, his triple rhythm persisted and the diastolic pressure did not at any time fall below 120 or the systolic below 180 mm. Hg.

Pre-operative Investigations

Teleradiograms of the chest in the antero-posterior and right and left anterior oblique views showed slight enlargement of the left ventricle.

The 12-lead electrocardiogram (July 22) showed severe ischaemia of the left ventricle as a result of hypertrophy of that chamber. The R wave was tall in leads V5, V6, VL, and standard lead I, and the S wave was deep in leads V1, V2, and V3. The T wave was inverted in leads V5, V6, VL, and standard leads I and II (see accompanying electrocardiograms).

An intravenous pyelogram showed delayed secretion of the left kidney with some deformity of the left lower calices. The right kidney was radiologically normal.

Chromocystoscopy by Mr. Yates-Bell showed slight delay on the left side, and micro-urea concentrations of ureteric urines showed slightly diminished concentration on the left side.

The blood urea was 44 mg. per 100 ml., and his urea clearance was 46% of the average standard normal. The urine showed a slight cloud of albumin with scanty red cells and pus cells and a few hyaline and granular casts. Urine culture was sterile. Haemoglobin was 108% and the red cells were normal.

Left nephrectomy was carried out by Mr. Yates-Bell on August 9. The perirenal fat was adherent and the ureter was found with difficulty among dense fibro-fatty tissue.

Pathological Report on Left Kidney (Professor H. A. Magnus).—The kidney weighed 84 g. The capsule stripped with some difficulty, revealing fine granulation of the kidney, especially on its greater curvature. On slicing, it was apparent that there was a very considerable reduction in the kidney substance with a corresponding increase in intrapelvic fat. At the lower pole there was one small cyst. The blood vessels were not unduly prominent and the renal pelvis appeared normal.

Sections showed numerous areas in which there was complete obliteration of glomeruli with marked arteriosclerotic changes in the associated blood vessels. These damaged areas of kidney tissue tended to have a linear distribution, but this was not a constant feature. In the areas of kidney tissue not involved the glomeruli were remarkably normal, but the arterioles and larger vessels still showed the changes of arteriosclerosis. Towards the medulla the larger vessels showed pronounced medial hypertrophy and some fibrosis.

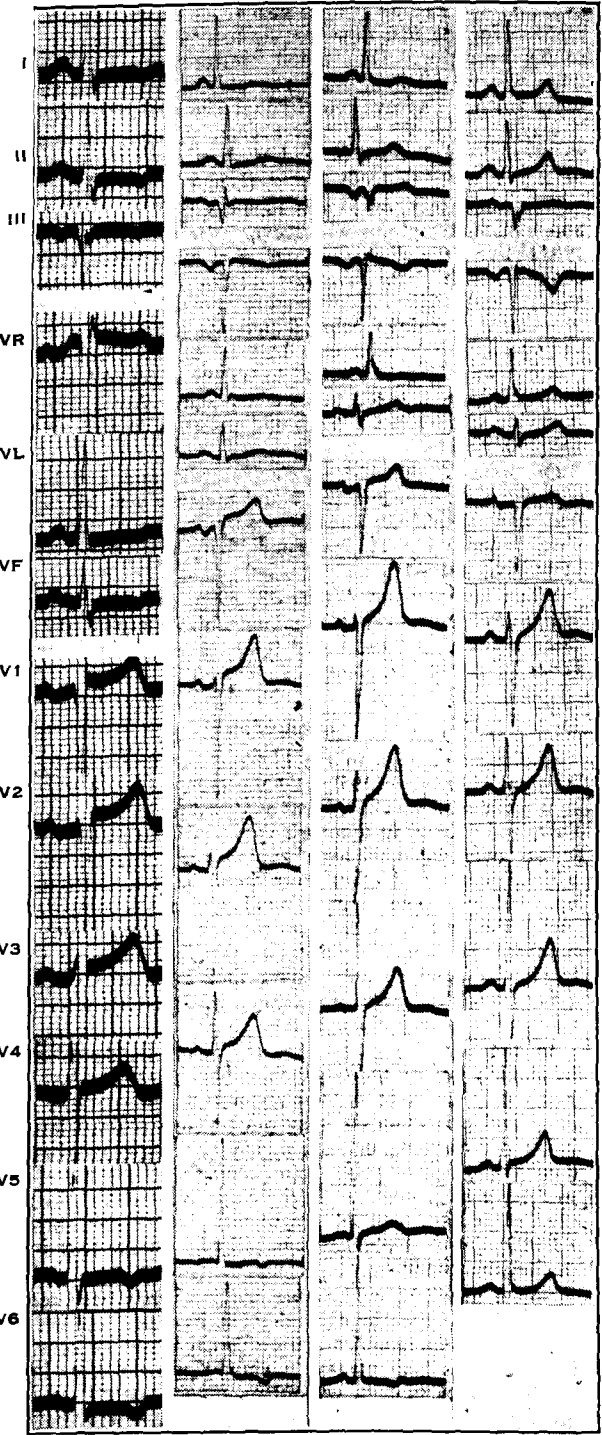
The histological picture suggested some process of long standing, and it may well have represented the end stages of damage from x-ray therapy. Professor Magnus stated that he had never seen a kidney in this condition, so that he was unable to make any comparison. He did not think the histological picture was that of malignant hypertension, and it was certainly not that of chronic nephritis. The vascular changes present in this kidney were not recent, and it was probable that they did not give a picture of what the vascular system was like as a whole. Had he not known the clinical history of the patient he would have suggested that the lesion represented the end-result of a chronic pyelonephritis.

Post-operative Progress

The blood pressure on the day after operation fell at one time to 130/80, but within a week it had reached 180/120 and a canter rhythm at the apex became again audible. At the time of his discharge from hospital on the 22nd day after his nephrectomy the blood pressure had reached

180/100. On that day Mr. Crick reported slight diminution of the oedema of both retinae; no haemorrhages were visible and the exudates were slightly less and the arterioles fuller than previously. The conclusion was that there was slight general improvement in the fundus picture. By September 8 the patient's blood pressure had reached 210/140.

On September 30 Mr. Crick reported that without doubt there had been a recession in the papilloedema and there was less attenuation of the retinal vessels, particularly noticeable in the right eye. In addition, some of the sharply defined glistening exudates which formerly made up



Electrocardiograms showing reversion to normal in less than a year after nephrectomy.

the pattern of the macular fan in the left eye had disappeared, so that there was now only one streak left in this formation, together with a few dots. No haemorrhages were visible.

By October 15 the blood pressure had fallen to 172/104 and the electrocardiogram showed slight improvement. The T wave, which previously had been inverted in lead VI and standard leads I and II, had become just upright. It was, however, still slightly inverted in leads V5 and V6.

A month later the visual acuity was 6/6 in each eye and there was a further slight improvement in the appearance of the fundi.

By December 22 he was quite well and working a full day, and had had no further headaches or nocturia, and he realized for the first time that he had been dyspnoeic prior to his operation. His blood pressure was 200/110, but there was no albuminuria. The electrocardiogram showed some further improvement in that the previously inverted T wave in lead V5 had now become upright, although inversion of the T wave in lead V6 persisted; the amplitude of the T wave in leads I and II had improved.

When next seen, on March 16, 1955, he was working hard and had no symptoms whatsoever; the blood pressure was 190/110 and the electrocardiogram remained essentially unchanged, with slight inversion of the T wave in lead V6 still present. His fundus picture showed still further improvement, the disks being flatter, the exudates fewer, and the vessels less attenuated. In view of the blood-pressure figure it was thought justified to try the effect of "serpasil" orally, 0.25 mg. three times a day. By April, 1955, the reserpine had reduced his blood pressure to the range of 150-160/92-110.

On June 22 the 12-lead electrocardiogram had become completely normal and the blood pressure was 162/94; he was now taking 0.5 mg. of reserpine thrice daily. Mr. Crick reported that his fundi had also now become completely normal.

When last seen on March 28, 1956, the patient had no symptoms whatsoever, was taking only reserpine, 0.25 mg. three times a day, the blood pressure was 152/92, and his 12-lead electrocardiogram was still normal in all leads.

Discussion

Radiation damage to the kidneys was first described by Ralston Paterson in 1952, and the material upon which his communication was based was analysed in detail by Kunkler, Farr, and Luxton in the same year. All the patients in this series—over 30—had been treated for testicular tumours with a radiation dose of from 2,000-3,000 r, distributed to both kidneys. The onset of renal failure was comparatively early, the interval after treatment averaging about eight months. In a number of cases the renal damage proved fatal. However, it was found that even in severe cases a considerable degree of recovery was possible after blood transfusion and prolonged rest.

In the case here reported the main incidence of the irradiation was on the left kidney, which received just under 3,000 r. The right kidney received a considerably lower dose, and part of this kidney must have sustained less than 2,000 r. Further, in considering the cause of the renal damage it must be taken into account that the kidney may well have been involved in the extensive growth which was present at the time of treatment. There can, however, be little doubt that radiations played a major part in producing the condition.

So far as we know, no case has previously been reported in which the picture of malignant hypertension has been produced by unilateral radiation damage, and we consider it important that this possibility should be recognized in view of the chance of cure offered by timely nephrectomy. Of all the malignant growths in the abdomen, seminoma perhaps offers the best prospect of cure by radiotherapy, and it is not unlikely that a proportion of the patients so cured suffer from malignant hypertension due to unilateral renal

damage. If this possibility is borne in mind at the follow-up of these patients lives may be saved.

Since Goldblatt's classical researches (Goldblatt *et al.*, 1934; Goldblatt, 1937, 1948) and those of Wilson and Byrom (1939) much interest has centred on the part played by human renal disease in causing hypertension, and in particular in the role of unilateral, or mainly unilateral, kidney disease. The exact cause of the high blood pressure in unilateral renal disease is still unknown, but it is probable that the diseased kidney secretes an excess of circulating pressor substance, and thus early removal of the kidney might be expected to reduce the elevated pressure.

The diseases which can give rise to unilateral or predominantly one-sided disease, with resultant hypertension, are numerous and may involve primarily the renal vessels or the parenchyma. Those conditions where nephrectomy has led to cure of the hypertension include chronic pyelonephritis, which is by far the commonest cause (Braasch, 1942), and such diseases as tuberculosis (Kennedy, Barker, and Walters, 1941), hydronephrosis, which usually results from an aberrant renal artery, neoplasm (Koons and Ruch, 1940), trauma (Farrell and Young, 1942), atherosclerosis of the renal artery (Leiper, 1944), infarction and undetermined cause (Perry, 1945).

In 1940 Schroeder and Fish laid down certain criteria for operation, among which was the absence of papilloedema and retinitis, but it is now realized that such malignant hypertension is by no means a contraindication to nephrectomy, as occasionally cure may result (Platt, 1941; Kennedy, Barker, and Walters, 1941; Powers and Murray, 1942; Leiper, 1944; Perry, 1945).

Recently Perera and Haelig (1952) have gone so far as to suggest that the type of hypertension induced by unilateral renal disease is in fact, malignant, being acute, severe, and rapidly progressive. Fourteen of their 16 adult cases showed retinopathy. They are of the opinion that as hypertensive vascular disease rarely, if ever, begins after the age of about 50 (Perera, 1948), the sudden appearance of a striking elevation in diastolic blood pressure in the older age groups, known previously to have been normotensive, should lead to a suspicion of unilateral renal disease.

Summary

An example is recorded of severe malignant hypertension induced by renal damage from irradiation that became normotensive after nephrectomy. Following nephrectomy, the blood pressure fell slightly over a period of seven months, and then responded at once, and satisfactorily, to moderate doses of reserpine orally. All symptoms disappeared after nephrectomy, and the continuous improvement of severe (Grade III-IV) retinopathy to complete normality within 10½ months of operation was paralleled by severe hypertensive electrocardiographic changes reverting completely to normal within the same period.

Attention is drawn to the possibility of saving life by timely nephrectomy where renal damage produced by irradiation has resulted in malignant hypertension.

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TOXICITY OF SOME ATMOSPHERIC POLLUTANTS

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Examples of the harmful effects produced in man by contaminated fogs are now well known. The general clinical picture is one of respiratory embarrassment with increased dyspnoea, cyanosis, progressive cardiovascular embarrassment, and possibly fever and toxæmia if secondary infection occurs. It was similar in the London fogs of 1948 and 1952, in the Meuse Valley fog of 1930, and in the Donora incident in 1948. The young, the old, and those with pre-existing respiratory or cardiac disease are the more seriously affected, and the post-mortem findings are consistent with the inhalation of an irritant substance.

The nature of the irritant substance is still unknown, although various contaminants have been arraigned by different workers. Sulphur dioxide, carbon monoxide, automobile exhaust fumes, and fluorine compounds have been suggested (Firket, 1931; Roholm, 1937; Regan, 1953).

Unfortunately no lethal fog has been adequately sampled during the incident, nor have its chemical and physical properties been determined. It is therefore difficult to plan any experimental work on the toxic effects of polluted fog. The obvious contaminants must be studied first, but in the absence of precise knowledge of the possible concentration or the physical state of each substance in a smog the practical implications of the results obtained must be in doubt. Such a study will, however, indicate which contaminants are potentially dangerous and those which may be harmless, although synergistic effects may alter this simple classification.

We at Porton have examined effects on animals and human beings of various substances and mixtures which might be important atmospheric pollutants. The results of these experiments have been or are being reported in detail elsewhere, but it did seem desirable to summarize our progress to date and to consider the toxicological picture as a whole.

The use of animals must necessarily form part of such an investigation; the relative toxicities of possible contaminants and any synergistic effects can only be accurately determined by using subjects drawn from a homogeneous population, which cannot be obtained with human beings. In general most species of animals are less sensitive to these toxic pollutants than is the susceptible proportion of the human population.

Sulphur Dioxide

SO₂ is a pollutant commonly sampled in fog atmospheres. The concentrations reported in "smogs" (about 2 p.p.m. or less) have no detectable effect on any animal used. However, a small portion (perhaps 1/100) of human beings have been found to suffer from bronchoconstriction when inhaling low concentrations of this gas. In some cases slight tightness of the chest could be felt with concentrations as low as 1 p.p.m. In a London fog on January 5, 1956, one

such subject experienced bronchoconstriction and severe respiratory distress, exactly similar to that produced by SO₂, when he attempted to hurry through the fog. In this instance the action of the gas was combined with the normal breathlessness due to exercise.

Smog atmospheres contain both SO₂ and smoke particles, and Meetham (1954) suggests that the SO₂ could be absorbed on to the smoke particles. It would then not be detected in the usual apparatus for measuring SO₂, as the air is filtered before entering the absorbent solution. Such SO₂-smoke particles would, however, if they existed, be inhaled and penetrate deeply into the lungs, and the SO₂ might be more toxic in this form than in the pure gaseous state.

The results of experiments on this subject have in some cases been expressed by the CtD₅₀. This is defined as the dosage (concentration time) to which a batch of animals has been exposed by the time 50% have died.

R. E. Pattle (unpublished results, 1955-6) has shown that the toxicity of SO₂ in a concentration of about 2,700 mg. per cubic metre (1,000 p.p.m.) to mice is enhanced by the addition of 100 mg. per cubic metre of smoke from a kerosene lamp. The CtD₅₀ for the mixture was about 40% greater than that for the gas alone. In one experiment where the mean SO₂ concentration was the same (2,560-2,590 mg. per cubic metre) for the clean and the smoky atmospheres, at approximately 300 minutes (292-295 minutes) the mortalities were: clean atmosphere, 3/25; smoky atmosphere, 16/25. The final estimated CtD₅₀'s in the case last described were only in the proportion of 1 to 2.

The dosage of smoke administered in the above experiments is large and the higher mortality in the smoky atmosphere is not surprising. There is probably no need to postulate any interaction between smoke and SO₂ to account for the results. At necropsy the lungs showed intense congestion, areas of consolidation, collapse, and emphysema, and traces of oedema.

Previous exposure of mice to somewhat lower but still massive dosages of smoke (40 mg. per cubic metre for 22 hours) actually increases their resistance to subsequent exposure to SO₂ (c. 3,000 mg. per cubic metre; c. 1,000 p.p.m.). The ratio of the CtD₅₀'s for smoked to unsmoked mice was found to be 1.55, while after 200 minutes 20/49 unsmoked mice and only 6/49 of the pre-smoked group had died.

Other experiments have given similar results, so that it is undoubtedly a real effect. The cause of the protection, however, is not known. It may be that the pre-smoked mice have a smaller respiratory minute-volume or that the smoke causes increased secretion of protective bronchial mucus. We have no information on these points. To find out whether smoke acquires any peculiar irritant properties by being in contact with SO₂, a flow of smoky air was divided into two portions. One portion was administered directly to 20 mice, while the other was mixed with SO₂ (5,070 mg. per cubic metre; 1,900 p.p.m.). The SO₂ was then removed from this second portion of air by bubbling through sodium carbonate solution, and the resultant air flow, with its burden of smoke, was administered to a second batch of 20 mice. Prolonged exposure (77 hours; average smoke concentration 50 mg. per cubic metre) caused no fatalities in either group of mice; seven in each batch were kept for three months and they remained in good health. Histological examination of the lungs of all the mice showed no differences between those which had received ordinary smoke and those which had breathed smoke which had been in contact with SO₂.

Sulphuric Acid Mist

Guinea-pigs are much more sensitive to H₂SO₄ mist than any other species; using these, we found that a mist with the larger particles was more toxic than one with smaller particles; and that reducing the temperature of the exposure chamber, but keeping the particle size constant, increased the toxicity of the mist (see Table).

Estimated Median Lethal Concentration (LC_{50}) of H_2SO_4 Mist for Guinea-pigs with an Eight-hour Exposure

Temperature	Particle Mass Median Diameter	LC_{50} (mg./cubic metre)
Room (20° C.)	2.7 μ	28.8
Room (20° C.)	0.8 μ	60.9
0° C.	0.8 μ	49.0

In high concentrations of mist the guinea-pigs die rapidly with bronchial spasm and a resultant emphysema; in smaller concentrations death is slower and there is more extensive pulmonary damage, including bronchial desquamation, haemorrhagic consolidation, oedema, and emphysema.

Early in the experiments it was noticed that fluctuations in the acid content of the mist occurred, and these were traced to the ammonia evolved from the faecal droppings and urine of the animals, which neutralized the acid. These fluctuations could be prevented by keeping the animals on a wire mesh above a tray of 10% H_2SO_4 . Under these conditions reproducible results could be obtained.

The other species examined—monkeys, goats, rabbits, rats, and mice—are much less sensitive to H_2SO_4 mist (Cameron, 1954; Pattie, Burgess, and Cullumbine, 1956); and in one experiment a rabbit survived a concentration of 400 p.p.m. for four days. The guinea-pig is known to be especially susceptible to conditions inducing bronchial spasm, and it is those individuals of the human species with a similar predisposition who are the more severely affected by smog atmospheres.

The variation in susceptibility of different individuals to H_2SO_4 mist is illustrated by our own exposure of human subjects (Van M. Sim and R. E. Pattie, unpublished results, 1955). Mist concentrations of 10 p.p.m., with the M.M.D. of the particles about 1 μ , were found to be highly irritant to the throat, although with prolonged exposure this irritation tended to decrease. If repeated coughing occurred, pain developed in the upper part of the chest. Most of the subjects suffered no long-term effects from an hour's exposure to this mist, but one subject exposed for 30 minutes had "wheezing," coughing, and expectoration for some hours; another subject continued to "wheeze" for two months.

Increasing the particle size of the mist also increased the irritancy, just as it increased the toxicity of the mist to guinea-pigs. Thus a mist of particle size about 1.5 μ M.M.D. was as irritant at 5 p.p.m. as the former mist at 10 p.p.m.

Ammonia was found to annul the irritant properties of H_2SO_4 mist and also those of atmospheres containing SO_2 .

Magnesium oxide smoke removed SO_2 from the atmosphere, but even when present in excess did not affect the irritant properties of H_2SO_4 mist.

Smoke

Smoke itself seems to be very inert so far as its acute toxicity is concerned. Our experiments indicate that the smoke from a kerosene lamp has a median lethal dosage to mice of the order of 1,500 mg. per cubic metre for 200 minutes.

Coal-tar Distillates

The effect of these is irregular; in one case dosages of 2,000 mg. per cubic metre of solid and liquid tar for 500 minutes produced no fatalities among exposed mice, but in another experiment with guinea-pigs and mice there were deaths due to irritation of the whole respiratory system.

Wood Distillates

Wood distillates have a much greater content of irritant aldehydes than coal distillates, but the effect of these irritants is masked by the presence of carbon monoxide in the wood gas. When suitably diluted they cause damage to the whole respiratory tract, especially to the trachea and bronchi.

Diesel Fumes

It has been suggested that the fumes from diesel engines may contribute irritant substances to a smog atmosphere. It is known that, because of their lower CO content, these fumes are normally less lethal than those from petrol engines; but Turner (1955) has claimed that diesel engines which are not in good mechanical condition produce more harmful fumes than those without defects. Because of the variety of toxic agents which diesel fumes contain investigation of their toxicity is difficult. Holtz *et al.* (1940) have indicated how the carbon monoxide, nitrogen oxides, and aldehyde contents in diesel fumes vary with changes in the fuel-air ratio.

We have exposed mice, guinea-pigs, and rabbits for varying periods of time to the fumes from a single-cylinder diesel engine (R. E. Pattie, H. Stretch, K. Sinclair, F. Burgess, and J. A. G. Edginton, unpublished results, 1955). Four conditions of engine-running were investigated and concentrations of CO, NO, NO_2 , aldehydes, vanadium, and several other substances were determined. The results of these experiments are to be reported in detail elsewhere; the most significant findings under each condition were as follows.

A. Fuel-Air Ratio 0.0121, power output low, good injector, air inlet open: No animals died in two experiments in which the exposure was in each case for five hours. In another experiment all the guinea-pigs, half the rabbits, and 20% of the mice were dead after seven hours' exposure. At necropsy all the animals showed gross damage to all parts of the respiratory tract, varying degrees of tracheitis, pulmonary congestion, consolidation, oedema, and emphysema being present. The fumes were highly irritant to the human eye, and the main causes of death were considered to be organic irritants of the acrolein type and NO_2 .

B. Fuel-Air Ratio 0.0193, power output 5.5 B.H.P., good injector, air inlet open: The fumes were less acrid but more toxic than in A. A five-hour exposure caused 90% of the guinea-pigs, 48% of the mice, but no rabbits to die. Post-mortem examination revealed gross pulmonary oedema, with some patchy areas of consolidation and emphysema. In contrast to the animals dying under condition A, tracheal damage was here slight. The main cause of death was considered to be NO_2 .

C. Fuel-Air Ratio 0.0199, power output 5.5 B.H.P., worn injector, air inlet open: Here the fumes were much less acrid and less toxic than in B. A five-hour exposure killed 60% of the guinea-pigs but only 1/40 mice, and no rabbits. The post-mortem pulmonary damage was similar to that occurring in B and was considered to be due to NO_2 .

D. Fuel-Air Ratio 0.033, power output low, good injector, air inlet restricted: The fumes were intensely irritating and more toxic than under conditions A, B, and C. The mice died first, but all the animals were dead before the end of the five-hour exposure. At necropsy the lungs of the mice showed intense congestion and small capillary haemorrhages. The degree of lung damage was greater in the guinea-pigs and rabbits, and these species showed a severe tracheobronchitis. The blood carboxy-haemoglobin content in the mice was about 60% and in the guinea-pigs and rabbits about 50%. The main causes of death were considered to be CO in the mice and in the other two species CO together with irritants.

It should be noted that under none of these conditions was a black smoke produced. White fumes were sometimes present in A, and condition D produced a dense white smoke, apparently consisting mainly of unburnt oil. There were more oxides of nitrogen under moderate load (B) than under light load (A). The aldehyde content was greater under the light load and was very high when the air intake was obstructed (D). In our experiments, therefore, three main toxic agents were recognized: irritant aldehydes, NO_2 , and CO. Each was always present in the diesel fumes, but their relative importance varied with the running conditions.

All our diesel fumes contained NO in greater quantities than NO_2 ; the toxicity and effects of NO are somewhat similar to those of CO. No vanadium was found in the fumes.

Further investigation of the toxicity of diesel fumes under conditions in which the exhaust is smoky is in hand.

The irritancy to man of small concentrations of various aldehyde vapours has been assessed (Van M. Sim and R. E. Pattie, unpublished results, 1955). The unsaturated aldehydes—acrolein and crotonic aldehyde—are highly irritant and cause lacrimation in concentrations of 1 p.p.m. and 4 p.p.m. respectively, while the corresponding saturated compounds—propionic and butyric aldehydes—are almost non-irritant in concentrations of 200 p.p.m. Acetaldehyde, isobutyric aldehyde, and *n*-valeric aldehyde are likewise almost non-irritant. Formaldehyde is intermediate between the two groups, 12 p.p.m. producing severe irritation. Since the individual aldehydes vary so much in their irritant properties, determination of the total aldehyde content of diesel fumes may not provide a good estimate of their irritant potentialities.

Mice, guinea-pigs, and rabbits have been exposed for six hours to a concentration of acrolein of 24.4 mg. per cubic metre (10.5 p.p.m.). This caused the death of about 50% in each species. The post-mortem picture was one of severe tracheobronchitis with pulmonary oedema, consolidation, congestion, and emphysema.

Field Work

We were permitted to take samples at the Dunn Laboratories at St. Bartholomew's Hospital in the fog of January 4-6, 1956. This fog was much less dense than that of 1952. The salient fact found was that filter samples taken up to 4.20 a.m. on January 5 were alkaline (maximum equivalent to 0.16 p.p.m. of ammonia, SO_2 concentration during sampling was 1.16 p.p.m.), whereas samples taken from 9 a.m. on that day until the fog dispersed on January 6 were acid (maximum 0.05 p.p.m., as H_2SO_4). The nature of the alkaline matter present is unknown; alkali carbonates as aerosols would react with SO_2 , so it was probably organic. The acid (which may have been present in small quantities while the filter samples were, as a whole, still alkaline) may have been sulphuric. Impaction of droplets on slides coated with indicator (N. W. Wootten, unpublished results, 1956) showed that the acid was present in droplets of 10 μ M.M.D., which were far fewer in number than were the smoke particles.

The fog when inhaled through the mouth produced slight tickling at the back of the throat, similar to that produced by inhaling H_2SO_4 mist in very small concentrations (<0.1 p.p.m.). The irritation was very inconstant, and was not severe enough to cause coughing; it was not possible to determine whether it was alleviated by ammonia. It was not present when a Siebe Gorman "microfilter" was worn. On this occasion, therefore, H_2SO_4 mist was not a major constituent; such respiratory effects as the fog produced (as described above) in otherwise healthy persons could be attributable to gaseous SO_2 alone. The fog had no effect on guinea-pigs exposed to it.

Discussion

Our experiments have indicated that many of the possible contaminants of the atmosphere are highly irritant substances. SO_2 , H_2SO_4 mist, certain aldehydes, and NO_2 can all produce death in animals from irritation of the airway and/or pulmonary tissues. CO concentration, particle size, and cold are other variants which might influence toxicity. In general our researches so far suggest that sulphur compounds are important acute toxic agents in smog (Firkin, 1937).

The peak concentration of SO_2 in the 1952 London smog was 1.34 p.p.m. (say 3.58 mg. per cubic metre at 20° C.); but this was an average figure for a 48-hour period, so that at times the actual concentration may have been much higher. SO_2 concentrations of this order may in general not be very harmful (Anderson, 1950), but some apparently normal individuals do show an increased airway resistance during exposure. Asthmatics and bronchitics may, of course, react more dramatically.

H_2SO_4 mist is both more irritant to man and more toxic to guinea-pigs, especially with medium-sized particles, which

may impact better in the larynx and trachea. It is not certain whether H_2SO_4 was present in the 1952 smog, but Ellis (1931) has found concentrations of it in fogs to be as much as three times that of SO_2 . Therefore, an average concentration of 4 p.p.m. might have existed in the London fog of 1952; with a suitable particle size and temperature, such a concentration might produce long-lasting respiratory symptoms in a proportion of otherwise normal men, and those with a pre-existing respiratory ailment might have a more serious response to a smaller concentration.

If H_2SO_4 and SO_2 are important toxic agents in smog their effects could be neutralized by means of ammonia. Indoors this is easy; the amount of ammonia required to neutralize all the sulphur acids in a house or hospital ward would be of the order of 2 g. Ammonia is a comparatively harmless substance; the "threshold limit" for man is given as 100 p.p.m. Ammonia gas could be added to the output of large chimneys to neutralize their SO_2 content.

Nitrous fumes, CO, and irritant aldehydes are emitted into the atmosphere from the exhausts of diesel engines. It is impossible, at present, to say how important these contaminants may be. NO_2 is formed in large quantities by the petrol engine (Hanson and Egerton, 1937); the fumes from this engine contain more CO but less aldehyde than those from a diesel engine. Petrol-engine fumes should therefore, even apart from their CO content, be at least as toxic as diesel fumes, although they would probably have less effect on the trachea and bronchi.

One of the difficulties in interpreting experimental data from so-called normal although sometimes susceptible animals and men in terms of morbidity and mortality in fog is that the latter affects only a specially sensitive small proportion of the general population. A significant observation was made in the SO_2 experiments described above. Here it was noticed that in the early stages, when the mortality was low, small differences in sensitivity (for example, between fresh and pre-smoked mice) gave rise to much larger differences in mortality. This is to be expected if the lethal dosage is distributed according to a "normal" law: If a similar phenomenon appeared in human mortality during smog it would mean that a slight increase in the contamination or duration of the smog would lead to a large increase in mortality; while if the fog contained a number of irritants, elimination of any one of them (for instance, coal distillates by reducing coal burning or sulphur oxides by means of ammonia) would reduce mortality considerably. In such a phenomenon could lie the greater lethality of, for example, the 1952 London smog as compared with others.

Summary

In a study of potential atmospheric pollutants, the effects on animals of sulphuric acid mist, sulphur dioxide, smoke, mixtures of SO_2 and smoke, coal distillates, wood distillates, acrolein, and diesel fumes (under four different running conditions) have been investigated. The guinea-pig is very sensitive to sulphuric acid mist, but, apart from this, the concentrations of pollutants required to produce any effect on animals are very much greater than those found in smogs.

The effects of H_2SO_4 mist, SO_2 , and a number of aldehydes on human beings have been studied. Sulphur dioxide in low concentration causes bronchoconstriction in certain cases; sulphuric acid mist can cause bronchitic symptoms, and is irritant in concentrations below 0.1 p.p.m. The toxicity of these compounds is annulled by ammonia.

Some results obtained during the London smog of January 4-6, 1956, are described.

It is concluded that the toxic effects of smog are due to the action of small quantities of pollutants on

exceptionally sensitive human beings; the substances concerned are probably, but not certainly, the sulphur compounds.

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SPLENOPORTAL VENOGRAPHY FOR EVALUATING ABNORMALITIES OF PORTAL CIRCULATION

BY

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Splenoportal venography by percutaneous injection into the splenic pulp was first performed by Boulvin *et al.* in 1951. A large number of splenoportal venograms have been carried out by different observers and much useful information has been gathered from visualization of the portal circulation. The communication by Atkinson *et al.* (1955) is particularly valuable in this respect. We became interested in the procedure after reading the paper by Dreyer and Budtz-Olsen (1952), and since that time a series of 46 successful splenoportal venograms have been performed by the method of percutaneous injection into the splenic pulp.

Most of these cases were subsequently operated upon for splenectomy, or splenorenal shunt, or ligation of hepatic and splenic arteries. Opportunity therefore presented itself for correlating the pre-operative assessment of the splenoportal circulation, as judged by the venographic procedure, with the actual anatomical state of the circulation, the portal venous pressure, and the naked-eye and histological state of the liver.

This communication is based mainly on the findings of the cases subjected to operation, but also includes a few cases which were not operated on but in which the splenoportal venograms were studied and interpreted along with the clinical diagnosis.

Certain suggestive venographic patterns have been formulated as a result of this study.

Clinical Material and Investigation

Of 54 cases in which splenic venography was attempted, successful venograms giving significant information were obtained in 46 (see Table), 5 were unsuccessful owing to spasm of the splenic vein, and in 3 others the findings were inconclusive. Operations were carried out in 32 cases—12 of tropical splenomegaly of uncertain origin, 10 of splenomegalic cirrhosis, 6 of portal cirrhosis, and 4 of

Analysis of 46 Cases with Successful Venograms

Nature of Case	Operated	Non-operated	Total
1. Tropical splenomegaly ..	12	0	12
2. Intrahepatic obstruction ..	4	2	6
		(1 confirmed at necropsy)	
3. Cirrhosis of liver:			
Splenomegalic ..	10	3	13
Portal ..	6	2	8
Biliary ..	0	1	1
Nodular hyperplasia ..	0	1	1
4. Suprahepatic obstruction ..	0	5	5
Total ..	32	14	46

intrahepatic obstruction of the splenoportal system. In each of these cases, the portal venous pressure was measured at the time of operation, the naked-eye appearance of the liver noted, and a biopsy taken. When splenectomy was performed the weight of the spleen was recorded and its histology subsequently studied.

The series of 14 cases which were not operated on included 3 of splenomegalic cirrhosis, 1 of biliary cirrhosis, 2 of portal cirrhosis, 1 of nodular hyperplasia following subacute hepatic necrosis, and 2 of intrahepatic obstruction of the splenic vein. In one of the cases in this last group obstruction of the splenic vein was confirmed at necropsy. In the remaining 5 cases the clinical features were suggestive of suprahepatic obstruction of the hepatic venous system.

Results

As a result of this study it seems that the venographic appearances fall into four characteristic patterns.

1. *Pattern of Tropical Splenomegaly of Uncertain Origin* (12 cases, all operated on).—In this type the splenic and portal veins were very dilated and tortuous. In the absence of secondary cirrhotic changes in the liver, collaterals were not present in any case. The bifurcation of the portal vein at the porta hepatis was well seen. The intrahepatic radicles were very faint and the peripheral branches were indistinct. However, in a few cases, when they were faintly visualized, the pattern did not show any distortion (Fig. 1).

2. *Pattern of Intrahepatic Obstruction* (6 cases: 4 operated; 1 not operated; 1 proved by necropsy).—In splenic vein obstruction the dye terminated abruptly at some part in its course (Fig. 2), whereas in cavernomatous transformation of the portal vein (Fig. 3) the dye became diffusely distributed over numerous small tortuous channels (Das and Basu, 1956). In both cases many collaterals were present.

3. *Pattern of Intrahepatic Obstruction due to Cirrhosis of Liver* (23 cases; 16 operated; 7 not operated).—This group can be subdivided into two categories.

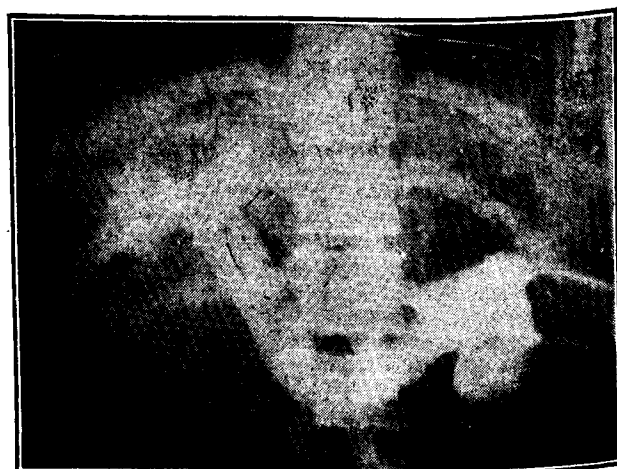


FIG. 1.—Venogram in a case of tropical splenomegaly, showing marked dilatation and tortuosity of the splenic and portal veins. The intrahepatic radicles are poorly seen.

(i) *Pattern of Pure Portal Cirrhosis* (8 cases).—Here the prominent features were (a) distortion, poor visualization, and absence of regular and dichotomous branching of the peripheral intrahepatic radicles; (b) pooling of the dye, often at the site of the proximal intrahepatic radicles; and (c) presence of numerous collaterals, directed upwards as well as downwards. The splenic and portal veins were more or less of normal calibre. The collaterals most commonly seen were those of the left gastric and paraoesophageal series. The inferior mesenteric vein was very commonly visualized. In the main there are two types of appearances. In one the contrast medium is concentrated in a few of the larger branches in the substance of the liver near the hilum. Often there is pooling of the dye at this site. The peripheral branches are not seen at all. The overall appearance is like that of a withered tree (Fig. 4). In another type the peripheral branches are better visualized, but the regular dichotomous branching of the radicles is absent. Both distortion and contraction of the intrahepatic branches are present (Fig. 5).

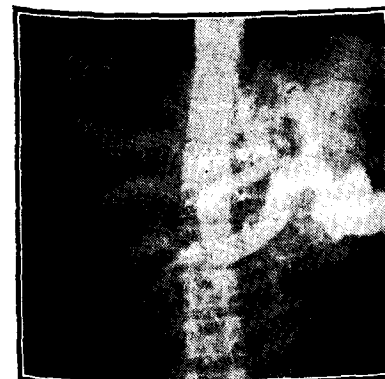


FIG. 2.—Obstruction of the splenic vein with large upwardly directed collaterals. Portal vein and intrahepatic channels not seen.

(ii) *Pattern of Secondary Portal Cirrhosis Following Long-standing Splenomegaly* (splenomegalic cirrhosis) (13 cases: 10 operated; 3 non-operated).—Here, although the collaterals were present in many cases and the intrahepatic radicles were similarly distorted, pooled, and partly visualized peripherally, the main splenic and portal veins were dilated and tortuous (Fig. 6). There were two other cases in which the venographic pattern was akin to that described for splenomegalic cirrhosis: one was a case of biliary cirrhosis, and the other a case of nodular hyperplasia of the liver following subacute hepatic necrosis.

4. *Pattern of Suprahepatic Obstruction* (5 cases, not operated).—In this type the intrahepatic radicles of the portal vein were very prominent and were well visualized right up to the periphery. Unlike the pattern in cirrhosis of the liver, there was no distortion of these intrahepatic channels, nor was there any evidence of pooling of the dye (Fig. 7). Collaterals were present in three cases.

Discussion

Amongst the series of tropical splenomegalies without cirrhosis operated on, the weights of the spleens ranged between 1,100 and 3,000 g. Nine had portal venous pressures below 200 mm. of saline and in two others the pressure

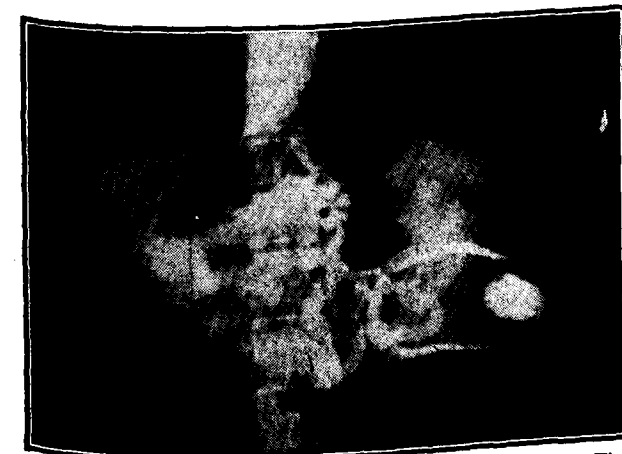


FIG. 3.—Cavernomatous transformation of the portal vein. The dye is diffusely distributed at the site of the portal vein and there are numerous upwardly directed collaterals.

was 200 and 300 mm. of saline. In all cases the splenic as well as the portal vein were greatly dilated in spite of there being no significant hypertension in nine. This dilatation was therefore caused by the large splenic effluent and is not an indication of portal hypertension. The absence of collaterals in any of the cases lends support to this view. The tortuosity of the vein is due to the large splenic mass causing distortion of the course of the vein. It was not necessarily due to mechanical displacement of the spleen at the time of injection, as suggested by Fuld and Irwin (1954). This was confirmed at operation in many cases. The faint visualization of the undistorted intrahepatic radicles was presumably due to two factors: dilution and diffusion of the dye on reaching the liver, and its rapid transit through an unobstructed portal bed.

The mechanism of the venographic pattern in the intrahepatic obstruction group is easily understood and has been confirmed in four out of the six cases. In one case—in which the venogram suggested cavernomatous transformation of the portal vein, with numerous upwardly directed tortuous collaterals involving the left gastric, the short gastric, and other unidentifiable veins (Fig. 3)—the anatomical pattern was confirmed at operation. The portal vein was absent and the numerous collaterals could be seen coursing upwards towards the cardia. In three other cases of obstruction of the splenic vein (as judged by venography) the diagnosis as regards the site of obstruction and the nature of collaterals was confirmed in two at operation and in the other at necropsy (Das and Basu, 1956). In another case of portal cirrhosis of the liver the venographic appearance suggested thrombosis of the portal vein (Fig. 8). The contrast medium terminated at the site of origin of the portal vein and was diverted through numerous collaterals. These findings were later confirmed at operation.

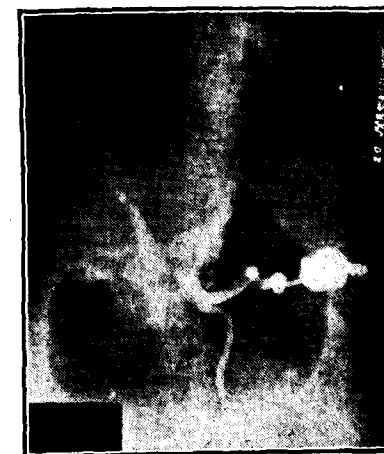


FIG. 4.—"Withered tree" appearance of the intrahepatic portal radicles in cirrhosis of liver. There are numerous collaterals, and the splenic and portal veins are not dilated.



FIG. 5.—Absence of regular dichotomous branching of the intrahepatic radicles in a case of cirrhosis of liver. There is pooling of the dye at places. Numerous collaterals are present.

The venographic pattern in cirrhosis of the liver is more obscure and requires careful elucidation. A careful review of our material shows that the intrahepatic radicles are distorted by the fibrotic process. Further, the degree of distortion is roughly proportional to the extent of the fibrosis. The left main branch of the portal vein at the hilum of the liver was often not seen at all. In general, these findings are in conformity with those of Atkinson *et al.* (1955).

Additional features in this pattern are the presence of numerous collaterals, which is explained by the degree of portal hypertension. In our cases this ranged between 340 and 385 mm. of saline. The lumen of the splenoportal trunk was not dilated in the absence of significant splenomegaly. We therefore feel that portal hypertension, *per se*, does not necessarily lead to dilatation of the splenic and portal veins.

As is to be expected, when cirrhosis had supervened in long-standing cases of splenomegaly, the pattern was a mixed one—showing dilatation and tortuosity of the splenoportal system, characteristic distortion of the intrahepatic radicles, and presence of collaterals. The same expected pattern was seen in a case of biliary cirrhosis and one of subacute hepatic necrosis, both associated with splenomegaly. The enlarged spleen in these two cases contributed to the dilatation of the splenic vein.

In five of our cases the venographic pattern was found to be significantly different from other types, particularly with regard to the intrahepatic channels. Four of these cases conform to the clinical picture described for veno-occlusive disease of the liver (Stuart and Bras, 1955). One of these was a case of polycythaemia vera, and the histological appearances of the liver biopsy material was highly suggestive of suprahepatic obstruction. The fifth case was one of congestive cardiac failure with hepatomegaly. The intrahepatic radicles were well seen right up to the periphery of the hepatic parenchyma. They showed normal regular dichotomous branching. There was no distortion or contraction of the branches, and pooling of the dye was not seen. Collaterals were present in three cases, and their visualization presumably depended upon the degree of the portal hypertension. This type of appearance may be attributed to obstruction to the outflow of the blood from the liver that may result from hepatic venous thrombosis or from rise of pressure in the inferior vena cava through congestive cardiac failure or constrictive pericarditis. We have therefore called this type the pattern of suprahepatic obstruction. In later stages of this type actual cirrhotic changes in the liver may supervene and alter the characteristic venographic pattern.

This investigation indicates that portal hypertension can be assessed with a fair degree of accuracy from the venographic patterns. The presence of collaterals is the most significant indication in this respect. For example, of the

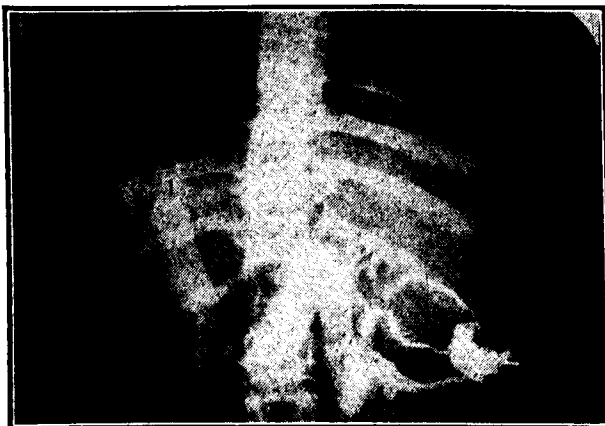


FIG. 6.—Appearance in a case of splenomegalic cirrhosis. The splenic and portal veins are dilated and tortuous, and collaterals are present.



FIG. 7.—Appearance suggestive of suprahepatic obstruction. The intrahepatic radicles are well visualized up to the periphery and there is normal dichotomous branching. Collaterals are present.



FIG. 8.—Non-visualization of the portal vein due to thrombosis in a case of cirrhosis of liver. Numerous collaterals are present.

six cases of portal cirrhosis—which were operated upon in our series of cases—collaterals were present in five. In each of these the portal pressure was above 300 mm. of saline. On the other hand, preoperative clinical indications of portal hypertension, such as recurrent haematemesis (2 cases), presence of prominent abdominal venous collaterals (4 cases), ascites (4 cases), and oesophageal varices as seen in skiagraphy (2 cases), were less frequent.

Similarly in cases of tropical splenomegaly, those showing collaterals on venography invariably had raised portal venous pressure and cirrhotic changes in the liver. By contrast, in cases of splenomegaly without collaterals there was no significant portal hypertension. There were, however, rare exceptions to this general observation.

In our opinion, therefore, the presence of collaterals in splenoportal venography is a positive indication of portal hypertension and appears earlier than other clinical evidences.

Portal venography, it seems to us, is also of value in the assessment of liver cirrhosis. The changes in the intrahepatic pattern described previously and the presence of collaterals together give an accurate estimate of the presence as well as of the extent of the fibrotic process of the liver.

Before operation, infrahepatic obstruction can be diagnosed with certainty by portal venography alone. Not only can the site of obstruction be accurately determined but often its nature can also be assessed.

With regard to suprahepatic obstruction, although we have suggested a characteristic venographic pattern on the basis of our clinical experience, further confirmation is necessary by operation, necropsy examination, or catheterization studies of the hepatic veins.

Venographic appearances in all these types of cases could be of great help to the planning of the operation—as regards both its indication and its nature. In tropical splenomegaly the absence of collaterals and the normal appearance of the intrahepatic radicles would signify absence of portal hypertension and liver changes and therefore splenectomy alone would be justified. On the other hand, the presence of such changes would often indicate a shunt procedure in addition. In infrahepatic obstruction the venogram would help the surgeon to anticipate the exact site and often the nature of the obstruction. For splenic vein obstruction, splenectomy would suffice in many cases, whereas in cases of portal vein obstruction a shunt operation would again be indicated.

In portal hypertension due to cirrhosis of the liver, visualization of a patent portal vein would enable the surgeon to plan a portacaval shunt if necessary, whereas its non-visualization—as in one of our cases—would indicate portal vein thrombosis and would preclude such a procedure. Further, the presence of secondary portal hypertension in cases of suprahepatic obstruction, as judged by the presence of collaterals, would lead to consideration of portacaval anastomosis.

Summary and Conclusion

Splenoportal venography has been performed successfully in 46 cases, 32 of which were operated on. The operative findings are correlated with the venographic appearances.

The clinical material consisted of 12 cases of tropical splenomegaly of uncertain origin, 13 cases of splenomegalic cirrhosis, 8 cases of portal cirrhosis, 1 case of biliary cirrhosis, 1 case of subacute hepatic necrosis with nodular hyperplasia, 6 cases of infrahepatic obstruction, and 5 cases of suprahepatic obstruction.

Four types of characteristic venographic patterns are described and discussed. These are for: (a) tropical splenomegaly of uncertain origin uncomplicated by cirrhosis of the liver; (b) infrahepatic obstruction of the portal venous system; (c) intrahepatic obstruction due to cirrhosis of the liver and splenomegalic cirrhosis; and (d) suprahepatic obstruction of the hepatic venous outflow.

The value of portal venography in assessing the presence of portal hypertension and cirrhosis of the liver is discussed. Visualization of the collaterals is one of the earliest indications of portal hypertension.

In infrahepatic obstruction, portal venography gives an accurate indication of the site and some indications of the type of obstruction.

The venographic findings could be of great help in the planning of a suitable operative procedure in abnormalities of portal circulation.

We are grateful to Dr. A. K. Dutta Gupta, Principal, Nilratan Sircar Medical College, for allowing us facilities for the investigation and for the use of the case records. Dr. S. Bose, professor of radiology and Dr. R. Roy Choudhury, radiologist, Nilratan Sircar Medical College, helped us considerably. Dr. R. N. Chaudhuri, Director, School of Tropical Medicine, Calcutta, referred to one of us some cases for operation, which have been included in the series, and our thanks are due to him.

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NEOSTIGMINE-RESISTANT CURARIZATION

BY

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One of the greatest attractions of the competitive myoneural blockers is their reversibility by antidote drugs. Indeed, it has become almost an article of faith with those who use agents of this type that it is safe to maintain curarization right up to the time at which the abdomen is closed, in the sanguine expectation that the paralysis will then be undone by neostigmine. It was therefore somewhat disquieting to be called by a registrar some two years ago to see a patient in whom the administration of this drug had failed to produce the expected recovery. Since that date four other cases of this type have been reported to me by registrars. Details of a sixth case were received from another source.

The Syndrome

In every instance the patient was elderly and dilapidated, and yet, though ill, was fit by ordinary standards for general anaesthesia. After premedication with morphine and atropine or papaveretum and scopolamine in safe amounts, anaesthesia was induced with a suitably small dose of thiopentone; the patients were intubated with the aid of suxamethonium, and breathing began again after a perfectly normal interval of a minute or two. Subsequently, anaesthesia was maintained with nitrous oxide and oxygen, together with small doses of pethidine and thiopentone. Relaxation was obtained in four of the cases by giving gallamine triethiodide and in two from D-tubocurarine. In none of the cases was the dose excessive for the duration and magnitude of the operation performed. At the end of the operation neostigmine was given in two lots of 2.5 mg., each with 1/100 gr. (0.65 mg.) of atropine. Spontaneous respiration returned, but in every case its amplitude was insufficient to maintain life. The patients continued with depressed respiration until, in spite of adequate assistance of the breathing, death from circulatory failure ensued some 6 to 8 hours after the end of the operation.

Apart from maintenance of adequate ventilation the following resuscitative measures were employed.

Vasopressor drugs were given in all instances to maintain the blood pressure when it declined. "Tensilon" was given to three of the six patients in repeated doses of 10 mg. with sufficient atropine (usually 1/200 gr.—0.32 mg.) to prevent muscarinic effects. It produced only an evanescent improvement in the breathing, which after some five minutes returned to its previously depressed inadequate level. Additional increments of 1.25 mg. of neostigmine also improved the situation a little in these cases, but there was again a tendency to relapse after some 10 to 20 minutes. In no case was it possible to obtain complete recovery by giving this drug, but its administration never aggravated the situation. All the patients received a large dose of nikethamide, which produced in its turn an even more poorly sustained period of recovery. The intravenous administration of potassium in the form of Nabarro's solution was tried in two of the cases. In one of these there was a definite improvement, although completely normal respiration did not recover before ultimate circulatory failure occurred. In the other instance where this solution was used no response whatever was obtained.

The surgical conditions from which these patients were suffering were all of the nature of an ileus with or without peritonitis. Two of them had acute cholecystitis. In another case the source of the infection was not apparent even at necropsy, and in yet another a 36-hour perforation of a

gastric ulcer was the underlying lesion. The fifth case had had a resection of the colon some three weeks previously. A week before he had had a leak from his suture line with the development of peritonitis and subphrenic abscess. The last case was of acute colonic obstruction in an elderly man.

Discussion

Cases of extreme sensitivity to myoneural blocking agents of the anti-depolarizing or competitive type have already been recorded by Gray and Halton (1948) and Condon (1951). In these cases, however, the main feature of the condition was an abnormal sensitivity to normal doses of the drugs. In the cases which I have described, however, ordinary doses of the relaxant drugs were required to produce abdominal relaxation. In some of them, indeed, spontaneous respiration became depressed after the administration of the relaxant, but was not in fact abolished until just before closure of the abdomen; in other words, the essential problem in the patients under review was not that they were abnormally sensitive to the relaxant drug, but that its curarizing effect persisted long beyond its normal span, and, further, that it could not be undone by neostigmine.

Most of the patients were already extremely ill when they came to operation, and it might seem possible that death was coincidental to the administration of the relaxant. In fact, however, though circulatory depression was present at the end of the anaesthesia in these cases, there was certainly enough circulatory activity to convey all the vasopressor and analeptic drugs from the place of their injection to the site where they acted. Further, in three of the cases there was a definite though fleeting response to the administration of tensilon. It would therefore seem as if there was some major abnormality of the physiology of the myoneural junction which made these patients fail either to recover spontaneously or to respond to neostigmine. The only other point of interest is that in all the instances described death was not due to respiratory insufficiency but to circulatory degeneration and peripheral vascular failure, which developed at varying times after the operation in spite of adequate artificial respiration.

One rather attractive explanation of the syndrome will unfortunately not bear detailed inspection. It might seem possible that in these cases the neostigmine had itself become a myoneural blocking agent or that it had produced an excess of acetylcholine which had interrupted conduction at the end-plate. If either of these events had occurred the injection of more neostigmine would have intensified the paralysis rather than relieved it. Similarly, it is unlikely that tension would have improved such a situation.

Block of the respiratory centre itself by curarizing drugs has been described (Ellis *et al.*, 1952). This condition is said to be reversible by nikethamide. There was, however, no sustained response to respiratory stimulants in these cases. Further, the type of breathing which was present was that characteristic of a fully active respiratory centre struggling hard to overcome a barrier of peripheral curarization rather than that of a central depression of breathing.

Lastly, it is possible that a hypercarbia due to insufficient ventilation may have been responsible. It is certainly true that a state of respiratory depression and persistent myoneural block can arise after the administration of suxamethonium in experimental animals exposed to high concentrations of carbon dioxide (Davis *et al.*, 1955). Scurr (1954), too, has reported a case where seeming curarization due to decamethonium was relieved by hyperventilation. A similar case has been reported by Gray and Fenton (1954) in a patient to whom D-tubocurarine had been given. Manual hyperventilation of my patients, however, produced no improvement. Indeed, its result was always temporarily to aggravate the respiratory depression. Further, in one case a slow recovery of myoneural block during the post-operative period was directly demonstrated by faradic stimulation of the flexor muscles of the forearm at a motor point.

It is interesting that while this material was being collected four other cases were submitted to me where neostigmine-resistant curarization seemed to have occurred, but where, in fact, the history made it clear that carbon dioxide narcosis was the essential lesion.

If it is accepted that the condition was in fact due to neostigmine-resistant myoneural block, it is pertinent to ask what was responsible for its persistence. It seems possible that some disturbance of the plasma electrolytes may be the explanation, for it is well known that in experimental animals abnormalities of the sodium-potassium balance at the end-plate can seriously interfere with its function. In patients of the type described such an upset was quite likely to be present. For they were extremely ill, and, further, had a gross disturbance of gastro-intestinal function. Vomiting had occurred in some, and in all some degree of ileus was present. Several of them had had considerable amounts of isotonic sodium chloride, with or without dextrose, infused intravenously in the hours or days preceding operation. Further, it is by no means impossible that elderly patients, especially women living by themselves, would have been for some time on a diet deficient in potassium. Deficiency of this ion in the body must therefore be considered as a cause of the disturbance.

It is admitted that the serum potassium level, determined in only one case, and that on a specimen which had stood overnight, proved to be normal, but an intracellular potassium deficiency may, especially in acidotic states, occur even if the concentration of the circulating ion remains unchanged. Further, in one case electrocardiographic evidence was obtained of the characteristic changes produced by potassium deficiency. Also, it was possible to obtain a temporary improvement in this patient's condition by injecting fluid containing this substance; in another case the transfusion of stored blood which has a high potassium content also produced a marked improvement. The evidence for potassium deficiency is, however, really slender, and it is advanced only as a tentative hypothesis upon which further work may be based. The main purpose of this article is, indeed, to draw attention to this condition, which does not seem to have been described so far, in the hope that further work on its aetiology will be stimulated thereby.

It is interesting that Dripps (1953) reported a group of cases in which much less lethal prolongation of the action of both decamethonium and D-tubocurarine occurred. After reviewing the various possible aetiological factors he reached virtually the same conclusions as those set out in this paper. Foldes *et al.* (1952) have also reported recovery from respiratory depression due to "mytalon" after the administration of potassium. I would, however, caution against the indiscriminate administration of potassium in cases of this kind. For an additional case of the type described in this paper seen lately had a serum potassium of 38 mg. per 100 ml.

From the practical point of view it is important to recognize the type of patient in whom competitive myoneural blocking agents are likely to be neostigmine resistant—that is, the elderly patient with ileus—and to use in them either some form of regional analgesia or a suxamethonium drip which allows the myoneural block to be more readily modified to meet the immediate needs of the individual patient. If competition blockers must be used they should be given only in amounts which will not seriously interfere with breathing.

Summary

In six elderly patients curarization produced by anti-depolarizing myoneural blocking agents persisted after the administration of seemingly adequate doses of neostigmine. It seems possible that this disturbance was due to an upset of the electrolyte balance in these patients; but the evidence is slight, and further investigation is required to elucidate the problem.

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TREATMENT OF ADDISON'S DISEASE

BY

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Differences of opinion still exist concerning the best method of treating patients with Addison's disease. The first real advance came with the discovery of deoxy-cortone acetate (D.C.A.), and early work with this substance was reported by Simpson (1938). It was soon clear, however, that D.C.A. provided only partial control. Patients remained liable to hypoglycaemic attacks, while any severe stress would still precipitate a dangerous and often fatal crisis. When cortisone became available it was evident that this substance exerted a profound effect: hypoglycaemia was abolished and the patient's improved energy, well-being, and weight gain, with improved ability to withstand stressful situations, clearly demonstrated its usefulness.

At first cortisone and D.C.A. were used together (Thorn *et al.*, 1951; MacNeal, 1951; Laurie, 1951; Fourman and Horler, 1954). Sorkin and Soffer (1953) state that D.C.A. is the most important hormonal preparation necessary in the maintenance of a patient with Addison's disease. They believe it should be employed in all cases because of its striking ability to correct disturbances in sodium and potassium metabolism. Thorn (1955) states that the amount of cortisone or hydrocortisone required to restore to normal the metabolism of sugar, etc., is too small to assure a normal electrolyte and water balance, and so he advises the addition of 10-15 g. of sodium chloride daily, or, in the majority of cases, D.C.A. with a normal sodium and potassium intake.

On the other hand, Simpson (1953) believed that when cortisone became freely available it would provide the basic treatment, supplemented, if necessary, with additional salt or D.C.A. Hart (1954) treats his adrenalectomized patients and patients with Addison's disease with cortisone alone and finds they can be maintained quite satisfactorily without D.C.A. Bishop (1955) states that cortisone has to a large extent supplanted D.C.A.

It was because of this conflict in opinion that we decided to test the effectiveness of various forms of treatment on patients with Addison's disease under their normal modes of life. In particular we were anxious to see if they could be kept in good health on cortisone alone.

Method

To determine the most suitable method of treatment, four patients with Addison's disease were studied over a prolonged period. Three of these were considered to have severe Addison's disease, while the fourth was a moderately severe case. The patients were treated for periods ranging from 9 to 21 months with D.C.A., sodium chloride, and cortisone (combined therapy), and for a period ranging from 6 to 10 months with cortisone alone. Each patient was assessed in detail before beginning treatment, when D.C.A. and salt were withdrawn, and at the end of the period with cortisone alone. As a safeguard every patient was interviewed monthly, and their blood pressure and weight were recorded.

During each of the major examinations careful attention was directed to the following factors: (1) energy and capacity for work and recreation; (2) sense of well-being, emotional tone, and mental state; (3) libido; (4) incidence and severity of infections and crises; (5) weight; (6) blood pressure; (7) pigmentation; and (8) electrolytes and blood count. Clinical details of the four patients, together with treatment adopted, are given in Table I.

Results of Treatment

Energy and Capacity for Work.—The degree of weakness and prostration suffered as a result of the illness was generally severe. In Case 1 the diagnosis had been made in 1950 and treatment with D.C.A. given. While this had restored his energy to some extent, it was apparent that he was unable to undertake all the heavy work of the farm, and required additional help from his neighbours. Owing to increasing weakness he had received a further implant of 250 mg. of D.C.A. two months before we saw him in a typical Addisonian crisis. In Cases 2 and 3 progressive weakness occurred until work became impossible. A more fluctuating weakness characterized Case 4, and for weeks at a stretch this patient was unable to do much housework; at other times she had more energy, but most household duties were a burden to her. However, before treatment with combined therapy began, she had been confined to bed for some weeks because of weakness and nausea, and was admitted to hospital for detailed investigation of her adrenal function and reserve. In these cases, with treatment the improvement in symptoms was striking, and energy returned to normal in three and nearly to normal in the other. There was no noticeable change in energy when D.C.A. and salt were stopped. The farmer (Case 1) and storeman (Case 3) both do heavy work and say they feel normal in every way on cortisone alone. One housewife (Case 2), who has a family of five to look after, is as fit and well on cortisone as on the combined treatment. The other housewife (Case 4), the only patient whose return of energy has not quite matched her original strength, felt no alteration in strength when D.C.A. and salt were withdrawn.

Sense of Well-being, Emotional Tone, and Mental State.—Three patients were mentally dull and two were depressed when untreated. All returned to normal on combined treatment, and there was no alteration in this when D.C.A. and salt were withheld.

Libido.—This was stated to be normal in one before treatment began and remained unchanged. In two, libido was depressed before treatment and improved with combined therapy. The improvement was maintained on cortisone alone. One patient had complete absence of libido following hysterectomy previously, and treatment did not alter this. Improvement in libido is likely to be related to the change in the patient's general condition rather than to any specific effect of the cortisone.

Incidence of Infections and Severity of Crises.—One patient, despite an implant of D.C.A. and additional salt therapy, was admitted to hospital in a severe crisis. One patient developed a crisis in hospital following anaesthesia for gastroscopy. A third patient had experienced recurrent

TABLE I

	Case 1 Farmer, Aged 46	Case 2 Housewife, Aged 39	Case 3 Storeman, Aged 43	Case 4 Housewife, Aged 53
Clinical features..	Known Addison's disease for 18 months; implanted elsewhere with 250 mg. D.C.A. two months before admission. Admitted in severe crisis precipitated by acute tonsillitis	Increasing pigmentation for 12 months with marked weakness. Strongly positive Kepler test. *No adrenal response to corticotrophin (17-ketosteroid output 1.2 mg./24 hrs.; following corticotrophin stimulation, 2.5 mg./24 hrs.)	3 years' loss of strength, with severe pigmentation. Addisonian crisis following gastroscopy. *No adrenal response to corticotrophin (hydrocortisone 0 mg./24 hrs.; following corticotrophin stimulation, 0 mg./24 hrs.)	12 years' history of moderate weakness, with exacerbations from time to time. More recent prostration; confined to bed before admission because of weakness and nausea, and occasional vomiting. Faintly pigmented. Kepler test strongly positive on two occasions. *No adrenal response to corticotrophin. (Urinary 17-ketosteroid output 3 mg./24 hrs.; following corticotrophin stimulation, 3.4 mg./24 hrs.)
Combined therapy and duration	Deoxycortone trimethylacetate microsuspension 50 mg. every 2 months, NaCl 4-6 g. daily, cortisone 25 mg. daily. Duration 21 months	Deoxycortone trimethylacetate microsuspension 50 mg. every 6 weeks, NaCl 6 g. daily at first, later 3 g. daily, cortisone 12.5 mg. daily. Duration 18 months	Deoxycortone trimethylacetate microsuspension 50 mg. every 2 months, NaCl 4 g. daily, cortisone 12.5 mg. daily. Duration 9 months	Deoxycortone trimethylacetate microsuspension 50 mg. every 6-8 weeks, NaCl 6 g. daily, cortisone 12.5 mg. daily for 12 months, then 25 mg. daily. Duration 14 months
Cortisone alone..	Cortisone 25 mg. daily. Duration 6 months	Cortisone 12.5 mg. daily. Duration 10 months	Cortisone 12.5 mg. daily. Duration 9 months	Cortisone 25 mg. daily. Duration 9 months

* The method adopted to test adrenal gland response to corticotrophin was the estimation of either the urinary 17-ketosteroid output or hydrocortisone output before and following adrenal stimulation by intravenous corticotrophin, 25 mg., on two successive days.

minor crises with attacks of vomiting and severe prostration. The fourth had a history of recurrent attacks of bronchitis. Since the institution of treatment no further crises and infections have occurred. It seems certain that cortisone is solely responsible for this major improvement in management.

Weight.—Combined therapy produced a gain in weight of 21 lb. (9.5 kg.) in the patient admitted in crisis (Case 1). The other three gained weight in amounts varying from 5 to 11 lb. (2.3 to 5 kg.). The gain was generally maintained on cortisone alone, although slight falls were recorded in three and a gain in the fourth. The weight changes on withdrawal of D.C.A. and salt were not, however, significant.

Blood Pressure.—The effect of treatment on the blood pressure is shown in Table II. All pressures rose on combined therapy. On cortisone alone there was a slight fall in the systolic levels, but the diastolic level rose in one, remained unchanged in one, and fell slightly in two. These changes do not seem to be significant, and it is clear that a satisfactory blood-pressure level can be maintained with cortisone alone.

TABLE II.—Blood-pressure Records

	Case 1	Case 2	Case 3	Case 4
Before treatment..	95/50	120/70	110/70	125/65
Combined therapy	130/85	135/80	140/90	135/85
Cortisone alone..	120/80	125/85	135/90	130/80

These are the average B.P. levels recorded before and on combined therapy, and on cortisone alone.

Electrolyte and Blood Findings.—Blood chemistry was checked before treatment started, at the end of the period on combined therapy, and at the final assessment at the end of the period on cortisone alone. Details are noted in Table III. The values for serum sodium were a little higher than normal during combined therapy. The values on cortisone alone, however, were completely normal, and showed that, at the end of a six-months period or longer, cortisone was sufficient to maintain a satisfactory electrolyte level during the ordinary requirements of day-to-day living.

Pigmentation.—Three patients were heavily pigmented before treatment started, and one was lightly and atypically

coloured (no buccal pigment). An improvement was noted in three cases. In two of these there was definite lightening with both forms of therapy, and in one the improvement was striking. In one severely pigmented subject there was little change with either form of treatment. Because of the known failure of D.C.A. to influence pigmentation in Addison's disease it is probable that cortisone therapy is related to this improvement.

Comment

All patients were maintained in good health on cortisone alone. All say they feel as well on cortisone as they did on combined therapy; one says he feels better, as the salt tablets sickened him. Despite the relatively limited effects that cortisone has on electrolyte metabolism, it seems clear from the practical viewpoint that cortisone can maintain these patients in electrolyte balance and maintain the blood pressure at a satisfactory level.

The improvement in the patient's general well-being on cortisone is striking when compared with pre-cortisone days. The absence of crises or infection during the period under review was noticeable, and all were satisfied with their physical and mental status during treatment.

From the point of view of the patient, oral therapy with 12.5 or 25 mg. of cortisone daily is satisfactory, and the avoidance of implants or the necessity for intramuscular injections with deoxycortone trimethylacetate is an advantage.

From the experience gained in this study we believe the majority of patients with Addison's disease can be maintained in good health on cortisone alone. In certain exceptional circumstances this may not be possible, as the following example shows.

In Case 1, after the final assessment had been made, the patient noticed some weakness and nausea during vigorous haymaking in the summer of 1955. The weather was exceptionally hot and sweating was profuse, and, because of this, additional salt (6 g. daily) had to be taken. When seen by us a few days later his B.P. was 120/70 and electrolytes read: Na, 139 mEq/l.; K, 5.1 mEq/l.; Cl, 98.3 mEq/l. Therefore, in cases where sweating is profuse additional salt may be required or a compound such as 9- α -fluorohydrocortisone, which can be administered orally, might

TABLE III

	Case 1			Case 2			Case 3			Case 4		
	B.T.	C.T.	C.A.	B.T.	C.T.	C.A.	B.T.	C.T.	C.A.	B.T.	C.T.	C.A.
Na ..	129	148	146	131	154	140	141	154	140	130	151	140
K ..	4.5	4.2	5.1	5.1	5.5	4.6	5.7	4.6	5.9	4.5	4.6	4.9
Cl ..	100	101	104	99	100	103	100	102	100	101	107	104
CO ₂ C.P. ..	19	28	25	27	24	26	—	—	27	28	21	24

B.T. = Before treatment. C.T. = Combined therapy. C.A. = Cortisone alone. Figures in mEq/l.

Medical Memoranda

Haemoglobin D in a Persian Girl: Presumably the First Case of Haemoglobin-D-Thalassaemia

Haemoglobin D has been found occasionally in families in North America (Itano, 1951; Sturgeon, Itano, and Bergren, 1955), in Britain (White and Beaven, 1954; Stewart and MacIver, 1956), and in Algeria (Cabannes, Sendra, and Dalaut, 1955). In Asia haemoglobin D was first found in a Sikh (Bird, Lehmann, and Maurant, 1955). It is now known that this haemoglobin variant is not rare in north-west Indians—Sikhs and Punjabi Hindus (Bird and Lehmann, 1956a, 1956b)—and in Gujaratis (Jacob, Lehmann, and Raper, 1956), in whom it was seen in 2% and 1% respectively. One family with haemoglobin D has also been discovered in the course of a survey of Turks (Aksoy and Lehmann, 1956); this has since been extended to over 400 individuals.

We have now seen haemoglobin D in a Persian girl, and, in addition to the anthropological interest of this observation, the case is noteworthy as it seems to represent the first instance of a disease hitherto not described—haemoglobin-D-thalassaemia.

CASE REPORT

A Persian girl aged 18 was seen because of vague pains and anaemia. There were no remarkable clinical findings beyond pallor. Details of the haematological investigations are given in the Table and Fig. 1. It will be seen that there

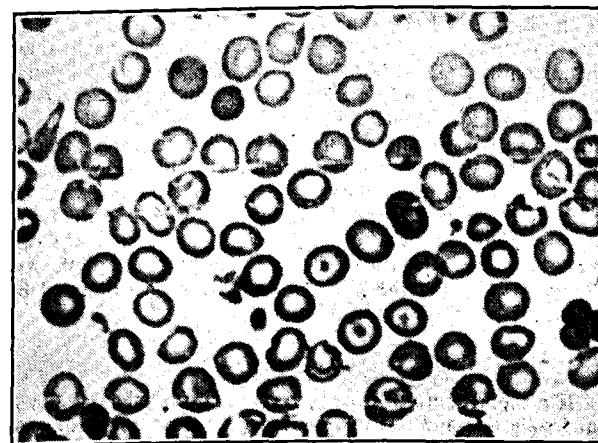


FIG. 1.—Blood smear of patient ($\times 700$). Note target cells, anisocytosis, and occasional poikilocyte.

Haematological Investigations

	Patient	Father	Aunt
Haemoglobin (g./100 ml.)..	11.3	15.5	16.9
Red cells (per c.mm.) ..	5.41	3.92	4.71
Haematocrit (%) ..	35	45	46
M.C.H. (γ) ..	20.9	39.5	36
M.C.V. (cubic microns) ..	65	115	97
M.C.H.C. (%) ..	32.3	34.6	36.8
M.C.D. (μ) ..	7.16	7.86	7.24
M.C. thickness (μ) ..	1.6	2.4	2.4
Leucocytes (per c.mm.) ..	9,000	7,000	7,000
Polymorphs ..	5,670	4,690	5,180
Eosinophils ..	135	210	70
Basophils ..	45	—	—
Lymphocytes ..	2,700	1,820	1,610
Monocytes ..	450	280	140
Film appearance ..	Many target cells, Anisocytosis + + Poikilocytosis +	Macrocytosis +	Anisocytosis +
Red cell fragility NaCl g.% ..	0.45	0.45	0.50
	0.20	0.35	0.30
Serum bilirubin (mg./100 ml.)	0.4	0.35	0.35

During a tour of the slum clearance areas in Liverpool on September 28 Mr. DUNCAN SANDYS, Minister of Housing and Local Government, said that in England and Wales there were some 850,000 insanitary and sub-standard dwellings. More than a quarter of these were in the Merseyside and Manchester area, and the problem was worse in Liverpool than anywhere else. The city corporation had estimated that, of the 200,000 dwellings in Liverpool, nearly half needed to be demolished. After the war the housing shortage throughout the country made it difficult to pull down any house, however decrepit, which provided a roof over somebody's head. But now that over 2 million new houses had been built the time had come when the families in the slums should be given their fair share of these new homes. Last year in England and Wales some 75,000 people were moved out of slums into new homes. This year the number was likely to be over 100,000, and might even be as much as 120,000. The Government's target was to re-house people from the slums at a rate of 200,000 a year.

We wish to thank Professor G. McG. Bull for his assistance in preparing this paper and for allowing us to treat one of his patients. Our thanks are also due to Dr. J. A. Smyth and Mr. D. W. Neill, who carried out the biochemical investigations.

ADDENDUM.—Cases 2, 3, and 4 have continued with cortisone alone and have been on treatment for 17, 16, and 16 months. All remain in good health and blood pressure and electrolytes are satisfactory. Case 1 is now on prednisone and D.C.A. as part of another clinical trial. Three additional cases, not described above, are being successfully maintained solely on cortisone. Treatment has been given for 10, 16, and 17 months respectively. All have regained energy, and one, a frail woman of 64, withstood the stress of a fractured tibia without undue disturbance or recourse to D.C.A. therapy. Dosage of cortisone for all cases has varied between 25 and 12.5 mg. daily. Complicating illnesses or operations will require additional cortisone, and it must be provided when necessary. Experience gained with the seven cases, during and following the trial described, has confirmed our opinion of the value of cortisone as the sole method of treatment in Addison's disease, and we now recommend it as routine treatment for new cases.

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was extreme microcytosis without iron deficiency. The microcytosis was due to reduced thickness of the red cells rather than to a small diameter. On electrophoresis a single band of haemoglobin was seen in the position of either haemoglobin S or D (see Fig. 2). Haemoglobin S and

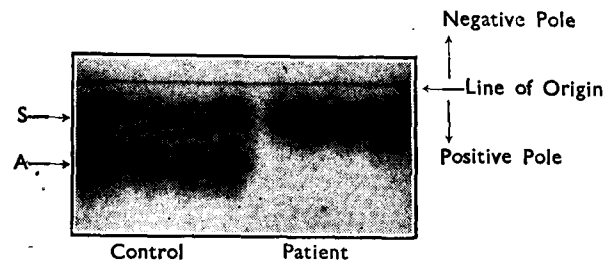


FIG. 2.—Paper electrophoresis of patient's haemoglobin (for details of technique see Lehmann and Smith, 1954). The control contains haemoglobins A and S. Note that the patient's haemoglobin is found as a single band in the position of S, which is also that of D.

haemoglobin D have identical electrophoretic properties, but they differ from each other in their solubility when in the reduced state, and by the fact that haemoglobin D does not cause the sickling phenomenon. The cells of this girl did not sickle on incubation with 2% sodium metabisulphite (Daland and Castle, 1948). In Itano's (1953) solubility test 5 g. of the reduced haemoglobin was fully soluble in 1 litre of 2.24 M phosphate buffer at 25° C. (50 mg. per 10 ml.). This would not have been the case if even part of the pigment had been sickle-cell haemoglobin.

The only comparable observation has been made on a Sikh (Bird and Lehmann, 1956a, 1956b), in whom also all the haemoglobin presented on electrophoresis as a single band in the S/D position, and in whom the solubility test and the sickle-cell test were used to exclude the presence of haemoglobin S. The Sikh's cells did not contain foetal haemoglobin (F), there were no poikilocytes, and the man was fit physically. The abnormality of his blood was in fact discovered in a survey of normal soldiers. In the present instance 4.2 and 4.9% haemoglobin F were found on two different occasions by means of the standard one-minute alkali denaturation test (Singer, Chernoff, and Singer, 1951), and the girl had actually been examined because of her anaemia and debility.

COMMENT

If a blood sample is found to contain no haemoglobin A, and only one and not two of its variants, no conclusion can be drawn regarding the genotype unless the family can also be studied. The blood can come either from a homozygote for the gene responsible for the particular variant of haemoglobin A, or from a heterozygote in whom the simultaneous presence of a thalassaemia gene has caused the suppression of haemoglobin A formation in the phenotype. Thus Edington and Lehmann (1955) found, in a survey of Gold Coast Africans, two people whose blood could not be distinguished by the conventional laboratory methods from that of sickle-cell homozygotes, yet a subsequent study of the families revealed that both were instances of sickle-cell-thalassaemia—that is, both were double heterozygotes for the haemoglobin A and S genes and for the thalassaemia gene respectively.

It was possible to examine the patient's father and the father's sister, but unfortunately not the mother. Both relatives showed nothing but haemoglobin A in their blood. There was every reason to assume true paternity—and this was borne out by the blood group results so far as they could help in the absence of the mother. The D-haemoglobinosis could therefore not be an example of the homozygous haemoglobin D disease. It is almost certain that a thalassaemia gene must have been inherited from either the father or the mother. The father showed no microcythaemia, no increased resistance of the red cells to

hypotonic saline, and no target cells or poikilocytes in the blood smear; foetal haemoglobin was absent. The only abnormalities were a raised mean corpuscular volume and a raised mean diameter of the red cells (see Table). There was no evidence of liver disease, neither clinical, nor were there abnormal values for serum albumin, globulin, thymol turbidity, serum electrophoresis, and serum pseudocholinesterase. This was considered relevant, as liver disease can sometimes be associated with an otherwise unexplained macrocytosis (Hall, 1956).

It may be relevant to quote Zuelzer, Neel, and Robinson (1956):

"It must be emphasized that the stigmata of thalassaemia minor are sometimes very slight . . . even with all the technics listed above, we have sometimes been unable to be certain of the diagnosis when on genetic grounds it seemed highly probable. Thus Kaplan and Zuelzer . . . obtained three families in which one parent of a child with thalassaemia major failed to show clear stigmata of thalassaemia minor. In one family, for example, the father of a child with thalassaemia major had the following blood values: R.B.C.—4,600,000; hemoglobin—14 g.; hematocrit—47%; M.C.V.—102 c.μ; M.C.H.—30.4 γγ; M.C.H.C.—29.8%; fragility (osmotic)—begins: 0.48% saline, complete: 0.28% saline; appearance of film—not unusual."

In their particular instance the American authors were able to discover at least one relative of the "normal" parent who showed signs of thalassaemia minor, and they concluded that "the apparently normal parent most likely possessed a thalassaemia gene which failed to find its usual expression." They do not remark on their unusual finding of an abnormally high M.C.V. in a non-anaemic person—an observation which is paralleled in the father of our patient, and which may be of some significance.

Our thanks are due to Dr. G. D. Hadley for referring this patient to us, and for giving his permission to publish our results.

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Perforation of Simple Ulcers of Ileum as Cause of Peritonitis

Simple ulcers of the terminal ileum, as distinct from ulcers due to uraemia, tuberculosis, typhoid, and other specific infections, have been clearly described by Paterson Brown (1924), who collected 33 cases from the literature and reported two of his own. Everts *et al.* (1948) have described 45 cases, mainly culled from the literature; and further reports, mostly of single cases, have appeared chiefly in the Latin-American journals.

The lesions are simple punched-out ulcers $\frac{1}{4}$ in. (3.2–6.4 mm.) across. They generally occur singly, but several may be present. There is usually no surrounding inflammation, and no redness or increased vascularity of the overlying peritoneum; nor is there any marked oedema of the intestinal wall, and the lesions bear no constant relation to the mesentery. Microscopically they are simple, non-specific

ulcers eroding all coats. The base is a layer of granulation tissue and the intestinal wall is infiltrated with lymphocytes.

The aetiology of the condition is unknown. Among suggested causes are infection, peptic digestion, trauma, and vascular abnormalities, but no one cause has been proved.

The true diagnosis is rarely, if ever, made before operation. Everts *et al.* describe melaena resulting from such ulcers in the chronic phase, but perforation is the commonest presenting feature, occurring in 81% of cases. If in a case of peritonitis no peptic ulcer or inflammation of the appendix is revealed at operation, perforation of a non-specific ileal ulcer should be borne in mind as among other less common causes, and the terminal small bowel should be most carefully examined.

In the following two cases such lesions were discovered at laparotomy as the cause of acute abdominal symptoms.

CASE REPORTS

Case 1.—A married woman aged 33 was admitted to Huddersfield Royal Infirmary on March 28, 1951, with a history of central abdominal pain which came on suddenly and had lasted 36 hours. She had vomited three times and had severe diarrhoea during the first 12 hours, but this had now ceased. There were no other symptoms of note, but it was discovered that enteric tuberculosis had been suspected when she was aged 11, though investigation gave negative results. She was pale and her tongue was furred but moist. Her temperature was 101.4° F. (38.55° C.), her pulse rate 124 and respirations 22 per minute. There was tenderness and guarding of the abdomen, especially in the right iliac fossa, with marked rebound tenderness. Tenderness was also elicited on the right side of the pouch of Douglas on rectal examination.

Operation was undertaken on a clinical diagnosis of peritonitis probably due to perforated appendix. A large amount of non-odorous pale fluid was present and the small bowel in the right iliac fossa was congested and oedematous. The appendix was retrocaecal and normal; stomach and duodenum were also normal. On tracing the ileum proximally from the caecum a perforation was found on the lateral wall about 4 ft. (1.2 m.) from the ileo-caecal junction. It was almost $\frac{1}{4}$ in. (6.4 mm.) across and was punched-out in appearance. This was closed in two layers with chromic catgut.

Post-operatively streptomycin was given together with intravenous infusion and continuous gastric suction. Bowel action returned within 48 hours with profuse, loose motions. This diarrhoea persisted for 14 days, gradually subsiding. During this period frequent stool culture showed no pathogens; fat estimations gave normal readings; and Widal reactions, blood cultures, and Wassermann and Kahn reactions were negative. The patient was discharged on April 28. When seen on May 11 she was well and physical examination was negative, her only complaints being a tendency to diarrhoea and amenorrhoea.

She was readmitted to a medical ward on October 22, 1951, with pyrexia of unknown origin. She complained of rigors and sweating, a cough of 11 days' duration with copious sputum, and diarrhoea. Radiography of the chest and sputum examination gave normal findings. All stool and blood examinations were repeated with negative results. By November 3 there was an irregular pyrexia and the abdomen was becoming distended and tender. Her general condition deteriorated and she died next day.

Post-mortem examination revealed a generalized purulent peritonitis. There were several sloughing ulcers in the ileal mucosa, and one of these had perforated into another loop of ileum. The mucosa was intact apart from the ulcers, and the rest of the intestinal tract was normal. Section of the ulcers showed no evidence of tuberculosis, and microscopically they appeared to be simple acute ulcers.

Case 2.—On January 28, 1955, a married woman of 64 was admitted as an emergency to the General Infirmary at Leeds with a history of two days' abdominal pain. This

had begun in the epigastrium and settled in the lower abdomen. Nausea was present, and she had induced vomiting on one occasion. There were no other significant symptoms.

On examination there was some tenderness and guarding in the right iliac fossa, and rebound tenderness was present in both fossae. On rectal examination tenderness was elicited to the right of the cervix. Clinical diagnosis was acute appendicitis, but at operation the appendix was normal and there was no free fluid. On tracing the ileum proximally from the caecum a patch of fibrin was seen about 1 ft. (30 cm.) from the ileo-caecal valve, and on separating this a pin-point hole was revealed in the ileum midway between the mesenteric and free borders. There was no induration beneath this puncture, but some inflammatory reaction around it, and in the leaves of the mesentery at the same level was a pea-sized nodule resembling a diverticulum. Nothing else abnormal was found. The affected bowel was resected with end-to-end anastomosis. Post-operative progress was uneventful and the patient was discharged on February 11.

The histology of the resected bowel was reported upon as follows (Dr. T. W. Sutherland): "There is an abscess in the mesenteric adipose tissue and pus infiltrates overlying submucosa and lamina propria. The depression is covered with a single layer of columnar epithelium in continuity with the mucosa. The floor of the depression must be ulcerated in parts not included in the section. This depression is an ulcer with a floor composed of purulent exudate. Similar exudate involves the whole thickness of the intestinal wall, including submucosa, and fills a well-defined breach of the muscularis suggesting perforation."

DISCUSSION

The commonest method of treatment of this condition is simple transverse closure of the perforation. Excision of the local area of the ulcer with transverse closure of the defect in the bowel, and wide resection of the area with anastomosis, have also been performed. The risk of recurrence is apparently small, but it does occur, and this, coupled with the difficulty of being sure of the diagnosis at the time of operation, would suggest that resection and anastomosis is the procedure of choice whenever this would not materially increase the risk. Experience with the first case here presented prompted resection in the second case, even though by so doing there is no clear indication that all the ulcer-bearing area has been excised.

Mortality is surprisingly high for a simple lesion. In Everts's series of 45 patients 17 out of 41 operated upon died, as did also the 4 not operated upon. In Paterson Brown's series of 35 cases all were fatal except 8 of the 16 treated surgically. Now that modern antibiotics are available it is probable that the mortality may be reduced, as with their use the chief causes of death in the past—peritonitis and chest complications—can be more readily controlled.

Although these cases usually present as surgical emergencies, Everts *et al.* lay stress on the chronic phase of the disorder. Here bleeding is a prominent feature, coupled with vague abdominal pains. They also quote stricture formation and obstruction as late complications. They admit, however, that these manifestations were commoner because emergency surgery was not undertaken; but their experience serves to emphasize the need to bear the condition in mind when investigating obscure intestinal bleeding.

I would like to thank Mr. F. W. Shepherd, of Huddersfield, for permission to publish the first case, and Professor J. C. Goligher for permission to record the second. I am indebted to Dr. T. W. Sutherland for the pathological report on Case 2.

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Reviews

HISTOLOGY OF TUMOURS

Histological Appearances of Tumours: With a Consideration of their Histogenesis and Certain Aspects of their Clinical Features and Behaviour. By R. Winston Evans, T.D., B.Sc., M.R.C.S., L.R.C.P. (Pp. 773+xvi; illustrated. 90s.) Edinburgh and London: E. and S. Livingstone Ltd. 1956.

This handsome volume is, as its name suggests, designed primarily as a practical manual of histopathology. Its numerous illustrations, nearly all photomicrographs, are well chosen to show both the usual structure of particular types of tumour and their less usual variants, and most of them are clear and of first-rate quality. They are accompanied by informative legends often containing relevant clinical details. A few of the figures are inferior or uninformative; and these are most noticeable when they appear side by side with good ones—for example, Figs. 601, 780, 790, 890, and 932. As is so often the case with colour reproductions, the few included here are no more informative by being coloured. A commendable feature, too seldom seen, is that all magnifications are stated. The text gives a sound, well-balanced, and pleasantly readable outline of tumour pathology, and clearly indicates the author's own views on controversial matters. The reference lists at the ends of chapters, mainly to recent British and American sources, are well chosen and give full titles—another useful feature. Gynaecological and intracranial tumours are omitted, because, the author says in his preface, these are the special provinces of the gynaecological pathologist and the neuropathologist. These omissions give the work a regrettable incompleteness, which it is hoped Dr. Winston Evans will remedy in subsequent editions. There is every likelihood that, if this is done, and a more stringent elimination of the less satisfactory pictures undertaken, this book will become the standard British atlas of practical tumour histology. It is warmly commended to all clinical histopathologists, who will find it a valuable bench-side manual.

R. A. WILLIS.

OCULAR SURGERY

Surgery of the Eye—Diseases. By Alston Callahan, B.A., M.S.(Ophth.), M.D., F.A.C.S. (Pp. 447+xxv; illustrated. £9.) Springfield, Illinois: Charles C. Thomas. Oxford: Blackwell Scientific Publications. 1956.

In 1950 Alston Callahan's book on the surgery of ocular injuries appeared; to-day it is regarded as one of the best books of its kind. This year there has followed a second volume, on the surgery of the eye for pathological conditions, and it is a worthy successor to the first. The volume discusses ophthalmic surgery systematically. A chapter on anaesthesia (local and regional), akinesia, and the general aspects of surgery (suture materials, preparation of instruments, etc.) is followed by successive chapters on the surgical techniques advised in the treatment of congenital deformities and diseases of the lids, the lacrimal system, the globe, the extraocular muscles, and the orbit. The book concludes by again reviewing the surgery of ocular injuries and brings up to date the subject-matter of the previous volume. Six chapters are devoted to the surgery of cataract; the intracapsular operation is fully described and the early and late complications are admirably dealt with; the extracapsular operation is dismissed in two pages. A special feature is also made of the various operations which may be used for glaucoma, as well as the complex and difficult situations which may arise when glaucoma and cataract are combined. In comparison, corneal grafts are discussed shortly in six pages, but the description of prosthetic implants after excision of the globe is full, critical, and full of wisdom.

The book is a good one; not the least valuable feature is that it is not a compendium of all the innumerable techniques to be found in the literature but is essentially based on the author's own experience with consultation with the best in American ophthalmic surgery. He has drawn

on the advice of Atkinson in anaesthesia, Wendell Hughes in plastic surgery, Cordes in congenital cataract, and others as well as Franceschetti, of Geneva, on the surgery of the cornea. Throughout the teaching is essentially practical and sound. Moreover, the writing is clear and concise, and the numerous and excellent illustrations are worth pages of descriptive text. The book is luxuriously produced—more luxuriously, indeed, than is practically necessary—and the price correspondingly high. It is certainly a noteworthy addition to the literature of ocular surgery and will undoubtedly receive as welcome a reception as its predecessor.

STEWART DUKE-ELDER.

STRUCTURE OF BACTERIA

Bacterial Anatomy. Sixth Symposium of the Society for General Microbiology held at the Royal Institution, London, April, 1956. Edited by E. T. C. Spooner and B. A. D. Stocker. (Pp. 360+viii; illustrated. 30s.) London: Cambridge University Press. 1956.

This volume contains 15 papers which were discussed at the sixth Symposium of the Society for General Microbiology held in April last. The subject was well chosen; electron and phase-contrast microscopy have revealed much new detail in bacterial structure, and many other methods have been brought in to elucidate it further. Enough is now known about individual parts of the bacterial cell—flagella, capsules, cell wall, and cytoplasm—for those well versed in these matters to be able to write intricate and fascinating accounts of each of them. In Stocker's contribution on flagella it is admitted that the miracle of bacterial motility cannot yet be fully explained, though a chemical basis for flagellar movements has been suggested; it is interesting that the breaking strength of a flagellum can be calculated, and is such that a cell tethered by one of them is securely held. Weibull himself contributes a paper on protoplasts, the spherical and still living structures—though of limited potentialities—which can be obtained under some conditions by destroying the cell wall. A long paper by DeLamater claiming to have demonstrated mitosis in bacteria is preceded by one in which Robinow contests his conclusions in much the strongest language to be found in the whole volume. Eight of the 15 contributors came from abroad—two each from the United States, Canada, and Denmark, and one each from Sweden and Switzerland. The society is to be congratulated on having assembled these authorities; the sum of their contributions represents a large increase in fundamental knowledge, and the volume, variety, and ingenuity of the work on which they are based will astonish those not familiar with it.

L. P. GARROD.

CARDIAC ANOMALIES

Cardiac Anomalies: A Clinicopathologic Correlation. By Vincent Moragues, M.D., and Chester P. Lynxwiler, M.D. (Pp. 92+x; illustrated. 50s.) London: Baillière, Tindall and Cox. 1955.

This book is an attempt to present in atlas form information which will be of help in the accurate diagnosis of congenital heart disease with particular reference to the selection of cases for cardiac surgery. The material comprises cases verified by post-mortem examination or surgery, and in each anomaly there is a description of the clinical and special methods of investigation. The text presents in list form the pathological and clinical features, together with electrocardiographic, radiological, and special investigations, in such extreme brevity as to fail completely to indicate the information which can be obtained in this way. The atlas method of presentation demands first-class reproduction of photographs of specimens and radiographs, but in this book the quality is often poor, particularly in the x-ray plates and electrocardiograms, the latter of which show only the three standard limb leads.

The medical student and general practitioner for whom this book was intended will gain a better understanding of these anomalies by a study of one of the several excellent texts available, and the specialist will need a great deal more detailed and accurate information than is contained in this work.

GRAHAM HAYWARD.

BRITISH MEDICAL JOURNAL

LONDON

SATURDAY OCTOBER 20 1956

MYELOSCLEROSIS

The haematological alterations of the so-called osteosclerotic anaemia may be found in two distinct conditions in which the marrow cavity is reduced or obliterated by proliferation of connective tissue or increased formation of bone. One condition, called osteopetrosis or marble-bone disease of Albers-Schönberg, is rare and hereditary, occurs in children or young adults, and is characterized by generalized condensation of bone and centripetal cortical thickening, with excessive calcification but defective ossification. The other condition, much more common, is myelosclerosis. It is not familial, occurs in later life, usually within or beyond the fifth decade, and, in contrast to the first, multiple fractures do not occur; here fibrosis of the marrow (myelofibrosis) or ossification of the marrow (osteosclerosis) may be recognized as the predominant feature. Probably the earliest cases were described by H. C. Wood,¹ G. Heuck,² and B. W. Sippy³ in the nineteenth century; since then about 250 cases have been recorded under many different names, by which the authors have emphasized various characteristic features in these essentially similar cases. Recently several comprehensive studies of myelosclerosis have been published.⁴⁻⁸

Though a feature of this disorder is that the pathology is variable, most of the reported cases have conformed to a fairly constant clinical pattern.^{4-9, 10} Patients are generally over 40 years of age, the sexes

being equally affected. The onset is insidious and the condition slowly progressive, so that symptoms have been present for some considerable time before the diagnosis is made. General weakness and fatigue are usually the earliest symptoms, but health may not be much impaired for some years. Anaemia, refractory to treatment, becomes evident, and in addition the patient loses weight. The outstanding physical sign is the enlargement of the spleen, usually considerable. Pressure effects may thus occur, resulting in epigastric discomfort, dyspepsia, dragging abdominal pain, disturbances of the bladder, with pains in the legs and aching from nervous and muscular ischaemia. Perisplenitis may cause splenic pain, but splenic infarcts are not common. The liver may also be enlarged, but to a less extent; generally the lymph nodes are not enlarged. Bleeding, purpura, jaundice, reticulocytosis, increased excretion of faecal urobilinogen, increased basal metabolic rate, hyperuricaemia, and gout have been reported at times. Patients may die from exhaustion due to the severe anaemia, infections, haemorrhages, or cerebral vascular accidents.

The spleno- and hepato-megaly are part of a pathological condition which results also in extramedullary formation of blood elements—i.e., myeloid metaplasia. This is also occasionally found in the lymph nodes and even in the kidneys and adrenals. In this metaplasia, "in addition to leucoblastic cells, erythroblasts are constantly prominent and giant cells (megakaryocytes) are numerous."⁹ The fibroblastic tissue of the spleen may be increased. The marrow shows fibrosis of varying amount and distribution; the bony trabeculae may be thicker than normal. The marrow is often hypocellular, but in some cases hyperplastic foci of haematopoiesis are scattered through the fibrotic elements, and occasionally in others a more diffuse hyperplasia is present. Megakaryocytes are usually prominent. Isolated marrow samples may give a misleading picture owing to the patchy nature of the fibrotic change. Sternal

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⁶ Hutt, M. S. R., Pinniger, J. L., and Wetherley-Mein, G., *Blood*, 1953, **8**, 295.

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¹¹ Sussman, M. L., *Amer. J. Roentgenol.*, 1947, **57**, 313.

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¹⁵ Gardner, F. H., *New Engl. J. Med.*, 1952, **246**, 623.

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³³ Cartwright, G. R., Finch, C. A., Loeb, V., Moore, C. V., Singer, K., and Dameshek, W., *Blood*, 1955, **10**, 550.

³⁴ Valentine, W. N., Beck, W. S., Follette, J. H., Mills, H., and Lawrence, J. S., *ibid.*, 1952, **7**, 959.

puncture is usually difficult, little or no marrow being obtained. This finding and the absence of the characteristic "give" which normally occurs when the needle has penetrated to the marrow cavity may suggest the diagnosis. Trephine biopsy will reveal the true histological pattern of the sampled site. Radiographic studies of femora, ribs, pelvis, and spine may in some cases indicate the diagnosis. They may show initial widening and increased density of the trabeculae, followed by deposition of bone in an irregular fashion throughout the marrow cavity without thickening of the cortex or periosteal reaction¹¹; or irregular rarefaction of the inner aspect of the cortex may be seen, with patchy areas of density in the medulla and distortion of the trabecular pattern.⁷

The commonest blood picture is of leuco-erythroblastic anaemia or leuco-erythroblastosis—that is, "an anaemia characterized by the presence in the peripheral blood of unusually immature red cells and a few immature white cells of the myeloid series. The anaemia is not necessarily severe nor is there usually a marked leucocytosis."¹² Occasionally immature red and white cells have been absent. However, repeated examination of the blood may be required to detect primitive red and white cells owing to the variations and fluctuations in the haematological features.¹³ Hence an important pointer beyond the diagnosis of "refractory anaemia" may be overlooked. The anaemia is usually normochromic, but sometimes hypochromic; macrocytosis has also been described. Polychromasia, poikilocytosis, and anisocytosis are more pronounced in these cases than would be expected for the degree of anaemia.¹⁴ Indeed, poikilocytosis and anisocytosis in the absence of hypochromia are said not to occur in any other condition.¹⁵ Tear-drop red cells (that is, with a thin tail-like extension) and elliptical forms have been emphasized.^{5, 16} Megakaryocytes, nuclear fragments of these cells, and abnormal platelets are not uncommon.^{4, 5, 9, 10} This, the usual symptom complex, is the one known by such diverse names as chronic non-leukaemic myelosis, agnogenic myeloid metaplasia, and aleukaemic myelosis with osteosclerosis.

Though most cases have been found with a leuco-erythroblastosis, no previous knowledge of the blood picture being available, in some a polycythaemia has been recorded previously; hence the reports of cases of "spent polycythaemia."^{4-8, 17} But in none of these cases, apparently, were confirmatory studies of blood volume and of arterial oxygen saturation level carried out. However, this sequence of changes has been considered frequent in cases of polycythaemia.¹⁸

It is now necessary to add other associated blood pictures to the well-known three—refractory anaemia, myelaemia, and spent polycythaemia.¹⁸ Frank polycythaemia in association with a myelosclerotic marrow has been reported in five cases.^{7, 8, 19, 20} H. N. Robson's case⁷ is of special interest in showing initially a macrocytic anaemia, then, after homologous serum hepatitis, a spontaneous remission, with splenomegaly developing and increasing and the blood picture becoming leuco-erythroblastic. At this stage the marrow showed myelofibrosis, formation of new bone, and megakaryocytosis, and the spleen and liver showed extramedullary haematopoiesis. Next a polycythaemic stage developed, with high levels of white cells. Finally at necropsy the marrow spaces showed hyperplastic haematopoietic tissue with some little fibrosis but no new bone, while extensive extramedullary haematopoiesis was still present. In view of the prominence of megakaryocytic hyperplasia in many descriptions, it is of interest to note the association of apparently pure megakaryocytic hyperplasia (with primitive megakaryocytes in the blood) with myelofibrosis⁷ and the similarity of these cases, with others described as megakaryoblastic leukaemia.^{21, 22} Whether or not this latter is recognized as an entity or regarded as a variant of myeloid leukaemia, such cases indicate a link between the various marrow cells in their hyperplastic activity. Further, it has been suggested²³ that the presence of megakaryocytes in the blood of patients with leukaemia or erythraemia may indicate a change in the usual character of the disease. The association of myelosclerosis with true chronic myeloid leukaemia has been disputed.^{9, 10} While the usual syndrome appears to differ haematologically,⁹ certain series^{24, 25} do suggest that myelosclerosis may undoubtedly be found in myeloid leukaemia. Other pathological conditions may be associated with myelosclerosis—for instance, chronic haemolytic disease,^{8, 26, 27} carcinomatous deposits in the marrow,²⁸ diffuse tuberculous infection,²⁹ chronic haemorrhage with sepsis,³⁰ and various other chronic toxic states due to organic chemicals.³¹

So far only blood transfusion has been temporarily helpful. Haematinics, corticotrophin, cortisone, and male hormone have been unsatisfactory. Antimitotic agents have been ineffective. In view of the extramedullary haematopoiesis, irradiation of the enlarged spleen has been generally regarded as unwise, a view confirmed by studies with radio-iron.³² However, temporary benefit has followed splenectomy in cases in which there is clear evidence of "hypersplenism."³³

The present consensus on aetiology is that it is a proliferative disorder of mesenchymal tissue, a theory first advanced at the beginning of the century. The mesenchymal cell is multipotential and is capable of differentiating into osteoblast, fibroblast, erythroblast, myeloblast, and so on. A unified picture thus emerges of myeloproliferative diseases in which clinical patterns are determined by the varying and predominant degrees of differentiation of the component cells. Hence myeloid leukaemia, megakaryocytic myelosis, polycythaemia vera, and myelosclerosis are recognizable entities, albeit with certain resemblances between them; in addition transitional forms and alterations from one clinical type to another might be expected to occur, and in fact to some extent do. Nevertheless it is well to bear in mind, in view of some biochemical studies,³⁴ that "separate metabolic defects, not necessarily of the same type or resulting from the same cause, may give rise to superficially similar morphological but metabolically different entities."³⁴

CHEAP PROPAGANDA ON POLIO

When the Labour Party was in power some of its spokesmen—though not usually those holding office—used to take credit for certain alleged effects of the N.H.S., such as the decline in infant mortality rate and even for a rise in the birth rate. But Labour Ministers of Health rarely if ever said stupid things about medicine. If they wanted to insult doctors they did so directly. We knew where we were with them. Last week the Tories at Llandudno cheered Miss Pat Hornsby-Smith when, with her full authority as Parliamentary Secretary to the Ministry of Health, she told the ranks of Tuscany that Britain's "anti-polio vaccine" had been a success. No doubt her remarks were aimed also at the readers of newspapers, and no doubt will be dished up at the next election—all with the view of showing the uninstructed mass how clever it was of the Conservative Party to introduce the polio vaccine, how successful it has been, and how safe the health of the country will continue to be if Conservatives return to power. It is all so sickeningly obvious—and cheap.

Miss Hornsby-Smith gave her listeners—and the newspaper readers—a completely false picture, and an utterly erroneous deduction from the figures she pre-

sented. She said that from the beginning of this year there had been 2,538 cases of poliomyelitis. But this number includes adults as well as children. Ten were children who had been vaccinated, four having paralytic and six non-paralytic disease. Vaccination against poliomyelitis began in the middle of May and continued to the end of June. Therefore an investigation of the effect of the vaccine should start with cases occurring in July and after. Between the beginning of July and the last weekly return published before Miss Hornsby-Smith's speech 1,701 cases of polio were notified, not 2,538. This is the first of many false trails. Now the vaccine was available only to a sample of children aged 1 to 9 years: approximately 200,000 were inoculated out of a child-population of this age group of about 6,000,000. A fair estimate suggests that a third of the 1,701 cases were over 9 years of age,^{1, 2} and that at least some were under 1 year. It is therefore possible that about 1,100 cases, non-paralytic and paralytic, occurred among children in the same age group as the inoculated, or 0.18 per 1,000. The incidence of 10 cases in 200,000 inoculated children is 0.05 per 1,000. Though this figure is between a third and a quarter of the other, it is based on so small an experience—owing to the limited outbreak—that no certain conclusion can be drawn from the difference between them. Miss Hornsby-Smith says that six of the cases were free from paralysis, and paralysis in the remaining four was not severe: that is, of the inoculated children who got poliomyelitis 40% had the paralytic form. If we take the figures for the whole country from the beginning of July, which are for patients of all ages, we find that 749 were paralytic cases and 952 were non-paralytic—that is, 44% had the paralytic form—a figure almost identical with that for the inoculated children. Miss Hornsby-Smith says that none of the ten cases in the inoculated children were fatal. As the death rate in uninoculated adults is higher than that in uninoculated children it is not possible to get an exact comparison. However, from the beginning of July there were in the "Great Towns" 999 cases and 29 deaths. Though the deaths cannot strictly be related to the cases, we may take as a rough estimate a case fatality rate of 2.9%, or 0.29 deaths for every ten cases. In other words, in the uninoculated community, including adults, on the average only every third or fourth sample of ten cases would have included a death.

Miss Hornsby-Smith's comparisons are therefore completely invalid, and valid comparisons show that her conclusions are unfounded. Largely because the outbreak of poliomyelitis was so small this year there

¹ Report of the Ministry of Health for the Year Ended December 31, 1955, Part 2, H.M.S.O., 1956.
² Ibid., 1955.

is no evidence about the efficacy of the British vaccine against poliomyelitis. "How right we were not to be stampeded into getting the American vaccine!" Miss Hornsby-Smith is reported to have told the assembled Tories. And how wrong about almost everything else! Many readers will share the contempt of a correspondent in this week's *Supplement* for this marketing of Medicine for votes. Medicine must be taken out of politics.

INTESTINAL INTOXICATION AND HEPATIC COMA

Biochemistry is now advancing so fast that the elucidation of the metabolic foundation of hepatic coma may not be long delayed. But the wheel has gone full circle and we are back once again to a theory of intestinal intoxication that has been out of favour for almost half a century.

Attention was attracted again to the intestine as the important source of the toxins responsible when it was observed that both in the dog with an Eck fistula¹ and in man with porto-caval anastomosis² mental disturbance and coma sometimes followed the ingestion of a large meal of protein. The frequency with which a large haemorrhage from an oesophageal varix is followed by coma in patients with hepatic cirrhosis is probably a further example of the same mechanism. The use of ammonium salts as adjuvants to the mercurial diuretics in the treatment of ascites, and more recently the administration of cation exchange resins in the ammonium form in similar cases, led to the hypothesis that the blood level of the ammonium ion was the main factor determining the onset of coma in patients with hepatic disease.³ Because of the known interaction of glutamic acid with ammonia *in vivo* to yield the amide glutamine, J. M. Walshe,⁴ suggested giving large doses of glutamic acid in the treatment of hepatic coma. Results, although sometimes dramatic, were variable and unpredictable, and, though some correlation could be shown between the degree of coma and the levels in blood and cerebrospinal fluid of ammonia, the correlation was not sufficient to support the idea of a direct causal relationship.⁵

The presence of a highly characteristic odour of the breath of patients in hepatic coma has long been described as fetor hepaticus. F. Challenger and J. M. Walshe,⁶ using methods successfully developed by

Challenger for the study of the metabolism of moulds, have isolated methyl mercaptan and dimethyl disulphide from the urine of a patient with a strong fetor hepaticus. The probable source of these odoriferous sulphur compounds is methionine liberated by hydrolysis of protein during intestinal digestion. That these and related catabolites derived from methionine are important in the pathogenesis of hepatic coma seems likely from what is already known of the toxicity of this group of substances. Thus methionine itself is toxic when given in excessive doses to rats on a diet low in protein⁷; its oxidation product methionine sulfoxide inhibits the formation of glutamine from ammonia and glutamine acid by *L. arabinosus*, while the sulfoximine produced in flour by agene treatment is responsible for the hysteria shown by dogs fed with bread made from such flour.

Since it was shown that methionine deficiency in rats leads to massive hepatic necrosis,⁸ this amino-acid has been widely used in the treatment of various hepatic disorders. It is apparent, however, that several catabolites of the sulphur-containing amino-acids are potentially dangerous, and in the presence of a diseased liver this potentiality may become an actuality. That this is so has been convincingly shown by Sheila Sherlock and her colleagues.⁹ Of twenty patients with hepatic disease given between 8 and 20 g. of methionine daily by mouth nine showed unequivocal deterioration of their state of consciousness. These nine had all previously shown spontaneous attacks of coma or pre-coma. All of seven patients with portal cirrhosis who had had no previous cerebral disturbance tolerated much larger doses of methionine, up to 100 g. a day. No significant change in the level of the blood ammonia was found in any of these patients, even in those with marked mental deterioration. Two further observations by the same authors throw much light on this methionine toxicity. The administration of methionine intravenously was not followed by the appearance of mental symptoms even in those patients in whom they appeared after its ingestion by mouth. The oral administration of chlortetracycline for a short time before and during the ingestion of methionine also prevented the development of these symptoms. The most obvious conclusion to be drawn from these results is that the toxic agent is produced in the gut by the action of the intestinal flora. It is well known that profound alteration of this flora results from the use of the so-called broad-spectrum antibiotics, and, though no definite evidence was obtained of any specific metabolic effect on methionine of any of the intestinal organisms studied, this explanation remains the most probable.

Sherlock and her colleagues, on the basis of these results, condemn the giving of methionine in the treatment of hepatic disease. But since the toxic effects, even in patients susceptible to them, can apparently be avoided by simultaneous administration of an antibiotic or by giving the methionine intravenously, other factors should determine the administration or withholding of this substance in the individual case. Two further suggestions of interest are made by the same authors.

First, the oral administration of methionine might prove a useful test in the diagnosis of strange neurological symptoms, and, secondly, it should be of value as a pre-operative test for the suitability of a patient for a porto-caval anastomosis.

The emphasis on intestinal intoxication as a factor in the cause of hepatic coma has important therapeutic implications. Sherlock claims that in the few cases studied chlortetracycline appeared to be of some benefit in spontaneous hepatic coma. C. J. Fisher and W. W. Faloon¹⁰ also report favourably on the use of antibiotics: they found a fall in the post-prandial level of ammonia in the blood as a result of giving large doses of neomycin to eight patients with cirrhosis of the liver. Two of their patients with impending coma improved but relapsed when the neomycin was withdrawn. In view of P. György's¹¹ results in the prevention of nutritional massive necrosis of the liver by the feeding of antibiotics, it would be premature to attribute these results entirely to their effect on the intestinal flora.

SARCOIDOSIS

Although various manifestations of sarcoidosis have been known for more than half a century,^{1,2,3} it was not until Schaumann⁴ recognized the histological similarity between these various manifestations that they came to be accepted as a clinical entity, the exact limits of which even now lack precise definition. Sarcoidosis is a not uncommon disorder with no special predilection for patients of a particular age and sex. It is a little more common in negroes and it has a widespread geographical distribution. Like most disorders with disseminated lesions, it has no single characteristic clinical presentation, and, as Dr. D. Geraint James points out in his article at page 900, the diagnosis can sometimes be made with certainty only after considering several factors, of which the microscopical appearances are probably the most important. Pathologically, sarcoidosis consists of widespread granulomata which on histological examination show epithelioid-cell tubercles but no tubercle bacilli. Apart from the lack of caseation and lymphocytic infiltration, the overall picture is very similar to that of a tuberculous granuloma, and in this country the general opinion has been that sarcoidosis represents a reaction to the tubercle bacillus comparable to the tuberculoid form of leprosy. The negative Mantoux reaction which usually obtains in sarcoidosis, even with a previous history of a positive reaction or evidence of old tuberculous infection, has been held to indicate a peculiar reactivity to the tubercle bacillus, the so-called "positive anergy." The experimental evidence for such a belief is, however, conflicting to say the least, and an acquired negative Mantoux reaction of itself may be non-specific, being found in other disorders of the reticulo-endothelial system in which at present there is no reason to suspect tuberculosis as a cause. The inci-

dence of frank tuberculosis, either accompanying or following sarcoidosis, may be, according to some authors, as high as 25%, and this again is adduced as evidence in favour of sarcoidosis being tuberculous in origin.

Against the theory of the tuberculous origin of the disease is the fact that the histology of sarcoidosis is seen in such varied disorders as berylliosis, leprosy, leishmaniasis, brucellosis, syphilis, and histoplasmosis. Furthermore it is doubtful whether true tubercle bacilli have ever been demonstrated by either staining or culture in sarcoid lesions. The distribution of lesions in sarcoidosis differs in many respects from the sites of recognized tuberculosis, sparing the digestive tract, the adrenals, and the serous membranes. Because it can make itself manifest in so many different ways, it may be that sarcoidosis comprises more than one entity—the fairly recent recognition of berylliosis affords one example. At the same time it is difficult to reconcile the picture of fully developed sarcoidosis affecting the uveo-parotid tract, the lungs, skin, bones, liver, and lymph glands with multiple causation. Perhaps the most accurate and helpful assessment that can be given at present is that sarcoidosis may ultimately be found to comprise several entities, of which a reaction to tuberculous infection may prove to be one.

SEASON OF MISTS

To the townsman this is the season of mists rather than of mellow fruitfulness, yet in spite of much work done on air pollution little is known about its nature and its effects on health. At best this is an indication of its complexity, but there has perhaps been a tendency to underestimate the magnitude of the problem and to draw easy conclusions from inadequate data. In this field of public health evidence is notably sparse, partly because of the complicated physical and chemical nature of pollution, which sets formidable analytical problems. We do not yet know what smog is, and the temptation to ascribe its effects, which are as ill-defined as its nature, to pollutants which are measured routinely should be resisted lest we neglect the many other impurities, unmeasured or unsuspected. Nor is one smog like another; patients' reactions to high urban pollution seem to bear little consistent relationship to the crude analyses of it that are made; some bronchitics who were badly affected by the 1952 smog have been found to tolerate 10 p.p.m. of sulphur dioxide without measurable effect, while some subjects who develop bronchospasm at 5 p.p.m. have never been troubled in smog. Though smog means smoke-polluted fog, it is certain that high degrees of particulate pollution without fog are clinically harmful.¹ Yet no suspect pollutant has been found in concentrations approaching those held to be perfectly safe for continuous exposure in industry. Some workers, hesitating to lay all the blame on the common simple pollutants, await the demonstration of a new toxic substance in

¹ Balo, J. L., and Kornpassy, B., *Arch. Path. (Chicago)*, 1932, 13, 80.

² McDermott, W. V., and Adams, R. D., *J. clin. Invest.*, 1954, 33, 1.

³ Phillips, G. B., Schwartz, R., Gabuzda, G. J., Jr., and Davidson, C. S., *New Engl. J. Med.*, 1952, 247, 239.

⁴ Walshe, J. M., *Lancet*, 1953, 1, 1075.

⁵ Seegmiller, J. E., Schwartz, R., and Davidson, C. S., *J. clin. Invest.*, 1954, 33, 984.

⁶ Challenger, F., and Walshe, J. M., *Lancet*, 1955, 1, 1239.

⁷ Earle, D. P., Smull, K., and Victor, J., *J. exp. Med.*, 1942, 76, 317.

⁸ Glynn, L. E., Himsworth, H. P., and Neuberger, A., *Brit. J. exp. Path.*, 1945, 26, 326.

⁹ Phear, E. A., Ruebner, B., Sherlock, S., and Summerskill, W. H. J., *Clin. Sci.*, 1956, 15, 93.

¹⁰ Fisher, C. J., and Faloon, W. W., *British Medical Journal*, 1956, 1, 1357.

¹¹ György, P., Stokes, J., Jr., Goldblatt, H., and Popper, H., *J. exp. Med.*, 1956, 83, 513.

¹ Hutchinson, J., *Illustrations of Clinical Surgery*, 1877, London, vol. 1, p. 39.

² Boeck, C., *J. cutan. Dis.*, 1899, 17, 543.

³ Besnier, E., *Ann. Derm. Syph. (Paris)*, 1889, 10, 333.

⁴ Schaumann, J. N., *Brit. J. Derm. Syph.*, 1924, 36, 515.

¹ Waller, R. E., and Lawther, P. J., *British Medical Journal*, 1955, 2, 1356.

² Commins, B. T., Waller, R. E., and Lawther, P. J., *ibid.*, 1956, 2, 753.

³ *Ibid.*, 1955, 2, 1135.

modern smog; others feel simply that urban pollution is irritant and prolonged irritation may be mortal in some cases.

At p. 913 of the *Journal* this week Mr. R. E. Pattle and Dr. H. Cullumbine give a report on the work in progress at Porton. They show that massive doses of irritant substances, some of which might be present in smog, produce their mortal effects by irritation and seem to have no subtle systemic effects. Some points in their paper should not be misinterpreted: their comments on smoke (which they tend to exonerate) refer, as they say, to carbon black from a kerosene lamp and ought not to be applied to town smoke, which is complex and clinically suspect; again, in their experiments with diesel exhausts the animals were exposed to undiluted fumes, and thus the results are hardly comparable to those obtained by P. J. Lawther and colleagues in a busy garage for diesel buses.² Their paper emphasizes the need for an empirical approach to the problem while research continues. The use of ammonia to neutralize acid mist was described in these columns last year,³ and informal trials of the ammonia bottle have given encouraging results. Smog masks will also be needed to give susceptible people simple protection against particulate pollution. But in the long run smoke pollution is one of those offences of city life that are best prevented.

A CODE OF SURGICAL OPERATIONS

The *International Statistical Classification of Diseases, Injuries, and Causes of Death*¹ is now widely used in this country, not least by hospitals, in the preparation of diagnostic indexes and statistical reports. Many have felt that this was incomplete without a classification of surgical procedures. In 1944 the Medical Research Council published such a classification,² but this has become out-of-date because of modern advances in surgical technique. A list of surgical operations based on one prepared in 1949 for use by the U.S. armed forces was tried out by a number of medical records officers in this country, and in the light of their experience and with the aid of the Royal Colleges of Surgeons of London and Edinburgh and of the Royal College of Obstetricians and Gynaecologists and of a number of specialists the Registrar-General has now prepared a new *Code of Surgical Operations*.³ Wide use of this code, which is not yet in its final form, will provide information on which to decide the best form for an international code—a matter in which the World Health Organization is taking an interest.

The code consists of three main parts, corresponding to the three main parts of the *International Statistical Classification of Diseases, Injuries, and Causes of Death*. Part I is a list of 3-digit categories divided into 15 main sections according to broad anatomical sites; Part II is

a tabular list showing the operations to be included in each of the 3-digit categories; and Part III is an alphabetical index of operations. With a few exceptions, the use of eponyms has been avoided, although these are provided for in the index. Two appendices provide for 5-digit classifications of radiotherapeutic and anaesthetic procedures. The code can easily be expanded by additional digits to meet the requirements of specialized departments. This publication will be welcomed by medical records officers and others concerned with classifications of diseases and operations and with the filing of medical documents. It is also a further step forward on the long road to attaining comparability in medical statistics.

DEATHS ASSOCIATED WITH MATERNITY

As death rates have declined over the years, so the registrars-general of Great Britain have had to present their statistics ever more finely analysed in order to make clear the remaining causes. Maternal mortality, for instance, once so largely the result of childbed fever, has in the last 20 years fallen by 80% in England and Wales, leaving a residual core of about 500 deaths a year, not now diminishing fast, due to a wide variety of accidents and diseases. While the causes of these, as of other, deaths are tabulated in the annual publications of statistics, further information about them appears in the *Text Volumes*. These many supplementary tables, with explanatory text, throw fresh light on causes of death by classifying them in categories not included in the main volumes of tables. In England and Wales in 1953, the year covered by the latest *Text Volume*,¹ 128 women died of conditions "not classed to pregnancy or child-bearing, but certified as associated therewith." Though not contributing to the maternal mortality rate, at least some of these diseases may have been fatal because of the associated pregnancy.

Among these the outstanding cause of death in the three years 1951-3 for which figures are given is "diseases of mitral valve." It comprised 17% of the 160 associated deaths in 1951, 25% of 161 associated deaths in 1952, and 15% of 128 associated deaths in 1953. These deaths from mitral disease, however, were only about 2% of the total deaths of women aged 15-49 from mitral disease in those years. Tuberculosis caused 8 associated deaths in 1953, malignant neoplasms 11, uterine fibroids 3, rheumatic fever 4, influenza 5, and pneumonia 5. A particularly notable cause among these associated deaths is acute appendicitis. There were 2 deaths in 1951, 3 in 1952, and 4 in 1953; they comprise respectively 2.1%, 5.8%, and 9.3% of total deaths of women aged 15-49 from this cause. As to maternal mortality so recorded, a regional analysis shows that the great industrial conurbations of the midlands and north have lower rates than the rural districts. This must be one of the few causes of death of which this is true, and presumably the presence of medical men and equipment on the spot in the great cities chiefly accounts for the difference.

¹ The Registrar-General's Statistical Review of England and Wales for the Year 1953, *Text Volume*, 1956, H.M.S.O. (9s.).

¹ *International Statistical Classification of Diseases, Injuries, and Causes of Death*, 1948, W.H.O., Geneva.

² Committee on Hospital Morbidity Statistics. "A Provisional Classification of Diseases and Injuries for Use in Compiling Morbidity Statistics." *Spec. Rep. Ser. med. Res. Coun. (Lond.)*, No. 248, 1944, H.M.S.O., London.

³ General Register Office. *Code of Surgical Operations with Classifications of Radiotherapy and Anaesthetic Procedures*, 1956, H.M.S.O., London.

EIGHTEEN DAYS IN THE U.S.A.

SOME RANDOM NOTES

BY

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During eighteen days in New York, Yale, and Harvard in May last, a period which gave one an opportunity for learning of and discussing much recent work on cancer of the lung, and cholesterol as a carcinogen, some other matters were encountered, and these are the subject of the following very informal notes.

New York

The island of Manhattan is thirteen and a half miles long by about one and a half miles broad, and surely nowhere else is a greater variety of human activity and achievement contained within such an area. New York is not merely a huge American city of eight million inhabitants: it has a character all its own. An immense amount of rebuilding is in progress; taller buildings which make greater use of old sites are going up. The huge vertical slab of the United Nations Building dominates its neighbourhood and makes the visiting speaker wish that agreement could be reached about the size of lantern-slides.

Two items of general knowledge which no one in New York seems to possess are the postage of a postcard to Great Britain (estimates ranged from 3 to 8 cents) and the method of disposal of the sewage, which must be conveyed to its destination through rock, from eight million people. When entering New York from the north on the return journey from Harvard, I saw some contact beds which were discharging an effluent into the adjacent river, but this was a small affair only. The force of the toilet flush on the twenty-first floor of a New York hotel indicates a very efficient booster mechanism.

Atmospheric Pollution

New York has a peculiar dusty, rather dingy, not smutty, appearance which is hard to define. The chief source of atmospheric pollution at the present time is the rubbish destructors, a thing unknown in many cities, but the most conspicuous is the tall chimneys of power stations which use bituminous coal—a practice begun during the second world war, when anthracite was unobtainable, and, though contrary to regulations, still continued. At times the atmosphere is distinctly smoky. Dr. Gellhorn took me on to the roof of the Delafield Hospital, a part of the Medical Centre, and pointed out that the most famous tall buildings of New York could not be seen for this reason. We have some friends who possess two things very rare in New York—namely, a garden and a cat. After rain, when the cat comes in from the garden, his paws must be wiped or they will make black marks on the carpet, a trivial matter of course, but perfectly valid evidence of atmospheric pollution. But New York does not strike anyone accustomed to the larger English cities as a sooty place. The forsythias in Dr. Rhoads's beautiful roof-garden on the Memorial Hospital, which were in full flower, are sprayed daily to remove "deposited matter."

Dr. Hiscock, Professor of Public Health at Yale, kindly gave me an introduction to Dr. Leonard Greenburg, who is Commissioner of Air Pollution Control for New York City, from whom I received literature on this subject. Some of the sources of pollution with which Dr. Greenburg has to deal are as follows.

1. The sulphur content of fuel oils. Much of the oil used in factories, offices, and apartment houses contains 2.5 to

3% of sulphur. Dr. Greenburg proposes that 1% should be the highest amount permitted.

2. In many apartment houses the occupants can discharge rubbish through a shoot direct into an incinerator, and this unskilled stoking does not give the best results. During May last 4,200 of 10,000 or so incinerators of this type in the city were inspected, and advice was given about their management.

3. On waste ground in and around New York one sees heaps of the flattened remains of motor-cars from which most materials of any value have been removed, and these residues may be set on fire, with production of a variety of vapours, in the hope of further gains. Persons engaged in this industry tend to disappear when the police approach.

4. The bus service, which is provided by eleven companies, is subject to the rules that "prohibit a bus from emitting visible smoke or visible fumes while stationary or while moving for a distance of 100 yards or more," and they "provide that no bus engine shall be allowed to operate for more than three minutes while the bus is stationary at a route terminal."

In New Haven some industrial chimneys were giving out very perceptible smoke at the time of our visit, and in Boston I saw a perfectly shocking instance of the emission of black smoke from an industrial chimney, as bad as anything that could have been seen in England in the preceding century; how long this went on, or how often it occurred, I cannot say. Both Boston and New Haven are seaside towns with a smokeless zone on one side of them; New York shares with the other islands the property of being surrounded by water, and these water channels provide air channels from which no part of the city is much more than a mile distant.

The heating of buildings, which is especially noticeable in the always crowded elevators of a building such as the Sloan-Kettering Institute, is somewhat of a trial to British visitors, and many of the inhabitants complain of it also, but no one seems to have any power to make a change: man is conservative even in New York. At Harvard, all the University buildings are heated by steam-pipes from a central station, where the water is heated by electricity. This heating takes effect under the floors, after the manner of the Roman hypocaust, and is wholly independent of the simultaneously active radiators.

The Sloan-Kettering Institute for Cancer Research

The staff of the Institute consists of about 200 graduates and 300 technical assistants, and everyone must admire the courage of the man who undertakes to direct this organization. The work of the institute is shown in a popular cinema film consisting of two parts—an elementary description of cancer, and a survey of some aspects of the activities of the institute. In the first, normal and malignant cells are represented by good and evil goblins whose antics would be rather tedious even in the comic strips of a children's newspaper; one might suggest that some way of showing normal cells and cancer cells could be found which is less distant from reality and yet intelligible to the general public. The other part of the film concentrates chiefly upon the work of the chemotherapeutic department and shows the usual abundance of bubbling distillations, complicated apparatus, and good-looking girls in white coats, which, on both sides of the Atlantic, are essential to such popular expositions of research. One sees a new compound, in this case 6-mercaptopurine, under test. First, its name and origin are entered by the filing secretary, who is in charge of the card index of the 16,000 compounds which have been tested already. One is shown a great variety of chemical and biological tests, including many trials upon animals, chiefly mice and hamsters.

Then the climax approaches. One sees the chief seated at a big round table with the white-coated heads of departments. After earnest debate the decision is reached that it is justifiable to apply the remedy to human patients. A

final nod from the chief, and a white-coated assistant rises and hurries to the door to take immediate action; a second later the screen shows a little girl sitting up in bed looking very happy and drinking a glass of milk; a fortnight before she had been almost moribund, presumably from some form of leukaemia.

A Chemotherapeutic Luncheon

On May 9 I attended one of the chemotherapeutic lunches which are a regular feature of the work of the institute. The lunch and the lecture began simultaneously at 12.45 p.m. and the latter went on until 1.30 p.m. During the greater part of this time the room was darkened to allow of the showing of, literally, many scores of lantern slides. To eat copious helpings of unfamiliar foods in the dark and, at the same time, to follow immensely detailed descriptions, by at least a dozen persons, of the haematological, chemical, and histological changes produced by the compound in question, in several species of animals, and in human patients, is not easy. The first quarter of an hour of the lecture was concerned with the rather lugubrious clinical histories of a series of dogs, upon which the remedy, N-desacetylthiocolchicine, had been tried. Subsequent speakers described a great variety of biological and biochemical tests, and the final conclusion seemed to be that this remedy was not very hopeful. If one wishes to criticize, one might suggest that, if the period 12.45-1 p.m. had been devoted solely to lunch, and the lecture had then proceeded until 1.45 p.m., the fifteen minutes thus "lost" would not have been a very serious matter. Dr. Sugiura maintains no fewer than 25 tumours of mice and five of rats by continual transplantation for these chemotherapeutic tests.

A Metabolic Ward

Dr. Joseph C. Aub showed us his Department of Research Medicine at the Massachusetts General Hospital, in which there is a special ward for metabolic studies. A year's supply of many foodstuffs is taken and kept in cold storage so that one analysis serves for the whole year. When the patient visits the toilet the excreta are passed horizontally to an expectant nurse, and hence there is no difficulty in the collection of twenty-four-hour specimens, a contrast indeed to certain—anonymous—hospitals. The teaching, research, and nursing staffs of this hospital take meals together in one cafeteria, where we had lunch. Dr. Aub retires from his professorship this summer and will devote himself to his studies of the cell surface, surely the most important surface in our world, for it is here that the cell makes contact with the "internal medium" of Claude Bernard.*

Dr. Aub will be succeeded in the chair by Dr. Zamecnik, who is investigating the chemical geography of the cell as revealed by the distribution of various compounds and enzymes in particles of different sizes. An interesting study in this field is that of Dr. Mary Bucher, who found that the liver of the rat if ground sufficiently to disintegrate cells, but not much more finely, could synthesize cholesterol from labelled acetate.

Freshmen at Harvard

We stayed in very comfortable quarters at Dana-Palmer House, taking meals at the Faculty Club except at the weekend, when we went to the freshmen's dining hall and took our meals with the new students, who number usually about a thousand but have not all to be served at the same time. Women students number about 8% of the whole university, but I saw only three in the dining hall. Coloured students are very few in numbers, as they seldom succeed in passing the entrance examination.

* Bernard's teaching on this matter is well set out in Dr. Homer W. Smith's *From Fish to Philosopher* (Little, Brown and Co., Boston). A copy of this book was presented to me by the author at a luncheon given by Dr. Peyton Rous at the Rockefeller Institute for Medical Research.

The dining hall is a cafeteria, and each student takes a platter, about 15 inches in diameter, of plastic material which is divided into six sections, with a socket for a cup at the centre. One-half of the platter is divided into three equal sectors, the other half into one large and two small ones. The large sector receives the chief item, such as bacon and eggs or roast beef and potatoes, the other sectors are adapted to various forms of cereals, bread, rolls, and fruit, and butter or marmalade. The most usual drink contained in the cup at the centre seemed to be cocoa, but every student took one or two glasses of milk, whether at breakfast or the evening meal, and up to four tumblers of fruit juice. The consumption of milk reminds one of what one sees in such Scandinavian countries as Iceland and Finland, but these countries are poor indeed in the matter of fruit juice. The student takes knife and fork in his breast pocket, the fork being used deftly for such items as bacon and eggs, while the knife serves chiefly as a spreading instrument.

The students struck one as somewhat more uniform in dress in comparison with English students and certainly much more uniform in evidence of a recent haircut.

Birds and Gardens in Massachusetts

We visited Dr. Aub's beautiful house in the country at Belmont, and were entertained at a dinner party, with Virginian fare. In this part of the States, in contrast to a large part of England, the construction of a rock garden is easy. The rock is there and the garden has to be provided. The supply of gardeners is extremely scanty. Dr. L. F. Fieser had just acquired one of these, together with two birch trees. He is fortunate in having a friend whose daughter has a riding-horse, which animal serves as a source of horse manure, which is now a very rare commodity in that region. The spreading of horse manure must be one of the most ancient agricultural operations; Dr. Fieser had been carrying it out in his own garden while following an important baseball match by means of a wireless apparatus of the latest type in his pocket—surely a unique combination of old and new human activities.

Dr. Lewis L. Engel and his wife took us to their beautiful home at Natick, about 20 miles from Cambridge, where one could sit in the garden and see no other house. The birds know that some grain has been scattered in the grass for them, and we saw many that were new to us. One looks for the beautiful flash of colour when the red-winged thrush takes flight, and we saw the stately approach of a fine cock ring-necked pheasant with his three hens; here the pheasant is regarded as a bird, not merely as an item in the competitive totals of socially important shoots. Other inhabitants of the garden were Phoebe, a flycatcher, very similar in behaviour to the English spotted species; the ubiquitous blue jay; and the big American robin, which is really a thrush.

In the evening Dr. Engel took us to a restaurant famous for its immense steaks; the hostess kindly put the considerable fractions that we were unable to eat in an envelope for Mrs. Engel's two Irish water-spaniels, whose staple diet is canned horseflesh. One was glad to see horseflesh appear boldly among the joints on the menu at the Harvard Faculty Club.

While at Yale we visited another haunt of birds, the garden of Professor and Mrs. W. U. Gardner, where the return of the beautiful Baltimore oriole from the south, delayed by the cold spring, was awaited.

Secretarial Aids

In all the laboratories and institutes in New York, Yale, and Harvard that I visited, one was struck by the abundance of every possible aid to economy of effort—filing systems, typed scripts, and especially photostats of results. Secretarial assistance to research workers is regarded as an essential means of saving time which they would otherwise spend in writing; the services of a typist are not looked

upon as a luxury to be doled out as sparingly as possible, and only to those of the highest rank, whereas in . . . But it is better not to make comparisons.

New Roads in New Jersey

Our visit to the Veterans' Hospital, East Orange, New Jersey, to see the work of Dr. Oscar Auerbach on cancer of the lung, gave one an opportunity of seeing the new main roads and the wonderfully convoluted junctions by which minor roads gain access to them. One gets the impression that the roads are at least as important, in their own right, as the towns to which they lead. Our host, who so kindly drove us to East Orange, was misdirected and we saw more of East Jersey than had been intended, but the journey was full of interest; the direction signs at the roadside are apt to be obscured by a deluge of unofficial notices, offering one tomatoes, hamburgers, puppies, and many other commodities.

A Dissecting Room

Professor W. U. Gardner, who is Professor of Anatomy at Yale, at my request showed me his dissecting-room, where about 36 bodies were being dissected—a place different, both in absence of smell and in perfect tidiness, from my own places of study at the beginning of the century.

About one-third of the bodies used come as gifts in accordance with the wishes of persons, mostly from Middle and Eastern Europe, and not of the richer classes, who feel that they are indebted to medical science. In a few States of the Union the wishes of persons in this matter have legal force.

Gadgets

The United States is the chief home of the mechanical gadget, which does not always work. In our hotel at New Haven the secret of how to turn on the shower defied even my wife's ingenuity, and the chambermaid was helpless in the matter; eventually an engineer was summoned. In the same hotel one's morning ration of marmalade was enclosed in a seamless plastic container which defied everything but direct violence with a knife if one did not know the weak spot. A dangerous gadget is a door-handle which shuts, and locks, a door; if one enters a room without knowing of this device one cannot get out again until one has mastered it.

CONTROL OF CANCER

PROSPECTS OF CHEMOTHERAPY

Dr. C. P. RHOADS, director of the Sloan-Kettering Institute in New York, gave the Imperial Cancer Research Fund Lecture on "The Soluble Puzzle of Cancer Control" to a crowded audience at the Royal College of Surgeons on October 9.

Dr. Rhoads said that it was in 1941-2 that a decision was taken to deviate from the conventional policy then obtaining in cancer research, which was to attempt to define the nature of cancer as the necessary preliminary to any attempt to control it. It was felt that from an empirical approach some cure of cancer might be sooner obtained. From surgery and radiotherapy there had not come the expected advance in cure rates, and, in fact, the figures showed that between 1935 and 1944 the percentage of diagnosed cases surviving for five years improved from 22 to 28, but in the next seven years only a further 1% advance had been achieved. Radical surgery was reaching its limit, because in so many cases secondary growths were established before diagnosis of the primary cancer had been made.

There had been big advances in the technique of radiotherapy with the introduction of high-energy radiation over the last 10 to 15 years, but during this period there had been no visible improvement in the results of radiotherapeutic treatment. The modern sources of radiation enabled the

dosage to be given more rapidly and with less scatter, but the final results were no better, for again the same problem of metastases from the primary growth had to be faced. It was for these reasons that the development of the chemotherapy of cancer was justified. The first efforts in this direction were greeted with distinct scepticism, if not ridicule, but a rational approach had proved to be possible.

The success of so many surgical excisions of primary tumours, where in subsequent years there had been no re-appearance of primary growth nor of any secondary deposits, indicated that a cancer tumour did not imply the existence of any systemic condition. It was therefore quite rational to make the cancer cell itself the target of attack, and certainly by this approach a very wide spectrum of transplanted animal tumours could be cured by drugs—though it had to be noted that no spontaneous animal tumours had ever been cured—which also had the power to restrain those types of human cancer which were widespread in the system.

Analogy Between Cancer Cells and Micro-organisms

The tremendous advances in combating the diseases that were attributable to micro-organisms should be capable of extension to the field of cancer chemotherapy, for if one looked at the cancer cell from the standpoint of Koch's postulates for defining a micro-organism it could be seen that there was an analogy between the two. The micro-organism was characteristic of a particular disease and was always identifiable in that disease and might be isolated from the body. In its behaviour the cancer cell was comparable. Just as micro-organisms might be cultivated and prepared as pure cultures outside the body, so too it had proved possible to prepare pure cultures of cancer cells *in vitro*. Human cancer cells had also been grown on the chorio-allantoic membrane of the chicken egg embryo by Dagg and Karnofsky, and this in fact had been used as a test system for drugs that inhibited the growth of the implanted cancer cells but not of the embryo. Human epidermoid cells could be inoculated in day-old chicks, with the development later of tumours in many different sites, and the implantation of no more than 100 mg. of excised human tumour implanted into each cheek of a hamster produced in a short time a harvest of 2 to 3 g. of tumour tissue.

Like micro-organisms, cancer cells could be reinoculated, and thrived in their new surroundings. As an example, cells from a tumour in the cervix were transplanted to the hamster and subsequently transplanted subcutaneously in the patient, with the development of the tumour in the axillary nodes. A human tumour which had been maintained in rats and hamsters for four years still grew when reinoculated as a subcutaneous transplant in a human cancer patient. However, all these examples of subcutaneous transplantation of tumour tissue into humans were carried out on patients already suffering from incurable forms of cancer. It was, therefore, important to discover whether in healthy individuals there was any immunity to the cancer cell. Fourteen male volunteer prisoners who received subcutaneous implants of tumour cells all produced vigorous reactions which proved to be entirely made up of inflammatory tissue, and only in two cases did histological examination reveal the presence of any surviving cancer cells. From this experiment it would appear that there was some innate mechanism of immunity to the cancer cell by the healthy human body.

Transplantation Experiments

The possibility of the selective destruction of cancer cells in the midst of their environment of normal cells must depend on the extent to which the former differed from the latter. It was observed that normal epithelial cells being grown in tissue-culture medium underwent 62 normal serial transplantations, after which cells of a different morphology appeared which had a different growth rate from the original cells. This new type of cell was transplantable and appeared to demonstrate an *in-vitro* change from normality to malignancy. Further examination of these cells showed that, like tumour cells, they had a significantly higher rate of anaerobic

glycolysis (Warburg effect) than the normal tissue from which they were derived.

Cytological examination by Levan of tumour cells which had been cultivated for long periods out of the body and of the transformed epithelial cells showed that both types still retained their human chromosomes, but in an abnormal condition. It would appear that the nucleic acid, which was one of the principal constituents of the chromosome, might prove the most vulnerable point of attack.

Selective Destruction of Tumours

The structure of D.N.A. was such that by varying the bases and the proportions of the various nucleotides it might be possible to produce antimetabolites capable of altering the genetic behaviour of the cells. The purine and pyrimidine bases had been shown to have quite simple precursors, and the syntheses by G. B. Brown and his associates of both these types of bases incorporating ^{15}N and ^{14}C had permitted a study of the anabolic pattern of both normal and cancer cells in the presence of these and other preformed labelled precursors. These studies led to the conclusion that there was a significantly different anabolic pattern in the two cases. For some precursors the cancer cell showed preferential uptake, while for other precursors uptake by the normal cell was better. From this it could be concluded that tumour cells differed from normal cells in the way they built up hereditary material. It had been found that some D.N.A. was much more susceptible to enzyme attack, while the D.N.A. obtained from tumours that had become resistant to 6-mercaptopurine differed in solubility, size, and shape from that derived from non-resistant tumours. Furthermore these differences were reproducible. The overall conclusion from these studies was that human tumours used preformed precursors in a different way from normal human cells, and this might well present a route to selective destruction of the tumours.

Based on these conjectures a long series of antimetabolites, of which 8-azaguanine and 2:6-diaminopurine were among the first, had been synthesized and tested. A very convincing test system was established, in which cells from mouse sarcoma 180 grew alongside normal mouse fibroblasts in the same medium and with the same rate of growth as established by mitotic counts. Treatment with 2:6-diaminopurine destroyed the tumour cells, while leaving the normal fibroblasts unaffected.

Combination Therapy with Antimetabolites

After treatment with nucleic-acid antimetabolites cells sometimes developed a resistance, but it had been found that on changing the antimetabolite new sensitivity might be developed in the cell. Further, combination therapy in this series was successful, and truly synergistic effects had been obtained by Clark and Philips; for example, a combination of azaserine and 6-mercaptopurine each at a quarter of the optimal dose required for one drug alone was both less toxic and more effective. These effects of renewed sensitization and synergism were perhaps due to sequential blocking in the biosynthesis of nucleic acid. Azaserine blocked the incorporation of glutamine, A-methopterin prevented the formylation stage, while 6-mercaptopurine appeared to inhibit the incorporation of hypoxanthine into polynucleotides. The nitrogen mustard HN_2 acted at a later stage in the process, blocking the structural formation of D.N.A.

The effectiveness of these antimetabolites in inhibiting animal tumours was limited by the knowledge that human neoplasms were sharply differentiated from animal tumours. While mice could be cured, human cancers could not. However, it did appear that nucleic-acid antimetabolites could act on human cancers. The study of the urinary calcium output from patients with bone cancer showed that the higher calcium level returned to normal after treatment with antimetabolites; this might prove to be of importance in guiding future research, even though the patient derived no clinical benefit from the antimetabolites at present available.

Dr. Rhoads concluded his lecture with an example of some small but welcome success in the treatment of acute leukaemia in children. While no more than 5% of children with acute leukaemia survived for more than one year without treatment, combined therapy with A-methopterin and cortisone achieved one-year survivals in 35% of cases, and A-methopterin, cortisone, and 6-mercaptopurine brought the figure to 55%.

STUDENT MENTAL HEALTH

[FROM A SPECIAL CORRESPONDENT]

The First International Conference on Student Mental Health, sponsored by the World Federation for Mental Health and the International Association of Universities, was held at Princeton, New Jersey, in the second two weeks of September. The conference was small and exploratory in nature; its aim was that university physicians and psychiatrists, and university administrators, should meet together with sociologists, anthropologists, and psychologists and try to arrive at a better understanding of the problems of mental health, and of mental ill-health, among their college and university students. It was not intended to produce at the end a forceful list of resolutions suggesting specific action to the universities. It was recognized that practices highly desirable in the universities of one country would be quite unsuited to another; not only was there a great difference in the college conditions between the more and the less developed nations, but even among the prosperous Western countries circumstances and customs varied greatly. But equally it was recognized that people, particularly young people, are much the same the world over, and a general consideration, without detailed recommendation, was well justified. The verbatim reports are to be edited by Dr. Daniel Funkenstein, of Harvard University, and will be published with the assistance of the Grant Foundation and the Field Foundation, which together financed the conference.

The problem of student mental health, it was agreed, has a double importance. Mental distress among students, whether manifest in overt breakdown or hidden under a cover of poor work and inadequate participation, was responsible for much substandard performance among students. Even when it did not prevent efficient study and ultimate graduation, it could interfere gravely with that general and cultural maturation which every university, as well as teaching bald facts, seeks to give its students. And the problem also had its second and wider importance in the framework of society. Happiness and the good life, it was thought, had not advanced hand in hand with increasing material prosperity. However little medicine yet knew about this problem, however little it could yet do about it, it was, the conference felt, through the students, this special group who would be the next generation's teachers, that any wisdom we had, and any good we might do, could best flow to society as a whole.

Drop-out Rate

The proportion of students who enrol for degree courses and drop out unsuccessful at some time during the course, or who, at the end, fail to graduate, varies enormously in different countries. In the Philippines and the big state colleges in America, for example, every applicant can demand acceptance. Intellectually unsuitable people have to be admitted, and as many as 80% may leave in the first or subsequent years. But even where selection is rigorous, as in certain of the American universities and in Great Britain, the drop-out rate is a great deal higher than most people realize. Though there are no accurate published figures for Britain as a whole, it seems probable that about 15% fail to complete their courses. In some places, and on some courses, the figures are much lower; in others they are much higher. A failure rate of this order can produce a great deal of personal suffering and can result in resentment against the university.

It would be unreasonable to suggest that mental ill-health and personal distress are the main factors in academic failure. But where good selection procedures are enforced, and only those students who have passed appropriate preliminary examinations at school are admitted, it seems unlikely that intellectual inadequacy can be the most significant cause. It was the feeling of the conference that a substantial proportion of the drop-out rate under those circumstances must be due to the effects of personal distress, and to the moodiness and the transient emotional instability which is so common as almost to be natural in this age group. But about these matters we still know very little; the need for methodical and well-organized research is great.

It is sometimes suggested that a better knowledge of the problems of mental instability could improve the selection procedure so as to lessen the number of unstable people admitted. While this might be true, it was felt to be an argument containing the seeds of some danger. Often great intellect, certainly genius itself, is housed in an unstable personality. A university, if it wants great men, must take selection risks or sink to the even tenor of the second-rate. Quite apart from the universities, these unstable personalities do not cease to exist in society simply because they are refused admission. It may be that they, as individuals, have the greatest need of the advantages of university education. Whether desirable or not, selection on grounds of emotional stability is not technically easy, for where instability is a transient result of the vicissitudes of maturation it may be essentially unpredictable at the time the student is accepted. All in all, the conference felt the most fruitful line of approach to the high drop-out rate was to offer help to cases of mental disturbance as they arose, with the aim of enabling them to continue their studies with the least possible interruption.

Preventive Measures

In many parts of the world considerable services for helping the disturbed student already exist. They range from the highly structured systems of counselling in many American universities to the intimate and informal help that can be given by individual members of the teaching staff in the older colleges. Student health services, which now exist in most parts of the world, are also coming to do more and more of this sort of work; the emphasis here is not primarily medical in the sense of dealing with psychiatric disease, but social in the sense of advising. If, as seems reasonable, these services taken all together can result in even a marginal reduction of the present unsatisfactory drop-out rates, they can pay their costs off many times over.

Ideally prevention is better than cure, and the conference was sharply aware of the much greater potential importance of preventive measures. This was felt particularly to be the case here, where the troubles encountered are not properly to be regarded as disease but as being precipitated by the more or less normal turbulence of growing up. But to translate precept into practice is far from easy, for there is as yet little knowledge of and less agreement on what techniques, if any, are effective in this field. The conference was emphatic that in this field of preventive mental health in the universities there is a need for much experiment. Simple didactic lecturing of set courses in "mental hygiene" was possible, but its value, though real, was limited. Its particular application was to medical students and to the sociological studies. Discussion groups, perhaps organized through the extension of counselling arrangements, were also worthy of trial. One problem that was open to immediate practical alleviation was that of the lonely student. There is ample evidence that loneliness, not "joining in," not only predisposes to distress, but is also a significant factor in academic failure. The provision of residential facilities is most helpful here, but there is ample opportunity also for experimenting with modified methods of university teaching, particularly with group-teaching projects, which involve a student with his colleagues in much the same way as does "pairing" in practical laboratory work. The universities, it was felt, should also experiment with modified techniques

to give more latitude to those students whose maturation is not proceeding as smoothly as is normal. There is a tendency to expect everyone to go through university in much the same way and at much the same speed and at much the same age, without full account being taken of individual differences. Ultimately, the conference felt, the most important contribution to prevention must be in modifications in university methods. And there was some evidence that the universities were already coming to realize that they must consider all the personal ingredients and the welfare of their students if they were to give the best in education.

The most important and consistent finding of the conference was that all these problems come back to the same fundamental—the need for more knowledge. Yet still very little is being done to augment it and almost nothing is being spent on active research. The conference felt this might well be penny-wise and pound-foolish.

WELSH NATIONAL SCHOOL OF MEDICINE 25th ANNIVERSARY OF CHARTER

On October 12 and 13 the Welsh National School of Medicine, University of Wales, celebrated at Cardiff the twenty-fifth anniversary of the granting of the school's charter. The opening address of the session was given by Professor JETHRO GOUGH—the first old student of the school to be appointed to a chair in the University of Wales—on the afternoon of Friday, October 12, and this was followed by a dinner the same evening in the City Hall which nearly 500 old students attended. Among the speakers at the dinner were the Vice-Chancellor of the University of Wales (Principal Anthony Steel), Sir Clement Price Thomas, Sir Tudor Thomas, Professor H. Scarborough, and the Provost of the school. On the Saturday afternoon a reception was held at University College, Cardiff. During these two days the departments of the school were open to visitors, and many old students took the opportunity to visit the various exhibitions and demonstrations which had been arranged. The original charter of the school was on view in the library, together with a number of historical books and documents.

Professor Gough's Address

Professor GOUGH began by reminding his audience that, although the school was celebrating the twenty-fifth anniversary of its charter, it was not celebrating its birthday. The school had been formed in 1893 by the University College of South Wales and Monmouthshire. Many famous medical men had been students of the college, but had gone elsewhere for their hospital training; these included the late Sir Thomas Lewis, Sir Clement Price Thomas, Sir Tudor Thomas, Sir Alun Rowlands, and Dr. Ernest Jones; but of the younger generation of consultants and specialists many had done the hospital as well as the college part of their course in Cardiff. The Welsh National School of Medicine, said Professor Gough, provided a basic training which enabled a man or woman to become a competent doctor and even to rise to the topmost heights of the profession.

The earlier teachers of the school had been mainly Scotsmen or men who had had their medical training in Scotland. The tradition of bedside teaching had come to Scotland from Leyden, in the Netherlands, and the Scots brought this tradition to Wales. The wheel had now turned full circle, for to-day there was a teacher from the medical school of Leyden in Cardiff learning the newer techniques of examining lungs. The past twenty-five years had seen great improvements in the school, particularly the provision of the new library and the formation of new departments, such as that of anaesthetics, which was now a full professorial department. Hospital facilities had also expanded. Llandough Hospital was now used for teaching, and the new maternity hospital, started by the Cardiff Royal Infirmary and continued under the National Health Service, had been completed. The Government had promised to build a new medical teaching centre, but so far there was no sign of this being

begun, and in any case it would be many years before it would be ready for use. The policy of the school, therefore, was to continue development in its present locality and to improve further the facilities for teaching and research. When the school obtained its charter, said Professor Gough in conclusion, there was great industrial depression in Wales, and the help from commerce and industry which is often given to university institutions was not forthcoming. But, now that Wales was more prosperous, the school might expect to get help from these quarters.

THE MOTOR SHOW

[FROM A SPECIAL CORRESPONDENT]

For the first time for many years there is a refreshing breeze of competition blowing through the Motor Show, which opened at Earl's Court on October 17 and remains open until October 27. This is, all to the benefit of the customer, and the prospective purchaser of even the most modest car—modest, that is, in size—receives the respect that is his due. The motor trade, too, is the first to admit that the stimulus of harder times is more healthy for the industry.

The outstanding feature of this year's show is the introduction of two-pedal control systems for the less expensive cars. One well-known 10-horse-power car has this system in its basic specification. For others it is an optional extra. Two-pedal control is dependent upon vacuum action for declutching during gear changes, and the necessary servo and control gear is said to have been brought to a fine pitch of perfection. Full automatic transmission is now a feature in a number of cars of the more expensive kind.

Doctors especially will look for reliability, safety, comfort, and economy in running cost, and these virtues are to be found in the standard ranges offered by the big manufacturing groups. So many of them are sisters under the bonnet that points of difference have to be looked for in other directions. The buyer's final choice may well be made on personal likes and dislikes of not so essential but nevertheless important matters of detail—for instance, ease of getting in and out of the driving seat.

The finish of all models is much improved, and one hopes that with a smaller output there will be a closer inspection in the factory than has lately been the rule before delivery to the buyer. There have been too many complaints of minor faults which a keener eye would not have passed, and this irritation need not be an inherent evil of mass production. One also wishes that some day some manufacturer will make it really possible for the owner to oil and grease his car himself without having to run the risk of slipping a disk. One manufacturing group is showing a car with safety belts fixed to each passenger seat. These are an extra at £3 10s. each, but it is a step in the right direction. Nearly all makers are now fitting tubeless tyres to all their models, and this also should make for greater safety. Except on some of the expensive sports cars, disk brakes have not yet arrived, but generally speaking the modern hydraulic type of brake gives sure service.

In a short visit to a show where it would occupy much time to form a proper appreciation of each exhibit alone it would be invidious, even if it were possible, to pick out any cars for particular appraisal. Two, however, might perhaps be mentioned as being out of the common run. One is an inexpensive (£575, purchase tax included) sports car with a resin-bonded moulded fibre-glass body. The total weight of 5½ cwt. allows the air-cooled twin-cylinder two-stroke engine to propel the car at a speed which is claimed to be in excess of 70 m.p.h., with a petrol consumption of 55–60 m.p.g. The other interesting feature—more in the shape of things to come—is the Rover gas turbine car. No date has been put for its production yet, and many technical problems have to be overcome before it will be generally available. In appearance it is a beautiful car, and it attracts the eyes of many for whom its engineering features are a hidden mystery.

Correspondence

Because of heavy pressure on our space, correspondents are asked to keep their letters short.

B.C.G. and Vole Bacillus Vaccines

SIR,—In his letter (*Journal*, October 6, p. 826), Dr. E. F. James asks for clarification of certain parts of the Medical Research Council's report on B.C.G. and vole bacillus vaccines in the prevention of tuberculosis in adolescents (*Journal*, February 25, p. 413).

In the first place, he considers that insufficient weight has been given to complications of vaccination in concluding that the procedure is beneficial. In particular, he draws attention to the two cases of erythema nodosum attributed to B.C.G., and to three cases of regional tuberculous adenitis following vole-bacillus vaccination, as well as to the 22 cases of lupus requiring treatment that also occurred among the 6,400 participants receiving the latter vaccine. He rightly points out that these complications were excluded from the calculations from which the incidence of tuberculosis in the vaccinated children was assessed, and suggests that the true morbidity in this group should be taken as the total incidence of tuberculous lesions, whether caused by infection with the human tubercle bacillus or by vaccination. Presumably Dr. James would set some limit to this procedure, since every vaccinated person who shows a normal skin reaction at the site of inoculation has a tuberculous lesion, deliberately produced. If, however, the procedure recommended be restricted to the lesions mentioned above, the addition of the two cases of erythema nodosum to the 13 cases of tuberculosis occurring in 14,100 participants given B.C.G. (table IV of the report) would merely raise the average annual incidence of tuberculosis in this group from 0.37 to 0.43 per thousand, as against 1.94 in the comparable unvaccinated group. There is nothing in these figures to substantiate Dr. James's own claim that "B.C.G. is the most dangerous substance which has ever taken shelter behind the principle of protective inoculation." On the other hand, the development of lupus in the vole-bacillus vaccinated is given prominence in the section of the report which discusses how far the complications attributable to vaccination should weigh against the efficacy of the method in preventing tuberculosis. Although the lesions were localized and were mostly discovered only on routine examination, their occurrence certainly contradicts the present routine use of this vaccine. The report, however, mentions the possibility that an intracutaneous method of administration (instead of multiple puncture) might not produce this sequel.

Secondly, Dr. James criticizes the reliance placed on methods other than the periodic radiograph for the discovery of tuberculosis in the participants. In fact, 55% of the 165 cases of definite tuberculosis were first found by these other means. All suspected cases, however they came to notice, were fully investigated by radiography. Dr. James further points out that a quarter of the participants did not have our routine radiograph during the follow-up period covered in the report; but this proportion was approximately equal in the vaccinated and unvaccinated groups, and, because of the initial random allocation, there is no reason to believe that this omission has affected the ratio of the incidence of tuberculosis in the vaccinated to that in the unvaccinated group. Moreover, the high yield of cases from other sources indicates that lesions developing in the participants not attending for the periodic radiograph could be expected to be discovered by these other means if clinically important; it is thus probable that very few cases of clinically important tuberculosis escaped notice.

In answer to the third question, for reasons of space the report did not include an analysis of the protective effects of

the vaccines in London, Birmingham, and Manchester separately. In fact, protection was approximately equal in all three areas.

Finally, Dr. James's concluding remark links his present criticisms with those which were made in 1927 by the Editor of the *British Medical Journal*¹ and by the late Professor M. Greenwood in your correspondence columns,² with reference to the original statistics of Calmette and Biraud on tuberculosis in B.C.G.-vaccinated children, and which "exposed Calmette's fallacious claims for B.C.G." These earlier criticisms were concentrated almost entirely upon the lack of adequate unvaccinated controls in the early studies. In designing the present trial, the Committee responsible was determined to avoid just these faults, and made a special point of arranging for random allocation of the tuberculin-negative volunteers into vaccinated and unvaccinated, but otherwise similar, groups, which have been followed with similar intensity; furthermore, the cases of tuberculosis have been assessed by an independent assessor.—I am, etc.,

P. D'ARCY HART,

Chairman,
Medical Research Council's
Tuberculosis Vaccines Clinical Trials Committee.

London, N.W.3.

REFERENCES

- 1 James, E. F., *Amer. Rev. Tuberc.*, 1955, 71, 321.
- 2 *British Medical Journal*, 1927, 1, 845.
- 3 Greenwood, M., *British Medical Journal*, 1927, 1, 896 and 1082.

SIR,—If editors possess functioning blush reflexes you must have blushed to the roots of your editorial hair when reminded by Dr. E. F. James (*Journal*, October 6, p. 826) that in 1927 you "exposed Calmette's fallacious claims for B.C.G.," especially since it is such a short time since you described the report of the Tuberculosis Vaccines Clinical Trials Committee of the Medical Research Council as showing "beyond doubt the benefit of B.C.G. vaccination" and presenting evidence that seemed sufficient to convince the most critical (*Journal*, February 25, p. 443).

A few months later (*Journal*, June 30, p. 1534), when you must have had ample time to consider the matter fully, you wrote: "Doubts about the length of time protection lasts are not as important as the fact that vaccination has now been proved to prevent tuberculosis." It can therefore only be concluded that you are one of those who have accepted the Committee's findings with that lack of critical examination which has astonished Dr. James.

I have consulted the 1927 volume of the *Journal* to read the terms of your "exposure" of Calmette, but I find that all you did was to point out that, in the absence of compulsory notification, Calmette's estimate of the infantile mortality from tuberculosis in France required careful examination, and his claim for the efficacy of B.C.G. vaccination based on it was not valid. You quoted similar criticism by Danish workers, and concluded by proposing the terms of an ideal experiment for testing Calmette's claims. I could detect nothing resembling an "exposure" in the article. A postscript may be added that Calmette's oral method of vaccination was replaced by intracutaneous vaccination in Denmark in 1930–1, and began to be used extensively in 1940.

Dr. James must know that vole bacillus vaccine is not being used in the Ministry of Health's scheme of vaccination against tuberculosis in Great Britain, and that it has never been used in Ireland, but nevertheless he makes use of the occurrence of lupus vulgaris after vaccination with the vole bacillus by multiple puncture to discredit vaccination against tuberculosis generally. He omits any mention of the suggestion in the report that the lupus could have been due to the method of vaccination. The only recorded complications after B.C.G. vaccination were two cases of erythema nodosum, and even if Dr. James adds these to the cases of tuberculosis which occurred in the B.C.G.-vaccinated group the resulting incidence of "tuberculosis" is still only a fraction of that in the control group. He could, however, have gone further and classified every child vaccinated with B.C.G. as having "tuberculosis," in so far as a primary "tuber-

culous" lesion of the skin accompanied by regional adenitis occurs in every successful vaccination, but perhaps he does not really believe that tuberculous meningitis and B.C.G. adenitis are equal in the sight of the child's parents or his doctor.

His second criticism is of the validity of the follow-up. I do not possess the necessary knowledge of statistical methods to discuss that question, and I leave it to the statisticians on the Trials Committee.

Dr. James's third point—i.e., the geographical distribution of the cases of tuberculosis—is not likely to have escaped the authors of the trial, and it is presumable that they were aware of "accidental environmental factors . . . [which] might easily account for an apparent protective effect of the vaccination." As for his point about different diagnostic criteria possibly vitiating the results—the report states that every case of definite or suspected tuberculosis was examined in due course by one of the physicians of the Tuberculosis Research Unit of the Medical Research Council, and the records were kept centrally so that cases could eventually be assessed and classified by an independent assessor.—I am, etc.,

H. G. CALWELL.

Whitehead, Co. Antrim.

REFERENCE

- 1 *British Medical Journal*, 1927, 1, 845.

SIR,—Many more experienced and competent people will doubtless answer Dr. E. F. James's criticisms (*Journal*, October 6, p. 826). May I make just two points? (1) Cases of lupus only occurred after the use of the vole bacillus and never after B.C.G.; so to condemn B.C.G. vaccine on this score seems somewhat illogical. (2) At the Hospital for Sick Children we have occasional cases of regional adenitis (20 in 2,400 children vaccinated). We would not consider it reasonable to say these children are "suffering" from tuberculosis, and in only one case in five and a half years has there been constitutional upset with the adenitis. The rest have had no upset at all; the local lesion is painless, and clears up with one or at the most two expressions, usually without any anaesthetic. Constitutional upset sometimes follows diphtheria or "polio" immunization, but we do not describe these children as "suffering" from these diseases.—I am, etc.,

Great Ormond Street,
London W.C.1.

MARCIA HALL.

Diesel Fumes

SIR,—The report by Mr. B. T. Commins, Mr. R. E. Waller, and Dr. P. J. Lawther (*Journal*, September 29, p. 753) on smoke in a London diesel bus garage has been widely publicized in the popular press as proving that diesel exhausts are not responsible for the increase in lung cancer. The London Transport Executive has gone further, in announcing to the press that "the best medical advice available indicated that the diesel engine, when well maintained, did not emit any harmful amount of substances liable to be injurious to health, and that the exhaust emission of London buses contained little if any carcinogenic hydrocarbons" (*The Times*, September 29).

It would seem necessary, therefore, to emphasize that neither Commins, Waller, and Lawther nor any other investigators have ever stated that 3:4-benzpyrene is the only substance present in diesel exhausts which could be carcinogenic. Commins, Waller, and Lawther show that the concentration of smoke in the garage, when certain of the engines were running, was from two to six times as great as in the air outside. Since diesel smoke has been shown by Kotin, Falk, and Thomas¹ to be carcinogenic, it would be necessary to repeat the biological studies of the latter, using extracts of exhaust solely from "well maintained" diesel engines, before being able to suggest that these are not carcinogenic.

Moreover, it is questionable whether conditions in a garage truly represent those in a busy city street. It is stated in the report by Commins, Waller, and Lawther that movement of buses in the garage involved "several short bursts of acceleration with idling in between." Movement of buses in a busy

street involves very frequent acceleration and deceleration, and Elliott, Nebel, and Rounds² in an investigation of diesel buses in Chicago showed that the output of hydrocarbons per hour was as follows: idling 0.376 lb. (170 g.); accelerating 0.683 lb. (311 g.); cruising 0.300 lb. (141 g.); decelerating 0.960 lb. (426 g.). Thus the output is twice as great when accelerating and three times as great when decelerating as when idling. Kotin, Falk, and Thomas³ showed that the output of hydrocarbons from a diesel engine increases markedly with load (about 20% of the increase occurring between 25% and 50% load, 25% of the increase between 50% and 75% load, and 50% of the increase between 75% and full load). Buses in a garage are empty and are moving across a level floor; hence the load is negligible compared with that in a street. This probably also explains the fact that, although "London Transport derate all their engines by 10% in order to reduce the possibility of heavy smoke emission," nevertheless considerable smoke emission is not infrequently seen in London.

Quite apart from the question of lung cancer, it is known that the diesel engine produces large quantities of oxides of nitrogen. The maximum permissible concentration of these oxides for exposures of not more than eight hours is given by the American Conference of Government Industrial Hygienists (1954) as 5 parts per million. For technical reasons these gases are not easy to estimate, but calculation from the known relative exhaust content of nitrogen oxides and carbon monoxide from diesel and petrol engines, and the known concentration of carbon monoxide in London streets,³ suggests that the concentration of nitrogen oxides in London street air is 0.7 to 1.5 p.p.m. However, no allowance has been made in these calculations for the fact that the exhaust volume of the diesel engine is from two to seven times as great as that of a comparable petrol engine (the nitrogen oxide output being up to ten times as great), and that, since it is the larger vehicles which have diesel engines, the total horsepower of diesel engines in a busy street is much greater than that of the petrol engines. With these factors allowed for the concentration of nitrogen oxides reaches 6 to 8 p.p.m.

It would seem therefore that the onus lies upon the London Transport Executive and other authorities contemplating replacement of electric vehicles to obtain further proof that the diesel engine is entirely harmless to health before embarking upon replacement of vehicles which emit no fumes whatsoever.—I am, etc.,

London, E.4.

F. G. TOMLINS.

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- Kotin, P., Falk, H. L., and Thomas, M., *A.M.A. Arch. industr. Hlth.* 1955, 11, 113.
- Elliott, M. A., Nebel, G. J., and Rounds, F. G., *Journal of the Air Pollution Control Association*, 1955, 5, 103.
- Wilkins, E. T., *J. roy. Soc. Hlth.* 1956, 76, 677.

Purpose of Medical Education

SIR,—I have only recently received your issue of August 4. As a recently qualified practitioner doing his National Service I find the correspondence (p. 298) interesting. The eminent gentlemen have overlooked giving the answer to this important question: What sort of doctors do we want? Those who can safely be employed anywhere in the world, often with the minimum of facilities, or those whose basic training is so narrow that they will be a danger to their patients anywhere except in Great Britain, where the magnificent specialist services are within easy reach?

In my opinion it is a retrograde step to narrow the curriculum. Weed it or prune it of excrescences. Teach about the common things. Pathology, basic principles applicable to all medicine and surgery, basic clinical techniques, and a knowledge of what never to do—on these any intelligent person can build, using as bricks the knowledge of diseases he has seen or read about. Produce a man who uses his brain, his knowledge, and his common sense, who has the skill to give a safe anaesthetic or remove an appendix if he has to. I am biased, as I am serving afloat and most of the time I have no laboratory services available.—I am, etc.,

R. J. KNIGHT.

Medical Education

SIR,—In view of your recent number on medical education (September 1), I should like to add a word on one aspect that has been discussed in your columns previously.

Recently a responsible medical journal in one of its articles allowed the phrase "He was then laparotomized." This statement, which is gaining popularity, offends the ears even of one young in the profession and not trained in "the classics." It was written, moreover, by one who is responsible for postgraduate training in an important London hospital.

More and more such words are creeping into the medical vocabulary, and perhaps with attention again focused on medical education all professional journals might collaborate in refusing to print such monstrous expressions.—I am, etc.,
London, S.W.1.

H. STEWART MOORE.

Fluorohydrocortisone

SIR,—In the *Journal* of October 13 (p. 872) you state of fluorohydrocortisone "its effect on the excretion of sodium and potassium is so marked that it is doubtful whether systemic administration is ever likely to be indicated." In the past two years we have used this substance extensively in small amounts in combination with cortisone acetate in Addison's disease and after adrenalectomy. It has proved so useful in checking sodium loss in many of these patients that it is shortly being made available for hospital use at the request of several of us working in this field. In our hands, with experience of 150 adrenalectomized subjects, it has largely replaced deoxycortone, having the great advantage of being rapidly effective when taken by mouth in a fraction of the dose.

We feel that your rejection of this preparation is too sweeping, for it overlooks its great value in the special field of Addison's disease and after adrenalectomy.—I am, etc.,

London, S.W.1.

F. DUDLEY HART.

Enzyme Tests for Glycosuria

SIR,—It was with interest that I read Dr. Stuart Carne's letter (*Journal*, October 6, p. 827) concerning enzyme tests for glucose. I have been using "tes-tape" for some months for my midwifery and other general practice cases. There is no doubt that, as Professor Gray and his colleagues (*Journal*, September 8, p. 586) have pointed out, the test should be carried out with strict attention to cleanliness. Where patients are concerned such manoeuvres as "wiping off the excess of urine" will contaminate and invalidate "clintix" or tes-tape in equal degree. The remedy is to persuade patients to carry out the test properly.

For qualitative screening I use $\frac{1}{4}$ in. (6 mm.) of tes-tape dropped into the urine. I thereby avoid any need to play spillikins with small sticks, and a number of urines can be tested with a speed and efficiency not equalled by any other procedure. Tes-tape is put up in a light-proof container, and this seems to me an advantage over clintix, as the enzymes concerned deteriorate on exposure to light. For quantitative analysis I still prefer the Benedict's test, which for its proper operation requires eight drops of urine in 1 in. (2.5 cm.) of Benedict's solution, and not the inverse proportions, as inferred by your correspondent.—I am, etc.,

Hanworth, Middlesex.

B. M. D. ROSTEN.

Composting of Household Waste

SIR,—Now that the role of organic matter in the soil is becoming more widely understood, it was surprising to find the fallacies in the Zuckerman report¹ repeated in your otherwise most informative leading article on composting of town refuse (*Journal*, September 29, p. 758).

The primary and most important function of organic matter in the soil is to provide food for the soil organisms whose activities bring into solution the minerals which are present in abundant quantities in the rock particles in nearly all soils, thus making these substances available to plant

life. This effect of the presence of organic matter in soil has recently been demonstrated in a startling manner at the Haughley Research Station, where it has been shown that in soils which contain a high proportion of organic matter the content of available minerals, especially phosphates, rises steeply during the summer months even though no mineral fertilizers have been used; but that this rise does not occur in soils low in organic matter even though large quantities of mineral fertilizers have been applied.

The available minerals that any organic compost may contain should be regarded as a free bonus, rather than as a criterion of their value as a manure. In the Zuckerman report no attempt whatever was made to assess the value of municipal composts as a source of food for that most voracious, and at the same time most essential, section of the world population—namely, the soil organisms. In effect, its assessment of the value of such composts was equivalent to assessing the value of a packet of soap-flakes on the gift coupon that it happened to contain.—I am, etc.,
T. T. STAMM.

London, S.E.1.

REFERENCE

- Natural Resources (Technical) Committee, *The Use of Town's Wastes in Agriculture*, 1954. H.M.S.O., London.

SIR,—I have read with considerable interest your leading article on composting of household waste (*Journal*, September 29, p. 758). This, as you have pointed out, is neglected by the authorities here in Britain and leads to the waste of organic fertilizer material which must amount to many thousands of pounds annually.

In November, 1955, the Leonard Hill Technical Group published an article in *World Crops* entitled "A New Fertilizing Process for the Improvement of Unproductive Soil," by M. André Birre. This deals *inter alia* with a compost process developed by an American, Dr. Earp Thomas. After he had succeeded in isolating suitable types of bacteria and blending them so that they would transform waste organic matter into humus-like material, further research led him to build an apparatus to facilitate the transformation more rapidly. He was granted patent rights for the method, which makes use of his "continuous-flow digester."

This apparatus consists of a vertical cylinder divided into eight sections or floors and fitted internally with rotating booms. The organic household waste, after having been milled to a pulp-like consistency, is introduced into the top section of the digester and is treated there with the inoculum. The rotating booms stir the mass continually and convey it slowly towards an aperture that allows the material to fall on to the floor below; here the rotating booms continue to stir it and convey it to another aperture through which it again falls into the next section. The same process is repeated eight times before the material leaves the digester. The material takes 24 hours to reach the final opening before leaving the digester, and in this period it is completely transformed into fine, granular, humus-like material. It has the appearance and smell of mould and is ready for spreading on to the soil.

The first practical installation for this process in Europe was constructed in France, and after a period of experimental operation in Paris it has now commenced production on a commercial scale. M. Birre notes that La Direction Technique de la Voirie Parisienne is interested in installing similar plants in all their refuse dumps.—I am, etc.,

J. EDWARD THOMAS.
Editor, *World Crops*.

London, N.W.1.

Twopenny-halfpenny Advertising

SIR,—About a year ago I began to receive letters from a seaside resort, addressed in what appeared to be feminine handwriting and bearing twopenny-halfpenny stamps. These envelopes contained advertising material from a drug firm of transatlantic origin and presumably "advanced" methods of sales promotion. This method of gaining my attention to their products appeals to me about as much as "queue-jumping," so I now apply sanctions. These consist of throwing all this firm's literature straight into the waste-paper

basket and as far as possible avoiding the use of any of its drugs. I propose to continue to do this until a representative of this firm calls on me in person and hears from me what I think of his employers. Recently the post brought me a letter-card, sealed, hand-addressed, and containing a mimeographed advertisement for a product of another transatlantic drug firm. So I now have two names on my sanctions list.

No doubt these are attempts to reach the doctor who automatically throws all his unsealed mail straight into the dustbin. Although I feel there are strong arguments in favour of this method of disposal, I have always managed at least to glance through all my mail. The "twopenny-halfpenny" technique can only serve to annoy my class of recipient, without reaching the other class.—I am, etc.,

Shipley.

A. E. PENN.

SIR,—The latest manifestation of advertising to which we are being subjected is appalling. One has recently received in the post from a drug firm a series of cards in sealed envelopes ostensibly addressed by hand and postmarked from various different towns. It is obviously the sender's hope that one will mistake these letters for private correspondence and so will not consign them unread to the waste-paper basket. When an advertiser sinks to such a level in order to establish contact with me I can have no faith whatsoever in the honesty of any claims for his products which he may make once that contact is established.—I am, etc.,

West Bromwich.

D. SAKLATVALA.

Tests for Drunkenness

SIR,—May I through your columns call attention to the matter of medical examinations for drunkenness when in charge of a motor vehicle? To be incapable of driving or properly caring for a motor vehicle because of the effects of alcohol is a serious crime and can be punished severely. The verdict of the courts in such cases is substantially influenced by the medical evidence. Since medical diagnosis of drunkenness carries such heavy legal responsibility, the quality of the medical examination on which such a diagnosis rests should be beyond all doubt. I would like to suggest that: (1) drivers suspected of drunkenness by the police should be taken to a hospital for examination and not to a police station; (2) the examination should be made by at least two, or preferably three, medical men of senior status.

The examinee would still be able to call his own general practitioner, and if he so wished he could ask for legal representation. The panel should prepare a detailed medical statement of the facts of the examination and their interpretation thereof. Whether or not a unanimous decision was arrived at should be made known. No doubt a properly constructed medical panel would soon be pressing for blood and urinary alcohol tests to help them in their deliberations. I would not like this plea to fall down on possible impracticabilities, but in any case I wish once again to call attention to this important matter.—I am, etc.,

Wylam, Northumberland.

G. F. ROWBOTHAM.

Longer Holidays

SIR,—I read with interest Dr. G. A. Powell-Tuck's letter on the subject of longer holidays (*Journal*, September 29, p. 769). This subject has occupied my thoughts for some years, working as a G.P. in an industrial area. I agree with him about the undoubted increase in psychosomatic disorders and frequently stress the importance of a holiday as opposed to the "tonic" which is in regular demand. I have expressed my desire to several leaders of industry to have holidays organized on a "one-week every three months" plan, or alternatively one week in the winter-spring period, two weeks in the spring-summer-autumn period, and one week in the autumn-winter period. If such holidays could be arranged in a staggered fashion I feel sure that many works and industrial plants would not require to close at all (unless for replacement of plant, which could probably be done gradually throughout the working period in any

case), and with the mental and physical refreshment of the workers production would probably increase. I feel certain that a falling off need not be feared.

In the Scottish industrial belt life for a large proportion of the population hinges on two events—the "fair" fortnight, usually in July, and two to three days at the New Year. A six months' interval between holidays—too long. The mass exodus at the "fair" fortnight means inadequate and crowded accommodation and transport at holiday resorts and the prices at their highest, and the New Year respite with its accompanying celebrations invariably produces a sharp rise in the sickness rate. The prospect of a week's leisure with pay at reasonable intervals must make a strong appeal to the majority and can do nothing but good.—I am, etc.,

Bo'ness.

A. MCWATT GREEN.

Brown Dog of University College

SIR,—While I was waiting in a corridor for my viva in midwifery in December, 1907, Sir William Osler—as presiding examiner—went into the room where the examination was taking place. One of the examiners was a Dublin man, noted for his bullying tactics. After a few minutes Osler came out and said to me: "The torture of the Brown Dog of Battersea isn't in it."—I am, etc.,

Painswick, Glos.

S. HARTILL.

SIR,—Mr. A. Clifford Morson's letter (*Journal*, October 6, p. 827) prompts me to add one further note on this subject. I was R.M.O. at U.C.H. at the time of the attack on the "Brown Dog" in Battersea Park. Dr. Baron (*Journal*, September 1, p. 547) says it was on November 19, 1907, but W. H. Lister said it was on Wednesday, November 20; I don't know which is right. I was rung up by Lister that evening and told that he and nine others were being held at Battersea Police Station and asked if I could get them bailed out. I thereupon got in touch with Mr. Sidney Spokes, then dental surgeon to U.C.H., who happened to be the only J.P. on the staff, and he readily agreed to go down and deal with the situation. He certainly bailed out the U.C.H. men, who made up eight out of the ten, and I always thought he had bailed them all, but apparently Mr. Morson must have dealt with at least one from his own hospital.

Some of the victims still flourish and could no doubt give an accurate account of what happened at the Battersea Police Station.—I am, etc.,

London, W.1.

ARCHIBALD GRAY.

Brown Induration of Lung

SIR,—In your excellent leading article "Brown Induration of Lung" (*Journal*, September 22, p. 703) you say that the pathogenesis is unknown, but most workers have stressed the possibility of a primary defect of the elastic tissue of the walls of the small blood vessels and alveoli. You state that the prognosis is bad.

Having worked for some years on this problem, I^{1,2} think that it is questionable whether hypoplasia of pulmonary elastic fibres should be truly regarded as a primary symptom, and whether it is a consequence of some structural defect in the lungs. Essential pulmonary haemosiderosis is considered to be an immuno-allergic disease caused by a still unknown sensitizing agent inducing the production of auto-antibodies. The antigen-antibody reaction causes in the lungs, as the shock organ, capillary dilatation, consequent stasis, diapedesis, rhexis, increased destruction of the injured red corpuscles and deposits of haemosiderin. The mechanism of its origin is closely related to those of acquired haemolytic anaemia and idiopathic thrombocytopenic purpura. Prognosis is not so bad as stated, because favourable results may be obtained by splenectomy. Independently of each other, Paterson³ in England, de Castro-Freire and Cordeiro⁴ and Cordeiro⁵ in Portugal, and Steiner in Hungary have attempted not only to check the progress of the disease but also to make it regress in three cases by means of splenectomy.

Diagnostic lung puncture was applied in some cases, but it involves a certain risk because of the nature of the disease. This is why exploratory thoracotomy with lung biopsy was preferred in our case. Early diagnosis must be aimed at, since in this way there is hope for complete restoration to health.—I am, etc.,

Budapest, Hungary.

BÉLA STEINER.

REFERENCES

- Steiner, B., *Orv. Hetil.*, 1954, 95, 1120.
- *Acta med.*, Budapest, 1954, 6, suppl. 1, 79.
- Paterson, D., *Proc. roy. Soc. Med.*, 1946, 39, 131.
- de Castro-Freire, L., and Cordeiro, M., *Helv. paediat. Acta*, 1948, 3, 255.
- Cordeiro, M., *ibid.*, 1952, 7, 501.

Medical Evidence at Inquests

SIR,—My letter (*Journal*, September 29, p. 767) was not intended to cast any reflections, and I am sorry if it appeared to do so. The pathologist to whom I referred, a very well-known man, is dead, while the coroner retired some years ago. I am sure that neither of them would have felt hurt. The cases I quoted were used only to support Dr. F. M. Rose (*Journal*, August 11, p. 356), who said that the coroner might fail to get all the facts if he did not consult the family doctor.

Under a Home Office instruction the coroner now notifies the time and place of the necropsy to the doctor in charge of the case; but as this may be taken to apply only to the hospital staff the examination may take place before the family doctor knows even that the patient has died. Would it be too much to suggest that the hospitals might inform him whenever a necropsy is to be made on one of his patients?—I am, etc.,

Beckenham, Kent.

W. M. PENNY.

St. Luke's Day

SIR,—Once more October 18 comes round again, reminding us of the patron saint of our profession. On that day there will be again world-wide commemoration of his immortal work. It is, of course, as a writer rather than as a physician that he has become famous. Of his two great treatises the second, though less in honour than the first, is of very great value. It gives us all we know of the life-work of Paul, the foremost missionary to the gentile world. It shows us Luke as his fellow-worker and faithful friend and companion in the conversion of our gentile world to Christianity. His second work—the Acts of the Apostles—shows us the beginning of the first international society. We may well on St. Luke's day endeavour to realize our debt to Luke, not only as an evangelist, but also as the biographer of the foremost and greatest of missionaries to our gentile world, St. Paul.—I am, etc.,

Banstead, Surrey.

HERBERT CAIGER.

Selwyn College List

SIR,—New Zealand medical graduates who lived at Selwyn College, Dunedin, will be glad to hear that the *Selwyn College List* is now being printed. Besides short biographies of the ex-students, there is a history of the College and its foundation, full accounts of the former wardens, and the chronicle of the Students Association and its sporting activities. The list is illustrated and contains a fully coloured reproduction of the College coat of arms.

Those who have not already done so should order their copies immediately from the Business Manager, *Selwyn College List*, P.O. Box 620, Dunedin, New Zealand. Only a limited number of copies are being printed. The cost will be 25s. plus postage.—I am, etc.,

Dunedin, New Zealand.

W. R. MORRIS.

POINTS FROM LETTERS

Accident at Coughton

MESSRS. WHITELEY and PICKERING (Redditch) write: Will the doctor who rendered assistance at the scene of an accident at Coughton on the Birmingham-Alcester Road on June 13, 1956, when a boy was killed, please communicate with Whiteley and Pickering, solicitors, Redditch, Worcs.

Obituary

J. W. TREVAN, F.R.C.P., F.R.S.

Dr. J. W. Trevan, consultant to the Wellcome Foundation Ltd., and formerly director of the Wellcome Research Laboratories, Beckenham, died at his home at Addiscombe, Surrey, on October 13, aged 69.

John William Trevan was born at Bodmin on July 23, 1887. His family had roots in both Devon and Cornwall and he spent his boyhood in Plymouth, where he went to a local school and then to the Plymouth Technical School. With the aid of scholarships he was



able to become a medical student at St. Bartholomew's Hospital, where he soon made a name for himself, winning the Harvey, Foster, Walsham, and Burrows prizes. He was also awarded the Brackenbury scholarship in medicine. In 1908 he graduated B.Sc. with honours in physiology, and three years later he qualified in medicine, taking the degrees of M.B., B.S. After a resident post at Bart's he became a demonstrator of

physiology there while holding the Fishmongers' research scholarship. At this time his research work was mainly concerned with renal secretion and respiration. In 1914 he took the M.R.C.P. and during the first world war worked as casualty physician at St. Bartholomew's Hospital, except for two years' service in the R.A.M.C. as a pathologist in the Near East. In 1920 he joined the staff of the Wellcome Physiological Research Laboratories as pharmacologist when Sir Andrew Balfour was the director. At Beckenham he worked at first on local anaesthetics, the chemotherapy of tropical diseases, and the biological standardization of drugs. Existing methods were unsatisfactory, and, having a good mathematical brain, he examined the subject statistically, eventually evolving the method of determining toxicity by estimating the dose which is lethal for 50% of the test animals (LD50). After the discovery of insulin he turned his attention to solving the difficulties of standardizing preparations of that drug for use on patients. His well-known paper on the biological assay of drugs was published in the *Proceedings of the Royal Society* in 1927.

In 1940 Trevan succeeded Dr. R. A. O'Brien as director of the Wellcome Physiological Research Laboratories, and he held this post until 1953. He was also a director of the Wellcome Foundation Ltd., and for a short time before his retirement he acted as director-in-chief of the Wellcome Research Institution. Although he was best known for his work on the biological assay of drugs, he was concerned with research in many other fields, including veterinary medicine. During the second world war he played an important part in increasing the supplies of biological products needed by the armed Forces.

Trevan was a member of the Biological Standards Commission of the League of Nations and of the British Pharmacopoeia Commission. In 1937 he was elected

president of the Section of Therapeutics of the Royal Society of Medicine, and in the following year he was a vice-president of the Section of Pharmacology, Therapeutics, and Anaesthetics at the Annual Meeting of the B.M.A. He became a Fellow of the Royal College of Physicians in 1942 and of the Royal Society in 1946. At University College, London, he was an honorary lecturer, and was a member of the Board of Studies (Pharmacology) of the University of London.

Dr. Trevan's main hobby was music, and for many years he sang in the choir of St. Aubyn's Congregational Church, Upper Norwood, where he was also deacon.

He was twice married. His first wife, daughter of the Rev. J. L. Keys, died in 1937, and of this marriage there were three sons and two daughters. His second wife was the daughter of Sir Hubert Llewellyn Smith, at one time economic adviser to the Government, and there were a son and two daughters of this marriage.

We are indebted to Professor J. H. BURN for the following appreciation:

The sudden death of J. W. Trevan is a great shock to those who knew and respected him. He enjoyed the peculiar distinction of having made an outstanding contribution to pharmacology which resulted in the development of biological standardization as a discipline of its own. In the period before and after the first war the need for ensuring uniformity in the potency of digitalis and similar agents was realized, but no one knew how to achieve it. Pairs of frogs were injected with decreasing amounts of digitalis tincture to determine the minimum lethal dose. It was, however, impossible to find the minimal lethal dose, for often frogs receiving lower doses died, while those receiving higher doses survived. Then in 1927 came Trevan's paper showing that these results were the natural consequence of biological variation, and that lethal-dose measurements must be expressed in terms of the percentage of frogs killed, and that the most accurate estimate which could be obtained was of the dose lethal for 50% of animals, the LD50. Now Trevan would have rendered great service by pointing this out as an academic conclusion, but he applied it courageously in practice and taught us that in standardizing digitalis we must not be content to test a dose on two frogs but on thirty frogs. He stressed the necessity of using large numbers of animals, and as a consequence the necessity for using small animals. Faced with the problem of standardizing insulin, he developed the method, general throughout the world to-day, of using mice, in which after the injection of insulin the percentage of mice which convulsed was determined. In one of the early years 28,000 mice were used in his laboratory for this purpose, and the use of mice on this scale constituted a revolution.

His influence was not confined to pharmacology. In his paper on the error of determination of toxicity Trevan considered not only digitalis and insulin but also dysentery toxin and diphtheria toxin, and showed how his conclusions were equally applicable in the standardization of sera. In the field of chemotherapy, too, he and his colleagues described a method of measuring the effect of organic antimonials against trypanosome infections in mice by the mean survival times of the groups of mice treated; this was the first advance in the field after the work of Voegtlin and Homer Smith.

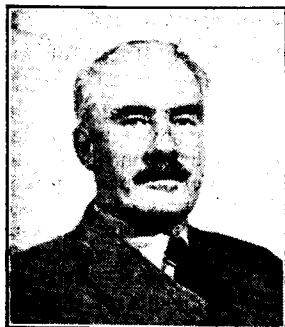
Trevan's scientific personality was well illustrated by his published papers, which were few in number but of the highest quality. He was beyond everything diffident about results until they were finally complete. This reluctance to publish was fully reflected in his modesty and in the serenity of his outlook, which was perhaps his most striking characteristic. He might appear at times gloomy and moody; this was entirely superficial, for just beneath was the humour which came flashing out to reveal how balanced and even he was. Ambition seemed to play no part, and he was satisfied with the performance of complex

daily tasks which were carried out in obscurity. Only those who had direct dealings with him knew the breadth of his knowledge, and how much thought he had given to the integration of the theory and practice of medicine. With his modesty and serenity he combined charity and charm.

A. Q. WELLS, M.A., D.M.

Dr. A. Q. Wells, who was on the scientific staff of the Medical Research Council and worked at the Sir William Dunn School of Pathology at Oxford, died suddenly at Inverness on October 9 while on holiday. He was 60 years of age.

Arthur Quinton Wells was born in London on June 22, 1896, the fifth son of Mr. A. P. L. Wells, who had been senior surgeon at the Central London Ophthalmic Hospital. He was educated at Peterborough Lodge School,



[David Peters, Witney, Oxon.]

University College School, and St. John's College, Oxford, going on for his clinical training to St. Bartholomew's Hospital, where many members of his family had previously qualified. During the first world war he served as a surgeon sub-lieutenant in the R.N.V.R., first in H.M.S. *Plassy* and then in H.M.S. *Ulysses*. After graduating B.M., B.Ch. in 1923 he went into general

practice for two years at Eyam, in Derbyshire, where he was honorary surgeon to the Bakewell and District War Memorial Hospital. In 1926 he was appointed research student in the department of pathology at Cambridge, and in 1928 he proceeded to the D.M. He moved to London in 1930 to become lecturer in bacteriology at St. Bartholomew's Hospital, and five years later he returned to Oxford as pathologist at the Bureau of Animal Population. At the beginning of the second world war he joined the Emergency Public Health Laboratory Service, and served as administrator of the laboratory at Oxford, which at that time was the headquarters of the service. After the war he returned to the study of tuberculosis at the Sir William Dunn School of Pathology. Wells's special interest in this subject had developed many years before, and he had published several papers on tuberculosis in wild voles and on murine tuberculosis, on which he was a leading authority and the author of a monograph published in the Medical Research Council Special Report Series in 1946. He developed the use of the vole bacillus vaccine and was a member of the Medical Research Council's Tuberculosis Vaccines Clinical Trials Committee, which reported earlier this year on the results of a large-scale trial of both B.C.G. and vole bacillus vaccine.

During his research activities Wells found time for a great deal of public service in an administrative capacity. He was a county councillor for Oxfordshire from 1938 to 1945 and was first chairman of the Oxford Regional Hospital Board. He gave up this latter appointment in 1950 because he found the work incompatible with his research work. He was also a trustee of the Nuffield Provincial Hospitals Trust and of the Oxford District Hospital Improvement and Development Fund. In 1953 he was High Sheriff of Oxfordshire, and with his tall stature and dignified appearance he was a magnificent

figure in court dress. A keen collector of alpine plants, he was chairman of the Curators of the University Botanic Gardens at Oxford.

Dr. Wells leaves a widow, four sons, and one daughter.

We are indebted to Dr. R. L. VOLLUM for the following appreciation:

Dr. A. Q. Wells discovered the mycobacterium now commonly known as the vole bacillus while investigating the cause of recurrent fluctuations in the population of voles for the Bureau of Animal Population. After prolonged investigation of the cultural characteristics and the limited pathogenic properties of this organism he saw the possibility of using it as a vaccine. He carried out extensive carefully controlled experiments in animals of various species, and when he was satisfied that it had useful antigenic properties combined with very low pathogenicity he carried out some experiments on humans. The results were promising, and the use of the vaccine was gradually extended, but always under carefully controlled conditions. The investigation of its value is still in progress in this country and in Africa. The indications at present are that it is at least as good as B.C.G., and that it probably produces a more enduring immunity. Recently he had been interested in the relationship between allergy and immunity in tuberculosis and had extensive experimental work in progress.

In spite of his multifarious activities he gave the impression of being a gentleman of leisure. He concealed his twentieth-century efficiency by gracious eighteenth-century living. At his beautiful home at Shipton Manor he had a very fine alpine garden—as well as an excellent market garden. He was a keen botanist. When I travelled with him in Africa he occasionally determined to take me for a long walk for much-needed exercise, but the walk was usually curtailed by his finding an unfamiliar plant or flower which had to be examined and photographed *in situ*. Indeed, on one occasion he and his camera were in danger of going over Victoria Falls when he found an interesting specimen on the edge of a precipice. He also enjoyed deer-stalking and shooting. During the pheasant season one did not expect to find him in his laboratory every day.

A. Q. was a colleague we could ill afford to lose. The final results of much of his work will not appear for some time, but he has laid a firm foundation for an enduring memorial. We will miss his quiet sense of humour and his shrewd comments on men and affairs. Our deep sympathy goes out to his wife and family.

C. L. DUNN, C.I.E., L.R.C.P.&S.Ed., D.P.H.

Lieutenant-Colonel C. L. Dunn, for many years director of public health in the United Provinces of India, died at Chislehurst, Kent, on October 10. He was 81 years of age.

Cuthbert Lindsay Dunn was born at Valparaiso on May 15, 1875, the son of Mr. Charles James Dunn, of Dunnfield, Co. Londonderry. He received his early education at Dollar Academy and studied medicine at Edinburgh University, taking the Scottish triple qualification in 1899. After service in the South African War, for which he was awarded the Queen's medal with four clasps, he entered the Indian Medical Service in 1902. Two years later he was awarded another medal and clasp for his work in the Tibet campaign. From 1910 to 1914 he held the appointment of deputy sanitary commissioner in the United Provinces, relinquishing the post to serve in the first world war. By this time he had determined on a career as a hygiene specialist, and had taken the D.P.H. In recognition of his distinguished services during the course of the campaign in Serbia he was awarded the Order of St. Sava (fourth class) by the

King of Serbia. Returning to India at the end of the war, he was appointed director of public health in the United Provinces in 1919, and occupied this post until he retired from the Indian Medical Service, with the rank of lieutenant-colonel, in 1932. He had been appointed C.I.E. in 1928. For some years after his return to England he served on the Indian Medical Services Committee of the B.M.A.

After his retirement from the I.M.S. Dunn joined the staff of the Ministry of Health and was much concerned with the plans for the Emergency Medical Service. In recent years he prepared, wrote, and edited the two volumes of the *Medical History of the Second World War* devoted to the Emergency Medical Services. The volumes were published in 1952 and 1953. He also wrote *Malaria in Ceylon* and was joint author of a book on *Indian Hygiene and Public Health*. Dunn was twice married. His first wife, formerly Miss Janet L. Dalgleish, died in 1941, and nine years later he married Miss Kathleen E. Knott. She survives him together with the two daughters of the first marriage.

We are indebted to Sir ARTHUR MACNALT for the following appreciation:

The *Official Medical History of the Second World War* has sustained a grievous loss in the sudden death of has sustained a grievous loss in the sudden death of the Lieutenant-Colonel C. L. Dunn, a medical officer of the Ministry of Health and an assistant editor of the *History*.

In his untiring work as director of public health in the United Provinces of India Dunn won the confidence and friendship of his colleagues and the people of India. Indian doctors, his former pupils, were his frequent visitors and correspondents in his later days. On retirement he lived at Fleet, in Hampshire, but the outbreak of the second world war called him once more to public service. He was appointed hospital officer of the Ministry of Health Eastern Region, Cambridge, where his experience and administrative gifts were exercised in a new field.

In 1941 Dunn became one of my assistant editors for the *Official Medical History of the War*. Up to 1945 he was chiefly employed in collecting material for the *History* of the Emergency Medical Services in the series. The first volume was published in 1952, the second in 1953. Both volumes were favourably received and were described as "a fascinating story of organization and achievement." By these Dunn will be especially remembered, as well as for his books on *Indian Hygiene and Public Health* and *Malaria in Ceylon*.

Up to the end Dunn's interest and work for the *Medical History* continued to be unremitting. He was a most painstaking editor, and no error or misprint escaped his eye. Of our many contributors a number have expressed their gratitude to Dunn for going through their manuscripts, making helpful suggestions and criticisms, and eliminating redundant and overlapping material. When Dunn appeared in my room with a cheerful smile, bearing a volume of typescript, and saying, "Now, Chief, I want you to write a foreword," I knew that my task of reading the book and approving its presentation had been lightened by his labours. On the morning of Dunn's death I received by post a critical and useful note from him concerning a contribution to our final volume.

Colonel Dunn was tall, clean-shaven, of fair complexion, and a typical Ulsterman. He carried his years lightly. In his Edinburgh University days he had been a friend of Sir Andrew Balfour, and like him was a noted athlete. Dunn played a good game of golf up to his 80th year, was an excellent raconteur, and interested in art and general literature. I miss a dear friend, a man of high integrity, a loyal servant of the Crown in peace and war, and an able medical historian. Our sympathy goes out to his wife and two daughters.

R. O. ADAMSON, M.D.

We record with regret the death on September 30 of Dr. Robert Oswald Adamson at the age of 91. For many years he was one of the best-known general practitioners in Glasgow. He retired to live at St. Andrews during the last war.

We are indebted to Sir ROBERT MUIR for the following appreciation:

Dr. Adamson was a man of striking personality and of unusual ability. He was born on January 9, 1865, and was the youngest son of Dr. John Adamson, of St. Andrews. The latter was a man of varied accomplishments and was a noted pioneer in the early days of photography, many of his photographs being preserved permanently in museums. He was noted still more for his services in connexion with public health during the cholera epidemic in the early days of the century. His work was of outstanding value, and he did much to improve the health and amenities of St. Andrews.

My associations with Robert Adamson were many and varied, but all were of the most pleasant kind. We entered the arts classes in Edinburgh University together in 1880, went through all the arts and medical classes together, and were also together as resident physicians in the Edinburgh Royal Infirmary. It is perhaps of note that ultimately we were nonagenarians for more than two years, he being slightly the junior. He took the degree of M.A. in 1884, and that was in the days of the compulsory seven subjects' curriculum. Later he graduated M.B., C.M., with first-class honours, in 1889, proceeding to the M.D. in 1901.

There was then a break in our intercourse till I was appointed to the chair of pathology in Glasgow, and at that time Adamson had established his position in medical practice and his reputation was steadily growing. He became our family physician and attended my sisters and myself through all our illnesses, some of them being of grave nature. He impressed me by his powers of accurate observation, wide knowledge, and decision in judgment, and I can say that in my opinion he was one of the ablest physicians that I have known. He had quite an unusual power of distinguishing trivial from serious cases, and in this way lives were saved by him. He had made the habit of making and storing full notes of all his cases, and this he considered an essential in his work. He himself was not a laboratory worker, but he was keenly alive to scientific methods so that he could view a case from all points of view. He often came to the pathology department to discuss problems and cases, and I was always impressed by his keen grasp of the practical use of our methods. I often thought that if there was such a thing as a chair of general practice Adamson would have made a grand professor.

Adamson was a hard worker and never spared himself in his professional work, but he had also recreations, and these meant much to him. He had a fine physique, and in his early days played Rugby football as a forward for the Edinburgh Academicals. Later he had his chief enjoyment from long walks and from nature studies, especially botanical; but golf, as to many others, was his chief enjoyment. I remember well the Wednesday half-day holidays at Killermont with him and various others, and from these he drew the greatest pleasure. He was a keen golfer and one hard to beat, but it was always good to have him as a companion whether as partner or foe. I remember also our golfing parties in places further afield. These were made up of men in various lines, and many were men of distinction, but Adamson was always a ruling spirit, and a common question when such an outing was contemplated was, "Is Adamson coming?"

Adamson was a wide reader, was always studying and trying to keep up to date. He took great pleasure in good literature, and Shakespeare was his favourite author. He was interested in the subject of his early days and always spoke with gratitude of his arts curriculum.

Adamson married Mary Ommaney, daughter of the late Commander Henry M. Ommaney, R.N. She died in 1953. They had two daughters and one son. Both daughters took up the subject of medicine and both gave distinguished services. The elder, Evelyn, after training in this country and obtaining the C.M.B. from Queen Charlotte's Hospital, went to Africa and there her life's work was carried out, most of the time in the service of the Universities' Mission. Her work was in medicine, especially midwifery, and even in the supervision of hospital construction, and was carried out in a devoted manner in the most adverse circumstances, sometimes in places without hospital or the bare essentials. The younger daughter, Estelle, entered the nursing profession and in it gained rapid promotion, being ultimately appointed as matron to the Western General Hospital in Edinburgh. Recently she was appointed to a travelling fellowship for three months, for the purpose of studying hospital administration in various countries on the Continent; she is at present engaged in this work.

Adamson's last illness was a long and wearisome one. There was prostatic trouble with chronic uraemia, but there was also general failing of powers, especially of memory. He was well aware of the latter failing, and this gave him much distress.

He was a man of strong personality and definite opinions, but he could always gain the affectionate regard of those who differed from him. Looking back now, I cannot remember him saying or doing anything of unworthy nature.

Professor J. M. MUNRO KERR writes:

As one of Adamson's oldest friends, permit me to add a few lines to the intimate notice his oldest friend, Sir Robert Muir, has furnished. "Bob" Adamson was a great fellow in every respect—a great family practitioner, beloved by his patients; a wonderful friend; a dour opponent but doughty partner at golf; one of the best exponents of the nonsense speech at medical-club dinners. All he said and did showed quality. He followed to the letter the old and wise advice: "Whatsoever thy hand findeth to do, do it with thy might."

T. MILNES BRIDE, M.D.

Dr. T. Milnes Bride, honorary consultant ophthalmologist to the United Manchester Hospitals, died at his home at Alderley Edge, Cheshire, on October 11. He was 74 years of age.

Thomas Milnes Bride was born at Wilmslow, Cheshire, on December 10, 1881, the elder son of Dr. John Bride, and was educated at Cheltenham College and at Owens College, Manchester. He graduated M.B., Ch.B. from the Victoria University of Manchester in 1905, proceeding to the M.D. four years later. After graduation he held numerous house appointments at Manchester hospitals. In 1912 he became honorary surgeon to the Manchester Royal Eye Hospital, a position which he occupied for thirty-five years until he retired in 1947, when he was appointed honorary consultant ophthalmologist to the United Manchester Hospitals. He was also consulting ophthalmic surgeon to the Royal Manchester Children's Hospital and St. Mary's Hospital, Manchester, and visiting ophthalmic surgeon to the Military Hospital, Davyholme, and to the Crumpsall Hospital. He was also clinical lecturer in ophthalmology in Manchester University, and examiner in ophthalmology to Oxford University. He served as a captain in the R.A.M.C. in Mesopotamia and Italy in the first world war. During his long connexion with the Manchester Royal Eye Hospital he built up a reputation as a highly conscientious member of the staff and was much loved by his colleagues and by the nurses.

Bride was a member of the Ophthalmological Society of the United Kingdom, and a life member and president in 1924 of the North of England Ophthalmological

Society. One or two of his papers were published in the *Transactions of the Ophthalmological Society of the United Kingdom*. At the Annual Meeting of the British Medical Association held at Manchester in 1929 he acted as one of the honorary secretaries of the Section of Ophthalmology. A keen golfer, he was for many years secretary, with H. T. Ashby, of the Manchester Medical Golfers Association. He married in 1915 Sylvia Louise Ruthven, daughter of J. Farran Leech, of Eccles, Lancashire, and she survives him. Their only child, a daughter, died in infancy. They were a devoted couple, and the hospitality for which they were so well known always included vintage port, of which he was a connoisseur. At his home on Alderley Edge facing a wide view of the Cheshire plain his wife and he created a very beautiful garden, and in later years his leisure hours were often spent trimming roses, inspecting the vegetable garden, or spying the distant view of the Wrekin and the Welsh hills. Tom Bride leaves behind him the memory of a gentleman who was both courteous and helpful.—H. V. W.

Dr. H. G. BRAHAM died at his home at Huddersfield on September 18 at the age of 50 after a long and painful illness. His death occurred only two days before that of his elder brother, Dr. David Braham, of Bournemouth. Born at Leeds on December 18, 1905, Harvey Gordon Braham was educated at Leeds Central High School and at the School of Medicine of Leeds University, taking the Scottish triple qualification in 1933. He then held resident hospital appointments at Sheffield and Bournemouth, and later was in practice for several years at Rawtenstall, Lancashire. Much to the regret of his patients and a wide circle of friends in Rawtenstall, he moved to Huddersfield in 1946 and took over a practice in the Lindley district. With his kindness to his patients, his medical knowledge, and his charm and sincerity, he soon became as popular and as loved at Lindley as he had been in his previous practice. He was a member of the Huddersfield Hospital Management Committee and a founder member of the Huddersfield branch of the Marriage Guidance Council, and in other ways he entered actively into the life of the community in which he lived and worked. In 1952 he had an abdominal operation which, because of complications, kept him away from work for about six months. This marked the beginning of the deterioration in his health. He continued in his practice, however, working with the same diligence and consideration for his patients, but at a slower pace: even so, it could be said that he sacrificed his life for his work. The sympathies of his large circle of friends, his colleagues, and his patients, in fact all those with whom he came in contact, go out to his widow and three children in their sad loss.—H. W. D.

Universities and Colleges

UNIVERSITY OF OXFORD

In Congregation on July 28 the following degrees were conferred:
B.M.—S. Ardeman, J. A. Lofting, A. R. R. Cain, P. G. Newall Watson, Mrs. Ann G. Taylor, *J. P. H. Anderson, *F. John.
*In absence.

UNIVERSITY OF DURHAM

In Congregation on September 22 the Diploma in Psychological Medicine was awarded to A. C. Gibson and H. S. McWalter.

ROYAL FACULTY OF PHYSICIANS AND SURGEONS

At a meeting of the Faculty held on September 3, with the President, Professor Stanley Graham, in the chair, the following were admitted Fellows of Faculty:

G. Church, I. W. W. Fingland, D. Harirajan, K. N. Kanwar, J. B. McGuinness, P. V. N. Raju, N. L. Sharma.

Medico-Legal

ARTERIOSCLEROSIS AND THE McNAUGHTON RULES

[FROM OUR MEDICO-LEGAL CORRESPONDENT]

On June 27, 1956, an elderly man named Kemp, who was of excellent character and had always been thought to be devoted to his wife, found himself on trial before Mr. Justice Devlin and a jury at Bristol Assizes on a charge of causing her grievous bodily harm by striking her during the night with a hammer.

It was common ground between the medical evidence called for the prosecution and the defence that at the time of the act Kemp was suffering from arteriosclerosis which caused a congestion of blood in the brain accompanied by a temporary loss of consciousness, as a result of which he acted irresponsibly and irrationally. It was agreed that he was not conscious of picking up the hammer or that he was striking his wife with it.

He was therefore, in the words of the McNaughton Rules, "at the time of committing the act . . . labouring under such a defect of reason . . . as not to know the nature and quality of the act he was doing." The issue in the case was whether this defect of reason was "from a disease of the mind." If it was not, Kemp would have been entitled to be acquitted because he was not responsible for his act, since he could not have formed the guilty intent necessary to constitute the offence charged. If, however, there was a "disease of the mind" within the McNaughton Rules, s. 2 of the Trial of Lunatics Act, 1883, would apply, and the jury would be bound to find the special verdict of guilty but insane provided by that section. This amounts to a qualified acquittal resulting in the detention of the accused at Her Majesty's pleasure—that is, in a mental hospital.

Mr. Justice Devlin ruled that as a matter of law the arteriosclerosis from which Kemp was suffering and which caused his "defect of reason" was such a "disease of the mind." He pointed out that, however important it might be medically whether the defect of reasoning was due to a disease of the brain or to some other form of mental derangement, all that the law had to consider was the state of mind in which the accused was, not how he got there. The contention for the defence was that, though arteriosclerosis is capable of becoming a mental disease by causing degeneration of the brain, Kemp's had not gone so far but had only caused temporary interference by cutting off the blood supply in the same way as concussion might do: when it reached the point of interfering with the brain cells so that they degenerated, then it would be called a disease of the mind. However, the law was not concerned with the brain, but with the "mind" in its ordinary connotation of the mental faculties of reasoning, memory, and understanding. Defect of reason caused by a disease affecting the mind was what the McNaughton Rules required, and the condition of the brain was as irrelevant to that question as whether the disease was curable or incurable, temporary or permanent. The hardening of the arteries in Kemp's case was a disease which had been shown by the evidence to be capable of affecting his mind in such a way as to cause a defect, temporary or permanent, of its reasoning and understanding, and was thus within the Rules, and he would so direct the jury.

The full report of Mr. Justice Devlin's consideration of the problem is an excellent example of the lawyer's approach to the McNaughton Rules and the question of insanity as affecting criminal responsibility. If the lawyer's approach was more often expressed with the clarity and logic to be found in the report there would be less misunderstanding between the professions on what has been a thorny subject for both.

[1956] 3 All E.R. 249.

INFECTIOUS DISEASES AND VITAL STATISTICS

Summary for British Isles for week ending September 29 (No. 39) and corresponding week 1955.

Figures of cases are for the countries shown and London administrative county. Figures of deaths and births are for the 160 great towns in England and Wales (London included), London administrative county, the 17 principal towns in Scotland, the 10 principal towns in Northern Ireland, and the 14 principal towns in Eire.

A blank space denotes disease not notifiable or no return available. The table is based on information supplied by the Registrars-General of England and Wales, Scotland, N. Ireland, and Eire, the Ministry of Health and Local Government of N. Ireland, and the Department of Health of Eire.

CASES in Countries and London	1956					1955				
	Eng. & Wales	Land.	Scot.	N. Ire.	Eire	Eng. & Wales	Land.	Scot.	N. Ire.	Eire
Diphtheria ..	8	0	2	0	3	10	1	4	0	
Dysentery ..	457	47	169	2		427	61	238	16	4
Encephalitis, acute	1	0		0		4	0		0	
Enteric fever: Typhoid ..	5	1	0	0	1	5	0	1		3
Paratyphoid ..	9	2	0	0	(B)	45	4	3(B)	19	
Food-poisoning ..	300	29	50	1		325	32		7	
Infective enteritis or diarrhoea under 2 years ..				12	35					75
Measles* ..	1,396	100	108	40	55	1,227	32	25	15	37
Meningococcal infection ..	22	2	13	1	2	22	2	11	1	
Ophthalmia neonatorum ..	27	1	9	0		39	3	5	0	
Pneumonia† ..	292	22	164	0	1	228	18	115	3	5
Poliomyelitis, acute: Paralytic ..	60	6	15	3	18	207	31	48	3	
Non-paralytic ..	71	5				180	29			
Puerperal fever§ ..	222	31	9	0		241	34	11	3	
Scarlet fever ..	447	36	86	27	21	550	30	87	23	22
Tuberculosis: Respiratory ..	524	68	92	15		710	85	102	13	
Non-respiratory ..	72	9	11	1		101	9	12	4	
Whooping-cough ..	1,765	100	191	12	33	993	55	50	55	67

DEATHS in Great Towns	1956					1955				
	Eng. & Wales	Land.	Scot.	N. Ire.	Eire	Eng. & Wales	Land.	Scot.	N. Ire.	Eire
Diphtheria ..	0	0	0	0	0	0	0	0	0	0
Dysentery ..	1	0		0		0	0		0	
Encephalitis, acute		0		0		0			0	
Enteric fever ..	0	0	0	0		0	0	0	0	
Infective enteritis or diarrhoea under 2 years ..	5	0	2	0	1	9	0	2	1	2
Influenza ..	3	1	0	0	0	5	1	0	0	0
Measles ..		0	0	0	0		4	0	0	0
Meningococcal infection ..		0	0				0	2		
Pneumonia ..	152	20	11	6	1	145	9	15	4	5
Poliomyelitis, acute	3	0		0		8	1		0	
Scarlet fever ..		0	0	0	0		0	0	0	0
Tuberculosis: Respiratory ..	48	4	7	2	2	48	5	8	0	4
Non-respiratory ..		2	0	0	0		0	0	0	1
Whooping-cough ..	0	0	0	0	0	1	0		0	0
Deaths 0-1 year ..	186	24	34	4	2	201	27	11	13	15
Deaths (excluding stillbirths) ..	4,541	652	538	97	145	4,421	617	62	91	152
LIVE BIRTHS ..	7,921	1215	934	225	467	7,493	1131	867	240	447
STILLBIRTHS ..	202	19	21			192	24	20		

* Measles not notifiable in Scotland, whence returns are approximate.

† Includes primary and influenzal pneumonia.

§ Includes puerperal pyrexia.

Vital Statistics

Infectious Diseases

Most infectious diseases increased in frequency in England and Wales during the week ending September 29. The largest rises were 314 for measles, from 1,082 to 1,396, 97 for acute pneumonia, from 195 to 292, 71 for scarlet fever, from 376 to 447, 67 for dysentery, from 390 to 457, and 65 for food-poisoning, from 235 to 300; the only large fall was 83 for whooping-cough, from 1,848 to 1,765.

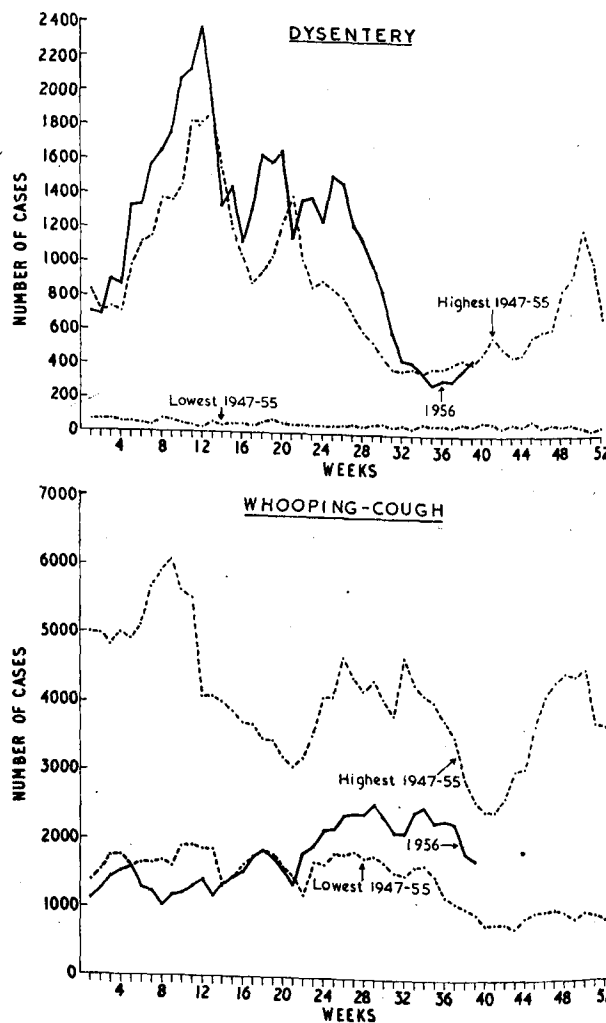
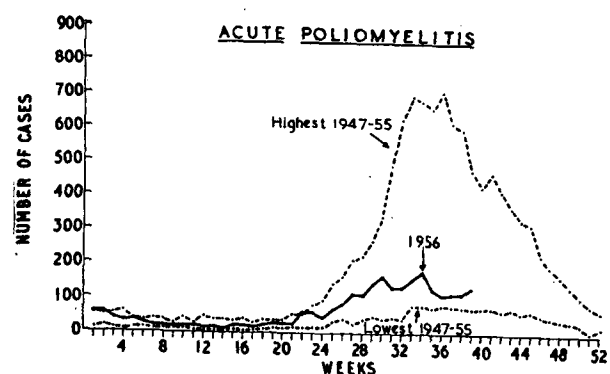
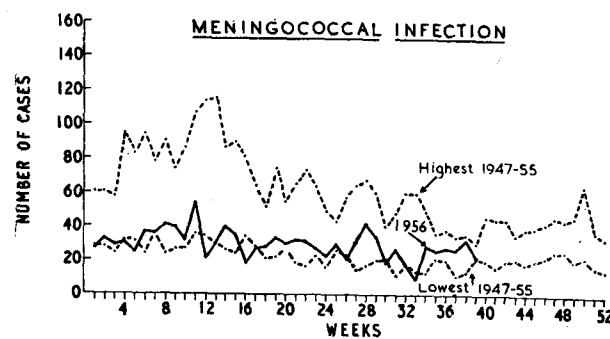
The largest rise in the incidence of measles was 65 in Yorkshire West Riding, from 55 to 120. Only small fluctuations occurred in the local trends of scarlet fever. The largest falls in the number of notifications of whooping-cough were 46 in Yorkshire West Riding, from 166 to 120, 41 in London, from 141 to 100, 34 in Essex, from 152 to 118. 8 cases of diphtheria were notified, being 2 more than in the preceding week; 2 cases were notified in Leeds C.B. and in the metropolitan borough of Wandsworth.

131 cases of acute poliomyelitis were notified, and these cases were 21 more for paralytic and 1 fewer for non-paralytic cases than in the preceding week. The largest returns were Lancashire 25 (Manchester C.B. 12, Middleton M.B. 4, Stretford M.B. 4), Yorkshire West Riding 15 (Leeds C.B. 7, Sheffield C.B. 2), Cheshire 13 (Stockport C.B. 9), London 11 (Fulham 4, Paddington 2), and Surrey 8 (Chertsey U.D. 2, Godalming M.B. 2).

The largest centres of dysentery were Yorkshire West Riding 100 (Leeds C.B. 28, Halifax C.B. 13, Sheffield C.B. 13), Lancashire 75 (Liverpool C.B. 19), London 47 (Islington 9, Paddington 9), Surrey 29 (Esher U.D. 16), Warwickshire 27 (Coventry C.B. 18), Middlesex 21, Durham 21, and Worchestershire 21 (Oldbury M.B. 10).

Graphs of Infectious Diseases

The graphs below show the uncorrected numbers of cases of certain diseases notified weekly in England and Wales. Highest and lowest figures reported in each week during the nine years 1947-55 are shown thus ----, the figures for 1956 thus —. Except for the curves showing notifications in 1956, the graphs were prepared at the Department of Medical Statistics and Epidemiology, London School of Hygiene and Tropical Medicine.



Week Ending October 6

The notifications of infectious diseases in England and Wales during the week included: scarlet fever 458, whooping-cough 1,487, diphtheria 2, measles 1,968, acute pneumonia 239, acute poliomyelitis 155, dysentery 421, paratyphoid fever 9, and typhoid fever 3.

Medical News

Dr. Morris Fishbein, of Chicago, internationally known as a medical editor, has been honoured as recipient of the 1956 Distinguished Service Award given by the American Medical Writers' Association. Dr. Fishbein is medical editor of *Excerpta Medica* and for very many years was editor of the *Journal of the American Medical Association*. He is equally well known as a writer, among his notable contributions being *Medical Writing*. The Distinguished Service Award is given annually to a member of the association "who has made distinguished contributions to medical literature or rendered unusual and distinguished service to the medical profession." The citation given in connexion with the award reads in part: "Eminent medical editor, voluminous writer, sparkling lecturer, university professor, as chairman or member of numerous official groups, you have given yourself to good works and patriotic causes. Recipient of multiple honours, you have been decorated by the governments of Cuba, Italy, the Netherlands, Spain, and your own United States of America. . . . From a position thus worthily won, you carried the anti-quackery fight to the public with a witty style that made of a threat a laughing-stock. With unerring

perception of a need unmet, you took to the road and the air, tirelessly, endlessly, speaking to and for practitioners of medicine, those ultimate guardians of the public health." The award, comprising a plaque and a gold medal, was presented to Dr. Fishbein on September 28 by the president of the association, Dr. RICHARD M. HEWITT, of the Mayo Clinic, who worked for many years with Dr. Fishbein as assistant editor of the *Journal of the American Medical Association*.

Lord Nuffield's Gift to Faculty of Dental Surgery.—At a lunch at the Royal College of Surgeons on October 12 Lord NUFFIELD gave a cheque for £100,000 to the dean of the faculty of dental surgery, Professor F. C. WILKINSON, to establish a chair of dental research in the new department of dental science at the College. Lord Nuffield's gift will provide the salary and expenses in perpetuity of a research professor who will also act as director of the department, which will, in close contact with the Institute of Basic Medical Sciences of the College, explore the fundamental problems of dental disease. It is hoped that the department may become a scientific centre not only for workers from this country but also for those from the Commonwealth. When Lord Nuffield decided to endow the research chair the appeal for funds for a new department had reached the halfway house. It had been given an excellent start by the Leverhulme Trust, which had assumed initial responsibility for the salaries of the scientific staff who will work under the Nuffield professor. Professor Wilkinson, thanking Lord Nuffield for his gift, said that future generations would wonder that one man could have done so much to foster the advancement of medicine in so many fields.

Harveian Oration.—Professor J. CRIGHTON BRAMWELL, formerly professor of cardiology and now emeritus professor at Manchester University, delivered this year's Harveian Oration at the Royal College of Physicians of London on October 18. His subject was "Practice, Teaching, and Research." There was no sharp dividing line between scientist and clinician, he said. The good teacher must have the spirit of an investigator—the powers of observation and deduction combined with the faculty of curiosity—although for teaching future practitioners clinical experience was more important than executive ability in research. Preclinical teachers should cultivate in their students the scientific attitude of mind and show them how to apply scientific methods to the solution of clinical problems. The rapid advance of medical knowledge had made specialization inevitable, continued Professor Bramwell; but the specialist whose field of vision was limited to his own specialty saw illness through tinted glasses. The specialist ought to be a general physician or surgeon who had added to his knowledge of general medicine a more profound study of one of the specialties. The fundamental unity of medicine could not be over-emphasized.

Leverhulme Research Awards, 1957.—Application is invited for fellowships and grants in aid of research. These awards are intended for senior workers of established position and are limited to British-born subjects normally resident in the United Kingdom; in exceptional circumstances the Trustees may waive the condition as to residence. No subject of inquiry is excluded from consideration, but preference is given to subjects in which existing provision for research is inadequate. The duration of the awards does not extend over more than two years or less than three months, and the amount depends on the nature of the research and the circumstances of the applicant. Application forms are obtainable from the secretary, Leverhulme Research Awards, St. Bridget's House, Bridewell Place, London, E.C.4. The closing date is December 31. Results will be announced in May and the awards will normally date from September 1, 1957.

Live Polio Vaccine Ready for Mass Trial.—According to reports from America, Dr. ALBERT A. SABIN, professor of research paediatrics at the University of Cincinnati College of Medicine, is now ready to test his live attenuated polio-

myelitis vaccine on a wide scale in humans. He has already arranged a trial in convict volunteers, and is stated to have enough vaccine to inoculate nearly two million people. The vaccine is given orally. Last year we published a paper by Dr. Sabin describing the results of a trial of an attenuated vaccine in 26 volunteers (*British Medical Journal*, 1955, 2, 160).

Glasgow Library.—The Wellcome Trust has agreed to grant £500 a year for five years for repairing the historical books in the library of the Royal Faculty of Physicians and Surgeons of Glasgow. The library was instituted in 1697, when the Faculty first obtained premises almost 100 years after its foundation by a grant from King James VI to Maister Peter Lowe. It now consists of some 150,000 volumes, more than 4,000 of them published before 1700. Many of these are of extreme rarity and some are unique. The preservation of this collection for the use of the medical profession not only in Glasgow but, by a system of inter-library loans, throughout the country has become a financial problem for the Faculty, and this gift will enable many of the older books to be repaired.

Convalescent Treatment under N.H.S.—The MINISTER OF HEALTH has appointed a working party with the following terms of reference: "To examine the extent to which the provision of convalescent homes in the National Health Service is meeting the demands placed upon it in the light of recent advances in medicine and modern conceptions of treatment and nursing care, to review the admissions machinery in the London area, and to make recommendations." The chairman is Dr. N. M. GOODMAN, a principal medical officer of the Ministry of Health, and the medical members are Sir HENRY TIDY, Dr. J. GRAHAM, and Dr. R. A. ANDREWS.

Royal Society Lecturers.—Dr. E. F. GALE, F.R.S., director of the Medical Research Council's chemical microbiology research unit at Cambridge, is to deliver the Leeuwenhoek lecture to the Royal Society on November 1. He will discuss the biochemical organization of the bacterial cell. The Ferrier lecture, on December 6, will be given by Sir WILFRID LE GROS CLARK, F.R.S., professor of anatomy at Oxford. He will lecture on the anatomical basis of olfactory discrimination. Both lectures are at 4.30 p.m.

Royal College of Surgeons.—At a council meeting on October 11 the president, Sir HARRY PLATT, presented the Walker prize to Dr. C. P. RHODES, of New York, whose Imperial Cancer Research Fund lecture is summarized elsewhere in this issue (p. 935). The Cecil Joll prize for 1956 was awarded to Professor P. R. ALLISON, of Oxford, for his contributions to thoracic surgery.

Leader for Antarctic Expedition.—The War Office has agreed to the appointment of Colonel R. A. SMART, late R.A.M.C., deputy director of Army Health, Western Command, as leader of the main party of the Royal Society International Geophysical Year Antarctic Expedition. The main party, which leaves London on November 15, is expected to reach its base at Halley Bay by the end of December. It will relieve the advance party, under another doctor, Surgeon Commander D. G. DALGLEISH, R.N., which went out last November.

Albert Schweitzer Medal Award.—Major C. W. HUME, director of the Universities Federation for Animal Welfare, which he founded in 1926 as the University of London Animal Welfare Society, has been awarded the Albert Schweitzer Medal of the American Animal Welfare Institute and a cheque for \$500 in recognition of his services to the welfare of laboratory animals.

Colindale.—Lieutenant-Colonel H. J. BENSTED retired from the directorship of the Central Public Health Laboratory at Colindale on October 3, and Dr. W. C. COCKBURN will perform the duties of acting director until a successor is appointed.

Dr. James Walker was inducted into the Chair of Midwifery and Gynaecology at St. Andrews University during the graduation ceremony there on October 10.

Dr. W. Mayer-Gross, of the department of experimental psychiatry, Birmingham, is going as a W.H.O. consultant to the All-India Institute of Mental Health, Bangalore, to advise on its further development. He will be away until the end of February.

COMING EVENTS

Worcester General Practitioners.—The College of General Practitioners has made arrangements with the staffs of the Worcester Royal Infirmary and Ronswood Hospital for a course of six medical meetings this autumn as follows: October 25, Worcester Royal Infirmary, "Antenatal Care," by Dr. M. IVOR COOKSON, general practitioner, and Mr. A. T. MARSHALL, obstetrician. October 31, Worcester Royal Infirmary, "The Diagnostic Processes," by Dr. D. L. CROMBIE, general practitioner. November 8, Worcester Royal Infirmary, "The Use of the X-ray Department by the General Practitioner," by Dr. A. A. VICKERS, radiologist. November 14, Worcester Royal Infirmary, "Anaesthesia in General Practice, with Special Reference to Dentistry," by Dr. W. D. STEEL, general practitioner. November 22, Worcester Royal Infirmary, "Ophthalmic Pitfalls in General Practice," by Mr. C. MARTIN DOYLE, ophthalmologist. November 29, Ronswood Hospital, open meeting. All meetings will be at 3.30 for 3.45 p.m., except the first meeting, which will start at 3.15 p.m.

Association of Anaesthetists of Great Britain and Ireland.—Annual meeting, November 1 and 2, at the Royal College of Surgeons, Lincoln's Inn Fields, London, W.C.2. Details from the secretary of the association at that address not later than October 26.

Aberdeen University Club, London.—Annual dinner on November 8 at 7 p.m. at the Hyde Park Hotel, Knightsbridge. Tickets (30s.) and further details from Dr. W. C. COCKBURN, Central Public Health Laboratory, Colindale Avenue, London, N.W.9.

Immunology.—The first meeting of the British Society for Immunology will be held at the Wellcome Foundation, 183, Euston Road, London, W.C.1, on Friday and Saturday, November 9-10. After introductory remarks by Sir HENRY DALE, O.M., F.R.S., at 10 a.m. on the Friday, scientific papers will be read, and in the afternoon there will be a symposium on complement. Particulars from Professor G. PAYLING WRIGHT, Department of Pathology, Guy's Hospital Medical School, London, S.E.1.

Semaine Endocrinologique.—At the Hôpital Laënnec, 42, Rue de Sévres, Paris, 7, November 26 to December 1. The subject will be prognosis in endocrinology. Details from the secretary of the hospital.

Sydney Watson Smith Lecture.—Professor JOHN McMICAHEL will lecture at the Royal College of Physicians of Edinburgh on November 27 at 5 p.m. His subject will be "Valvular Incompetence and Heart Failure."

SOCIETIES AND LECTURES

A fee is charged or a ticket is required for attending lectures marked ●. Application should be made first to the institution concerned.

Tuesday, October 23

BRITISH POSTGRADUATE MEDICAL FEDERATION.—At London School of Hygiene and Tropical Medicine, 5.30 p.m., Dr. V. P. Whittaker, D.Phil.: Metabolism of Choline Esters.

CHADWICK TRUST.—At Royal Society of Tropical Medicine and Hygiene, 5.30 p.m., Dr. W. Emrys Davies, Ph.D.: The Message of Public Health—How It Should be Told.

INSTITUTE OF DERMATOLOGY.—5.30 p.m., Dr. A. Tickner: Vitamins and Skin Metabolism.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.—3.45 p.m., Erasmus Wilson: Demonstration by Dr. L. W. Proger: Osteomyelitis.

ST. MARY'S HOSPITAL MEDICAL SCHOOL.—At Wright-Fleming Institute Theatre, 5 p.m., Professor H. H. Evers: Significance of Rubella in Early Pregnancy.

WEST END HOSPITAL FOR NEUROLOGY AND NEUROSURGERY.—5.30 p.m., Dr. T. Rowland Hill: neurological demonstration.

Wednesday, October 24

BIRMINGHAM MEDICAL INSTITUTE: SECTION OF PSYCHIATRY.—At 154, Great Charles Street, Birmingham, 8 p.m., joint meeting with Midland Branch of British Psychological Society and Midland Mental Deficiency Society. Dr. M. L. Kellmer Pringle, Ph.D.: Some Aspects of Emotional Re-education.

INSTITUTE OF DERMATOLOGY.—5.30 p.m., Dr. D. I. Williams: Use of Vitamins in Dermatology.

INSTITUTE OF DISEASES OF THE CHEST.—5 p.m., Mr. J. R. Belcher: Some Aspects of Mitral Valvotomy.

INSTITUTE OF UROLOGY.—4.30 for 5 p.m., Dr. A. R. Harrison: Tests of Renal Function.

LONDON UNIVERSITY.—At London School of Hygiene and Tropical Medicine, 5.30 p.m., special university lecture in hygiene and public medicine by Professor A. Charlotte Ruys (Amsterdam): Influence of Various Environmental Conditions on the Epidemiology of Tuberculosis.

POSTGRADUATE MEDICAL SCHOOL OF LONDON.—2 p.m., Dr. G. J. Popjak: Fat Metabolism.

ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE.—3.30 p.m., Dr. Cicely D. Williams: Needs and Opportunities for Maternal and Child Health in International Organizations.

SOCIETY OF CHEMICAL INDUSTRY: FOOD GROUP—NUTRITION PANEL.—At 14, Belgrave Square, S.W., 6.30 p.m., debate: That in the Opinion of this Panel, Sugar is an Unnecessary Article in the Diet. Proposed by Dr. A. E. Bender, Ph.D., F.R.I.C. Opposed by Mr. H. C. S. De Whalley, M.I.Chem.E.

WESTMINSTER HOSPITAL.—At Meyerstein Theatre, Westminster Medical School, 5.30 p.m., Professor H. K. Beecher (Massachusetts): Treatment of Severely Wounded Men.

Thursday, October 25

BRITISH POSTGRADUATE MEDICAL FEDERATION.—At London School of Hygiene and Tropical Medicine, 5.30 p.m., Dr. Mary Barber: Resistance of Staphylococci to Antibiotics.

GLASGOW UNIVERSITY MEDICO-CHIRURGICAL SOCIETY.—7.30 p.m., Dr. T. Anderson: Good Relations in Medicine.

HONYMAN GILLESPIE LECTURES.—At University New Buildings, Teviot Place, Edinburgh, 5 p.m., Mr. I. S. Smillie: Loose Bodies in Joints.

LIVERPOOL MEDICAL INSTITUTION.—8 p.m., symposium to be opened by Dr. J. P. G. Rogerson and Mr. H. V. Corbett: General Practitioner Midwifery Services.

LONDON UNIVERSITY.—At St. Thomas's Hospital Medical School, 5 p.m., special university lecture in human anatomy and morphology, by Sir Geoffrey Jefferson, F.R.S.: Effects of Brain-stem Lesions.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.—5 p.m., Thomas Vicary Lecture by Dr. William Brockbank: The Man Who Was Vidius.

ROYAL EYE HOSPITAL.—5.15 p.m., Dr. T. H. Whittington: Aspects of Refraction Work—(3) The Reduced Eye, and Retinoscopy.

ST. ANDREWS UNIVERSITY.—At Physiology Department, Queen's College, Dundee, 5 p.m., Professor G. McC. Wyburn: Present Limitations of the Interpretation of Structure with the Electron Microscope.

ST. GEORGE'S HOSPITAL MEDICAL SCHOOL.—5 p.m., Dr. M. A. Partridge: psychiatry demonstration.

SOCIETY OF CHEMICAL INDUSTRY: MICROBIOLOGY GROUP.—At 14, Belgrave Square, S.W., 6.15 p.m., medical films (Institut Pasteur, use-use control, action of antibiotics, etc.).

UNIVERSITY COLLEGE LONDON AND UNIVERSITY COLLEGE HOSPITAL MEDICAL SCHOOL.—At Anatomy Theatre, 5.30 p.m., Rickman Godlee Lecture by Sir Gavin de Beer, F.R.S.: Science and the Humanities.

Friday, October 26

INSTITUTE OF DERMATOLOGY.—5.30 p.m., Dr. L. Forman: Alopecia.

INSTITUTE OF DISEASES OF THE CHEST.—5 p.m., Dr. E. H. Hudson and Mr. J. R. Belcher: clinical demonstration.

INSTITUTE OF LARYNGOLOGY AND OTOLGY.—3.30 p.m., Mr. M. P. Ellis: Secretary Otitis and Eustachian Obstruction.

POSTGRADUATE MEDICAL SCHOOL OF LONDON.—10 a.m., Mr. D. Band: Personal Experience of Methods of Vesical Exclusion with a Reasonable Follow-up; 4 p.m., Sir Francis Walshe, F.R.S.: Traumatic Neurosis.

SIGERIST SOCIETY.—At Club Room, Imperial Hotel, Russell Square, W.C., 8 p.m., Drs. Angus and Barbara McPherson: Medical Visit to China. A short colour film of their journey will be shown.

Saturday, October 27

INSTITUTE OF OBSTETRICS AND GYNAECOLOGY.—9.45 a.m., Professor W. I. C. Morris: Post-maturity.

BIRTHS, MARRIAGES, AND DEATHS

BIRTHS

Beswick.—On October 9, 1956, at the Women's Hospital, Nottingham, to Sylvia (formerly Welch), wife of Dr. Hubert Beswick, a son.

Coutanceau.—On October 1, 1956, at the Liverpool Maternity Hospital, to Paula, wife of Henri Coutanceau, M.B., B.S., D.A., a sister to Suzanne and Maurice—Denise Madeleine.

Grant.—On October 6, 1956, at the Simpson Memorial Maternity Pavilion, Royal Infirmary, Edinburgh, to Dr. and Mrs. Peter W. Grant, of 127, Mayfield Road, Edinburgh, a son.

Jones.—On October 6, 1956, at University College Hospital, London, W.C., to Monica (formerly Cogman), M.B., B.S., wife of Peter H. Jones, M.V.O., F.R.C.S., a son.

Patey.—On September 18, 1956, at Paignton Hospital, to Jean (formerly Mason), M.B., F.R.C.S.Ed., wife of Mr. John Patey, a brother for Robert Johnny, and Margaret—Patrick Joseph.

Reilly.—On October 8, 1956, in Plymouth, to Joy, wife of Michael Reilly, M.S., F.R.C.S., a son.

DEATHS

Gray.—On September 24, 1956, in hospital, the result of an accident, Douglas Gray, M.B., of 84, High Street, Henlow, Beds, formerly of Bolton, Lancs, aged 78.

Hinkman.—On September 23, 1956, at Edinburgh, John Forrest Hinkman, M.B., Ch.B., late I.M.S., of Carlisle, Lanark.

Porter.—On September 11, 1956, at the Grove Hospital, Tooting, London, S.W., Joseph Herbert Porter, M.C., M.B., B.Ch., of 114, Cavendish Road, London, S.W.

Shaw.—On September 26, 1956, at 7, Midhurst Avenue, Fortis Green, London, N., Ernest Henry Shaw, F.R.C.S., M.R.C.P., aged 89.

Willoughby.—On July 16, 1956, at her home, 13808, 98th Avenue, Edmonton, Alberta, Canada, Dorothy Willoughby, M.R.C.S., L.R.C.P.

Any Questions?

We publish below a selection of those questions and answers which seem of general interest. It is regretted that it is not possible to supply answers to all questions submitted.

Chronic Haemospermia

Q.—An epileptic on phenytoin sodium reports that his ejaculate is almost pure blood. Is this related to the phenytoin therapy and how seriously must this phenomenon be regarded? Is there any indication for further investigation?

A.—The aetiology of chronic haemospermia is still largely obscure. It seems very improbable that, in the patient described, it could be due to the phenytoin therapy; and it is doubtless no more than coincidence that, like one of five patients reported by McDonald,¹ he has epilepsy. The blood in these cases appears to originate in the seminal vesicles, and, provided there is no obvious abnormality of these, further investigation is unlikely to yield useful information.

The condition, though alarming to the patient, appears otherwise to be of no consequence. According to McDonald, treatment with oestrogen (e.g., ethinyl oestradiol, 0.05 mg., from three times a week to twice daily, according to the response, and continued for from three to seven weeks) is very likely to stop the haemospermia, though it may recur later.

REFERENCE

¹ McDonald, D., in *Conference on Diagnosis in Sterility*, edited by E. T. Engle, 1946. Thomas, Illinois.

Preparation of Benzocaine and Urethane Solution

Q.—A solution of 2% benzocaine and 40% urethane in distilled water¹ has been advocated recently for the treatment of simple rib fractures.² Is this a standard solution marketed by any firm, or a solution made up by individual hospital dispensaries? In the case of the latter, please give me details of the dispensing.

A.—The first use of the benzocaine-urethane injection in this country was by Nitali and Kohn,³ who used a proprietary preparation "prolongal benzocaine" made by Zori, of Tel Aviv. This does not seem to be on the market in Great Britain. An injection of the strength mentioned in the question is in use in St. Giles's Hospital, London, and Queen Mary's Hospital, Roehampton.¹ In both hospitals the injection is prepared in the hospital pharmacy and is a simple solution of 2% of benzocaine and 40% of urethane. In the former filtration is used for sterilization and in the latter autoclaving.

If solutions are exposed to temperatures much below 20° C. some of the urethane may crystallize out, but it redissolves on warming. There are conflicting reports on the solubility of urethane in water. The B.P. and the B.P.C. give the solubility as 1 in 1.5 at 20° C., the U.S. Dispensary and Merck Index give it as 1 in 0.5, and the Extra Pharmacopoeia (Martindale) gives it as 1 in 2. The last three volumes mentioned state no temperature. Even taking the lowest solubility figure the strength of the benzocaine-urethane injection is well within the limit.

Benzocaine is stated in the B.P. and the B.P.C. to be almost insoluble in water, whereas the U.S. Dispensary, Merck Index, and Extra Pharmacopoeia give a solubility of about 1 in 2,500. Thus the amount of benzocaine in the injection is well in excess of its solubility in water. The amount required, however, dissolves readily in the urethane solution. That it is the urethane which crystallizes out is shown by the fact that, if a plain 40% solution of benzocaine is cooled to below 20° C. beside a sample of the benzocaine-urethane injection, crystallization occurs in both simultaneously and the volume of precipitate is as great in the plain

solution as in that containing benzocaine. The addition of 10% of alcohol reduces the liability to crystallization, but is not really necessary.

The following procedure is recommended for the preparation of the injection. Dissolve the urethane in a little distilled water with the aid of gentle heat and dissolve the benzocaine in the urethane solution. Place in ampoules or a rubber-capped container, as required, and sterilize by autoclaving at 10 lb. per sq. in. (0.7 kg. per square cm.) for 30 minutes. Rubber-capped bottles should not need any added preservative, as urethane is bacteriostatic. This solution should remain bright and clear at the temperature of most wards and theatres. At temperatures appreciably below 20° C. a crystalline deposit may appear. This can be dissolved by gently warming and shaking: often the heat of the hand in shaking the bottle is sufficient to cause the precipitate to dissolve. The solution is then quite suitable for use.

REFERENCES

- ¹ *British Medical Journal*, 1952, 2, 1418.
- ² *Ibid.*, 1955, 2, 829.
- ³ *Ibid.*, 1950, 2, 415.

Treatment of Pethidine Addiction

Q.—What treatment is advised for pethidine addiction?

A.—Careful nursing care and continuous medical supervision are essential in the treatment of pethidine addiction. Additional vitamins and a full diet should be given if the patient's physical condition is poor. When pethidine addicts are no longer allowed access to the drug a withdrawal syndrome develops. This is usually similar to, but less severe than, that arising from the removal of morphine, possibly because pethidine gives rise to much less euphoria. If pethidine administration is stopped abruptly symptoms rise to a peak in about eight to twelve hours and have usually disappeared in five days. It is usually better to withdraw the pethidine in stages over a period of three to four days. Sedatives such as chloral hydrate or paraldehyde may be required to produce sleep. A full psychological investigation should be carried out after withdrawal symptoms have disappeared, and subsequent supervision for several years is desirable.

Air-conditioning for Asthma

Q.—What are the indications for air-conditioning the bedroom of an asthmatic? How is this best achieved in cases where it would be of benefit? In such cases is there an optimum humidity for the air, and, if so, how can this be maintained?

A.—There is general agreement that excessive humidity and extremes of temperature are poorly tolerated by asthmatics and that they are most comfortable in a climate where the humidity is low and the temperature warm and even. However, attempts to relieve asthma by air-conditioning the bedroom have been disappointing. Several publications of such experiments appeared in the literature between 1924 and 1938,^{1,2} but little has appeared since. H. L. Rogers³ summarizes the position as follows: "Before asthmatic patients go to the expense of buying air-conditioning units, they should visit some friend or place where they can experiment with them. Most times they will decide they are not worth while."

Asthmatics sensitive to house dust should have a bedroom made as free from house dust as possible by correct furnishing and proper cleaning methods; feather pillows and eiderdown, horsehair mattress, and other sources of animal dander should be excluded. Episodes of infective asthma can be reduced by maintaining a warm, even temperature in the bedroom during the winter months by central heating or gas or electric fires, and this is especially helpful to young children and the elderly.

REFERENCES

- ¹ Rappaport, B. Z., Nelson, T., and Welker, W. H., *J. Allergy*, 1935, 6, 111.
- ² Nelson, T., *J. Amer. med. Ass.*, 1938, 2, 1298.
- ³ Abramson, H. A., *Somatic and Psychiatric Treatment of Asthma*, 1951, 1, 71. Baltimore.

Treatment of Disseminated Sclerosis

Q.—Have there been any recent advances in the treatment of long-standing disseminated sclerosis? Is nicotinic acid of value?

A.—There have been no important advances in the treatment of long-standing disseminated sclerosis, and until something is known of the aetiology of the disease it is very unlikely that any important therapeutic advance will be made. Provided the patient has not become bedridden, it is usually possible for the physiotherapist to help these patients by appropriate exercises or the provision of sticks or crutches. It is sometimes, but by no means always, possible to diminish spasticity by taking mephenesin by mouth; it is perhaps best taken in the form of tablets each containing 0.5 g. mephenesin carbamate; the dose of this preparation is slowly increased, and there seems to be almost no upper limit.

There is nothing to suggest that nicotinic acid has any place in the treatment of disseminated sclerosis.

Indications for Operation in Pelvic Tuberculosis

Q.—What are the indications for operative treatment in pelvic tuberculosis in women?

A.—The primary treatment of nearly all forms of genital tuberculosis in the female is now by means of streptomycin (1 g. daily) combined with P.A.S. (12 to 20 g. daily) or isoniazid (300 mg. daily). These are used in various combinations, sometimes alternating one with another, for a total of at least two months and preferably for three months. The best technique has still to be formulated and the long-term results determined. Meanwhile the short-term results, as regards eradication of active disease rather than restoration of fertility, are so promising that the place for surgical treatment of genital tuberculosis is strictly limited. It cannot yet be defined exactly, especially as chemotherapy is continually being developed. In general, it may be stated that operative treatment, if carried out, must be radical and only undertaken by an expert after considering all the circumstances of an individual case. It might be indicated by extension of the disease process, by the continuation of symptoms such as epimenorrhagia and pelvic pain, by fistula formation, and by the persistence of large appendage masses with caseation (small, symptomless, non-tender appendage swellings are not important) despite adequate and repeated courses of antibiotics and antibacterial drugs. Sometimes social and economic factors might influence the decision, and so might evidence that the tubes are so closed that it is certain that fertility cannot be restored even if active infection is eradicated by medical measures.

When there appears a good indication for surgery in any particular case there is still reason to hesitate if the clinical features suggest the presence of plastic peritonitis, which increases the risk of fistula formation as a result of operation. Moreover, all surgery should be "covered" by chemotherapy given for two weeks before, and for six weeks after, operation.

Gas-and-Air in Domiciliary Midwifery

Q.—What place has gas-and-air analgesia in domiciliary midwifery nowadays? Are there any definite contraindications to its use?

A.—Gas-and-air still has very nearly the same place in domiciliary midwifery as it has had for years. Trichloroethylene in one of the approved inhalers provides slightly more potent analgesia during the last few hours of labour. The liability to cumulation with trichloroethylene, and the danger of respiratory depression if its administration is combined too closely with large doses of pethidine, impose, however, certain limitations on its use. Gas-and-air may be used over longer periods of time, but needs a certain amount of experience for the best results to be obtained. Definite contraindications to gas-and-air analgesia exist

when in the opinion of the doctor the somewhat vigorous respiratory effort needed to inhale the gas from the apparatus, and the low oxygen content of the mixture (10% oxygen), would tire or harm the mother. The conditions in which this may be the case include cardiac and pulmonary disease (especially bronchiectasis and tuberculosis), anaemia, and severe toxæmia with hypertension.

Micro-methods for E.S.R.

Q.—What simple micro-methods are available for estimating the erythrocyte sedimentation rate? How reliable are the results compared with those from the usual methods?

A.—The usual methods for estimating the E.S.R.—for example, Westergren and Wintrobe—require 2 ml. citrated or oxalated venous blood. If there is difficulty in obtaining venous blood, micro-methods have been advocated which require about 0.2 ml. of blood from a skin prick. Speed in obtaining the blood specimen and mixing it with the anticoagulant is essential, since any degree of clotting will give misleading results. The technique for one such micro-method is as follows: 0.05 ml. trisodium citrate (3.8% solution) is drawn into an ordinary capillary pipette. Skin-prick blood, which must flow freely, is now taken up to the 0.2 ml. mark of the pipette. The specimen is quickly expelled into a small tube, which is rotated to aid mixing. The citrated blood is now sucked up into a special capillary pipette to a height of 100 mm. The internal bore of this pipette is 1.5 mm. The pipette is set vertically in a stand similar to the one used for Westergren pipettes. If the specimen can be obtained rapidly and mixed thoroughly with the anticoagulant the results are similar to and as reliable as obtained by the Westergren method. But the technical skill needed for this micro-method is considerable.

NOTES AND COMMENTS

Sore Tongue from Pipe-smoking.—Dr. H. D. FORBES FRASER (Crowthorne, Berks) writes: May I enlarge on the reply to the question about sore tongue from pipe-smoking ("Any Questions?" September 29, p. 778)? The patient referred to is clearly a learner pipe-smoker. He should inspect the proximal end of the mouth-piece of his pipe, and select one with a large, wide slot, and never use the cheaper circular opening. The wide slot distributes the hot smoke, the circular opening directs a hot jet on one spot on the tongue. The learner smoker should take courage to try a fairly strong, dark-coloured tobacco, which will give a cooler smoke. A fine-cut light-coloured tobacco will smoke hot. The pipe should be only half-filled until it begins to get nicely carboned. The learner pipe-smoker must learn. He should sit down and concentrate on the action of clear, quite regular draws, avoiding hurried puffing. He will at first be unable to converse while smoking, but will become a good listener. After about three weeks he will begin to enjoy his pipe.

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BRITISH MEDICAL JOURNAL

LONDON SATURDAY OCTOBER 27 1956

AETIOLOGY AND MANAGEMENT OF LESIONS OF THE FEET IN DIABETES

BY

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It is generally held that there is an association between diabetes and arterial disease. Joslin *et al.* (1940) state that "arteriosclerosis is excessive and has become the major cause of death among diabetics generally," and this view has many supporters. Opinion, however, differs on the nature of the arterial lesion, which is regarded by some—for example, Warren and Le Compte (1952), Barach and Lowy (1952), and Katz and Stamler (1953)—as atherosclerosis, and by others—for example, Lundbaek (1954)—as a specific form of angiopathy associated with long-standing diabetes.

Histologically it would appear to be impossible to differentiate between non-diabetic and diabetic arterial disease, and, although Lundbaek and Posborg Petersen (1953) have found statistically significant differences in the calcium, cephalin, and lecithin content of the coronary arteries in non-diabetic and diabetic subjects, these differences are admitted by them to be small. Lundbaek bases his belief on the existence of specific diabetic angiopathy largely on statistical grounds, sex incidence, and the presence of such associated lesions as retinopathy and the renal lesions described by Kimmelstiel and Wilson (1936).

Object of the Survey

The present investigation is particularly concerned with peripheral vascular disease of the lower extremities, and was carried out with the prime object of increasing our knowledge and understanding of the aetiology and treatment of lesions of the feet in diabetes; the results obtained, however, may have some bearing on the wider issue of the nature of the arterial lesion in diabetes.

In a recent survey of patients attending the diabetic clinic at King's College Hospital during the period 1950 to 1953, one of us (M. M. M.) found symptoms and signs of occlusive peripheral vascular disease affecting the lower extremities in 146 out of a total of 3,788.

These 146 cases have been analysed in order to determine the relationship between this condition and age, sex, and duration of diabetes.

Table I shows that symptoms and signs of peripheral arterial disease of the lower extremities were entirely

absent below the age of 40, and that there were only three cases between the ages of 40 and 49; thereafter the incidence rose sharply, being greatest above the age of 60. The same trend was observed in both sexes, although the incidence was greater in men.

TABLE I.—Incidence of Peripheral Occlusive Arterial Disease in Diabetes with Respect to Age and Sex

Age Group	Males per 100 Diabetics	Females per 100 Diabetics	Ratio Male/Female
20-29	—	—	—
30-39	—	1	2/1
40-49	2	2	2/1
50-59	4	4	2.75/1
60-69	11	5	4.6/1
70+	23	—	—

These results expressed as a percentage incidence of the diabetic population attending the clinic show that peripheral arterial disease was twice as common in patients of 70 and over as it was in the 60 to 69 age group.

Table II shows the relative sex incidence of occlusive vascular disease; it will be seen that male diabetics were much more commonly affected than females, especially in the older age groups.

TABLE II.—Age and Sex Distribution of Peripheral Occlusive Arterial Disease in a Population of Diabetics Attending King's College Hospital

Age Group	Male Distribution		Female Distribution		Total		Incidence in Diabetic Population
	Arterial Disease	Diabetic Population Used	Arterial Disease	Diabetic Population Used	Arterial Disease	Diabetic Population	
20-29	—	186	—	221	—	407	—
30-39	—	222	—	203	—	425	—
40-49	4	227	2	226	6	453	1.3%
50-59	11	280	9	531	20	811	2.5%
60-69	31	292	28	762	59	1,054	5.6%
70+	36	159	25	479	61	638	10.5%
Total	82	1,366	64	2,422	146	3,788	3.9%
Percentage	56	36	44	64	—	—	—

Peripheral Arterial Disease

It is significant that the incidence of symptoms and signs of peripheral arterial disease (Table III) appears to bear no relationship to the duration of the diabetes, the number of patients being approximately the same in all groups.

TABLE III.—Incidence of Peripheral Occlusive Arterial Disease in Diabetics with Respect to Duration of Diabetes

Duration of Diabetes in Years	No. of Patients
Less than 1	20
1-4	26
5-9	29
10-14	25
15-19	26
20 and over	20
Total	146

In a recent follow-up of some 250 diabetics in whom the disease began before the age of 15 and in whom it had been present for not less than 10 years, and in many for 20 or more, one of us (W. O.) was unable to find a single lesion attributable to occlusive vascular disease; this, of course, does not exclude the presence of such disease. In the great majority of these young diabetics the disease was severe and its control variable. In short, old age seems to be the common factor in these cases, and the duration, severity, and control of the diabetes of secondary importance. It would not, however, be true to say that lesions of the feet occur only in diabetics of 60 or over. Sepsis, perforating ulcers, and even gangrene are by no means uncommon below this age, but it has been assumed too readily that such conditions are due to peripheral arterial disease alone or combined with a lowered resistance to staphylococcal infection. Careful examination shows that the great majority of these comparatively young patients have a quite adequate blood supply as judged by peripheral arterial pulsation, oscillometry, and skin temperature tests, the common defect being diabetic neuropathy.

The importance of neuropathy in this connexion became apparent as a result of a detailed investigation of the incidence and manifestations of neuropathy in the diabetic department of King's College Hospital (Martin, 1952), in which there was observed to be a high incidence of septic and apparently ischaemic lesions in patients with severe neuropathy. Neuropathy, unlike retinopathy and most other diabetic complications, was found to be related less to duration than to control of the diabetes: this led to a reassessment of our older patients in whom lesions of the feet were often associated with diabetes of comparatively short duration. To our surprise we found that in most cases the increased incidence of lesions of the feet in diabetics could be explained by the superimposition of neuropathy on the degree of arterial disease common to non-diabetics of the same age and sex; the appreciation of this is essential, in our opinion, to a proper understanding of the aetiology and treatment of the diabetic foot.

Nature of Diabetic Neuropathy

In order to appreciate the part played by neuropathy in the production of lesions of the feet in diabetes, it is essential to understand something of the nature and manifestations of diabetic neuropathy.

Diabetic neuropathy is a degenerative condition of peripheral nerves occurring as a complication peculiar to the diabetic state. It affects mainly the nerves to the lower extremities at their periphery and is much more common than the published reports suggest.

Peripheral nerve involvement, although occurring in diabetics of all ages, is more commonly seen in the elderly, in whom the insidious onset of diabetes in middle and later life often results in long delay in diagnosis and treatment.

Neuropathic lesions of the feet are among the common complications for which such elderly diabetics may first seek medical advice.

Severe diabetic neuropathy, with extensive sensory loss and muscular weakness, may not be a frequent finding in smaller diabetic clinics, but less severe involvement of the nervous system characterized by pain, paraesthesiae in the feet and hands, calf tenderness, and vasomotor disturbances are commonly encountered. Although neuritic symptoms in the absence of physical signs have been regarded as distinct from diabetic neuropathy with its more permanent findings of peripheral nerve damage (Rundles, 1945), there is little doubt that they have a common aetiology (Martin, 1952).

The earliest phase in the development of diabetic neuropathy, characterized by diffuse and ill-localized pain, vasomotor disturbances, thermal paraesthesiae, changes in the tendon reflexes, and often alteration in pain sensibility in the feet without much impairment of perception of touch or pressure, is due to widespread degeneration of non-myelinated nerve fibres (Martin, 1952). The impairment of autonomic vasomotor responses and, to some extent, pain conduction due to interruption of the lower sensory neurone predisposes to excessive trauma and lowers tissue resistance (Lewis, 1927). Thus, even when the blood supply to such an area is intact, its tissues may be regarded as relatively ischaemic so far as the local defence and repair are concerned; this is the minimum degree of ischaemia which can be recognized clinically (Learmonth, 1953).

There is now a good deal of evidence that non-myelinated nerve-fibre degeneration occurs in a high proportion of diabetic patients, who, on clinical examination, show no evidence of "clinical" diabetic neuropathy (Martin, 1953). The presence in diabetics of such nerve-fibre disturbance explains the frequent finding of persistently cold feet and their proneness to traumatic lesions.

Cutaneous neuropathic changes commonly start as blisters about the tips of the toes or at the site of a corn or callosity in places constantly exposed to irritation by an ill-fitting shoe. Frequently the deceptive lack of normal sensation, and particularly pain sensation, leads the patient to ignore the lesion and delay treatment until secondary infection with deep penetration of the tissues or severe inflammation is present. The blood supply in many of these cases is quite adequate, and suitable local treatment, combined with good control of the diabetes, usually results in normal healing.

Classification of Lesions of the Feet.—For purposes of description it is convenient to divide lesions of the feet in diabetics into the following types (Oakley, 1954): (1) septic, (2) neuropathic, (3) ischaemic, and (4) combinations of 1, 2, and 3.

1. Septic Lesions

Uncomplicated sepsis produces essentially the same lesion in the diabetic as in the non-diabetic foot, and, apart from control of the diabetes, the treatment is the same, the chief measures being rest, drainage, and antibiotics.

2. Neuropathic Lesions

Loss or impairment of superficial sensation, and especially the appreciation of heat and pain, are important factors in the production of callosities, ulcers, and local gangrene. Loss of deep sensation may cause Charcot joints, while weakness of the intrinsic muscle may produce characteristic deformities which not only favour the formation of chronic ulcers but also add to the difficulties of surgical treatment.

A considerable number of diabetics complaining of their feet prove, on inspection, to have varying degrees of a quite typical deformity. The toes are held dorsiflexed at the metatarso-phalangeal joints with flexion at the inter-phalangeal joints, but these claw toes are never accompanied by the tight plantar fascia and short tendo achillis of fully developed pes cavus (Fig. 1). This deformity is often met with in the presence of an apparently normal circulation, but

is constantly associated with signs of neuropathy. An excessive keratinization of the horny layer of the skin is also usually present, although these last changes are minimized by regular attention. The cocked-up position of the toes is that into which they would be drawn by simultaneous contraction of the long flexors and extensors with the normal balancing force of the intrinsic muscles removed. The association of this deformity with sensory disturbances lends colour to the belief that this deformity is indeed a manifestation of a peripheral motor neuropathy. Proof of this



FIG. 1.—Typical deformity of toes associated with diabetic neuropathy.



FIG. 2.—Pressure gangrene of big toes associated with diabetic neuropathy.



FIG. 3.—The same patient as in Fig. 2 after conservative treatment.

contention is difficult, since the established deformity is often so stiff that electromyography is useless, and biopsy, for obvious reasons, is not lightly undertaken.

Such a foot produces symptoms sometimes attributable to ruthless shoe-pressure on a numb foot. Areas of superficial necrosis can appear with dramatic suddenness, but, provided further pressure is avoided, usually heal uneventfully (Figs. 2-3); in the case of the decubitus ulcer on the heel the patient should be confined to bed and the limb suspended until healing is well advanced.

In the presence of stiff and deformed toes the absence of the normal heel-and-toe movements in walking places

an abnormal thrust on the metatarsal heads, and the underlying neuropathic skin passes inexorably through the stage of ugly callosities to the formation of indolent ulcers (Fig. 4).

Treatment

These changes are only hastened by the use of appliances which, unable to affect the shape of the foot, become mere space-occupying lesions in the shoe. It cannot be emphasized too strongly that the use of any appliance inside the shoe in the presence of stiff toes will precipitate the very disasters it is intended to prevent. Appeasement can be obtained only by shoes made to measure, although a rocker bar on the sole may help in mimicking a normal heel-and-toe movement.

Once deep perforating ulceration has occurred, surgical intervention is essential. The object of the operation is to

remove the underlying bony pressure point and obtain skin cover without tension. Suture of the wound is permissible only when there is ample skin cover, no sepsis, and an adequate blood supply as judged by the haemorrhage at operation. Fortunately placed incisions, however, with or without primary Thiersch grafting, will allow rapid healing provided that the bone section has been radical enough. The problems presented by the neuropathic foot rarely carry an immediate risk to life, and consideration must be given to the long-term effects of the bone section proposed, since removal of more than one of the three middle toes will always result in further deformity, with the formation of new sites of pressure. If more than one toe has to be removed amputation of all five toes at once leaves a more shapely foot with a far better prospect of useful life. The "moccasin" prosthesis described by Downie (1956) seems to solve the problem of the aftercare of these feet.



FIG. 4.—Perforating ulcers of sole of foot in diabetic neuropathy.

3. Ischaemic Lesions

The generalized ischaemic lesion unassociated with neuropathy is not so common as is generally supposed, and must be differentiated from the local ischaemic disaster in an essentially neuropathic foot. The recognition of ischaemia is based on the history, clinical examination, and special tests. Pain of a burning character, worse at night and aggravated by heat, is suggestive of ischaemia but by itself does not exclude neuropathy; associated intermittent claudication greatly favours a diagnosis of ischaemia. The foot is typically cold and may be pale or pink, the latter colour being the more often associated with pain. The skin is often smooth, hairless, and shiny, and there may be trophic changes in the nails. Arterial pulsation may be absent at any level below the femorals, but inability to palpate posterior tibial and dorsalis pedis arteries does not necessarily mean that the blood supply to the foot is seriously inadequate. The intelligent use of the oscillometer is often helpful in this connexion, and, although it gives no information about the blood supply below the ankle, it is of considerable value in assessing the level of arterial patency above this level. Skin temperature tests are difficult to interpret, but, as one of us (M. M. M.) has shown, when used in conjunction with intravenous vasodilators such as

tolazoline hydrochloride they may be of considerable value in differentiating between arterial occlusion and vasomotor disturbances associated with neuropathy.

X-ray films of the lower limbs for arterial calcification are of little value in estimating arterial sufficiency, but arteriography provides more accurate and precise information than any other single test; it is, however, not readily available in the majority of cases, and is a somewhat specialized technique. The diagnosis of ischaemia can usually be established without the use of this test.

The two main manifestations of ischaemia in the diabetic foot are pain and gangrene; pain may be associated with gangrene or occur independently as the painful ischaemic foot.

Painful Ischaemic Foot.—This clinical condition is almost confined to the old, and usually affects both feet, although not necessarily to the same degree. The affected foot is typically cold, pink, and intensely painful, especially in bed at night. Gangrene of one or more toes may supervene, but is often absent or long delayed.

Treatment

Treatment is most unsatisfactory; vasodilator drugs are ineffective, the only conservative measures of any value being local cooling, analgesics, and hypnotics. Sympathectomy seems to relieve the pain in some cases, but amputation is the only reliable method of treatment, and is often carried out at the request of the patient.

Gangrene

True ischaemic gangrene usually starts in the distal phalanges of one or more toes and is often painless. Purple discoloration leads to the formation of a terminal black patch which tends to extend proximally, and, so long as there is no infection, causes little discomfort to the patient; severe pain is suggestive of a superadded infection. The lesion may remain localized or may, if untreated, spread so as to involve the skin of the dorsum of the foot; when this occurs local surgical treatment must give place to more radical amputation. The single dry gangrenous toe presents a serious problem, and the decision must be made whether to leave the gangrenous area to separate or to remove the toe.

In our experience the former policy carries with it certain definite disadvantages and dangers. In the first place, the length of time required for separation is always a matter of weeks and often months; secondly, there is the risk of extension of the lesion on to the dorsum of the foot; and, last but not least, infection may supervene. Furthermore, if the patient is confined to bed there is the very real possibility that the combination of pressure and ischaemia may result in ulceration of the heels, while the practice of allowing the patient to be up and about exposes the affected area to the danger of trauma and sepsis. For these reasons it is usually wise, in our opinion, to remove the single gangrenous toe by disarticulation, the wound being left open and allowed to granulate; primary suture is undertaken only if the bleeding at operation indicates the presence of a reasonably good blood supply and if the skin edges can be approximated without tension. In this connexion special mention must be made of ischaemic lesions situated over the heads of the fifth metatarsal; these are commonly due to pressure from tight-fitting shoes.

Such lesions present a special problem, as amputation of the fifth toe together with the head of the metatarsal bone often leaves a raw area for which it is impossible to provide any adequate skin cover, the patient being left with a chronic ulcer for which the only effective treatment is amputation of the leg. It is in such lesions that it is vitally important to distinguish between ischaemic and neuropathic ulceration, for in the latter the blood supply is often good enough to allow of the raw area being covered by a skin graft. In the case of the big toe, skin cover presents less difficulty, as it is usually possible to preserve a flap of skin from the

surface of the toe, which can be used to cover the site of amputation. When more than one toe is involved it is generally better to amputate all five toes by separate racket incisions, the resulting foot being functionally sound and rarely a source of further trouble. When the area of gangrene extends proximally beyond the toes on to the dorsum of the foot, local amputations are likely to prove unsuccessful, and amputation of the leg is the only reliable method of treatment. Various types of transmetatarsal and transtarsal amputations have been advocated as a means of avoiding amputation of the leg.

Such operations, in our experience, have seldom proved successful, the reason being that, in order to obtain a functional stump, closure of the wound is essential; such closure can very rarely be made without tension or the risk of tension from post-operative haematoma or sepsis. For some years it has been our practice at King's College Hospital to carry out such amputations below the knee. This operation has almost completely replaced the older practice of amputation above the knee in the treatment of diabetic gangrene, and represents one of the most important advances in the surgical treatment of this condition.

Amputation in the Diabetic

Before describing the technique for below-knee amputation, laid down by Silbert (1944), certain general rules of procedure for amputations in the diabetic subject are worthy of consideration.

(a) Expert general anaesthesia is essential, local analgesia being clearly impossible; we have had no experience of freezing in this connexion, but consider it contraindicated by the devitalized state of the ischaemic tissues. Many patients are bad operative risks and so demand the highest anaesthetic skill.

(b) No sort of tourniquet should ever be used on these limbs at any level or in any circumstances.

(c) Pressure points must be protected before, during, and after the period of anaesthesia. The skin of these avascular limbs is very fragile, and the disaster has befallen us of having a patient submit to amputation only to find, on recovering consciousness, that his hitherto good foot had a black heel. All bony points must be supported on a soft foam-rubber pillow throughout the whole period of narcosis; the ordinary "sorbo" mattress on the operating table is not soft enough.

(d) Tension must be avoided during and after operation. This is the only key to success, and conditions the entire design and performance of the operation. We are convinced that it is tension, often due to over-ambitious attempts at skin suture, which precipitates the so-called post-operative spread of gangrene; such tension must at all costs be avoided.

Below-knee Amputation

In the past eighteen months 50 below-knee amputations have been carried out by Silbert's technique in the diabetic department at King's College Hospital without a single re-amputation or a single death attributable to operation.

The operation is done through a circular incision 7 in. (18 cm.) below the knee. The skin is reflected up very gently for 2 in. (5 cm.) and the muscles are divided by a guillotine incision at this level. Blood vessels are ligated and the dissection continued in the subperiosteal layer until a 4-in. (10-cm.) tibial stump is obtained; the fibula is divided at a slightly higher level. The anterior border of the tibial stump is bevelled, and the soft tissues are allowed to fall down over the cut ends of the bones. The stump is bound up in gauze impregnated with petroleum jelly, the skin edges being turned in over the raw area, and the limb supported on a plaster trough extending well up the thigh. On the tenth day the patient is given an anaesthetic, and the stump is inspected; if there is any doubt about sepsis, healing is allowed to take place by granulation, but if, as usually happens, all is well, a delayed primary suture is carried out. Healing may then be expected in about three weeks.

4. Combinations of 1, 2, and 3

The coincidence of sepsis, neuropathy, and ischaemia presents an urgent and desperate problem which merits special consideration.

The sepsis usually arises in the forefoot where shoe-rubbing is most marked, and, since treatment by rest will involve putting the patient to bed with the foot supported on slings to prevent skin necrosis of the heel, gravity encourages the natural tendency of the infective process to spread into the hindfoot. In the surgical treatment of such an abscess really radical incisions arranged to divert the gravitational flow on to the skin of the sole are essential, and enough bone must be removed to allow the edges of the wound to fall together without tension. In our experience the filling-in of large dead spaces by granulation rarely occurs on account of the ischaemia, and the only hope of preserving the foot lies in obtaining early healing of the skin with an absolute minimum of raw area. We have also found that, if the primary drainage, although apparently satisfactory, proves within a few days to have been inadequate, a useful result seldom follows a second attempt at

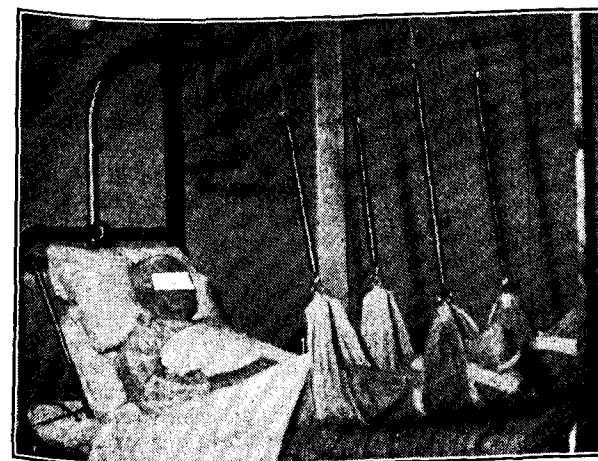


FIG. 5.—Spring suspension of lower limbs.

local drainage. Under these circumstances we are convinced that, if there is not good evidence of healing within ten days, a below-knee amputation should be advised to save the patient an indefinite period of pointless suffering. The treatment of suppurative tenosynovitis or web-space infection is so disappointing that signs of sepsis in an ischaemic toe should be regarded as a most urgent indication for local disarticulation; optimistic expectancy will often cost the patient his foot.

Whether the condition be due to neuropathy, ischaemia, or to a combination of these two factors, there is always the danger that, with the patient in the supine position, pressure on the heels may cause blistering, ulceration, or gangrene. For many years this complication has constituted a serious problem in the treatment of lesions of the feet in diabetes, and not a few limbs have had to be amputated on this account. For the past two years it has been our practice to suspend the lower limbs of all such cases (Oakley, 1954), and as a result we have not since had a single serious heel lesion in any patient. Each limb is swung a few inches above the mattress by means of two long springs, such as are used by the physiotherapists, the tension of the springs being 30 to 50 lb. (13.6 to 22.8 kg.), according to position and weight of the limb (Fig. 5). The slings are specially made of canvas lined with orthopaedic felt; a strap attached to the distal sling is passed round the sole of the foot to prevent the development of an equinus deformity. We regard this as a major advance in the management of diabetes with neuropathic and ischaemic lesions of the feet, and believe that this type of suspension should be used as a routine in the treatment of all such cases.

Discussion

From a long and wide experience of the treatment of lesions of the feet in diabetes we are convinced that the most important factors are the age of the patient, neuropathy, and ischaemia; sepsis is usually a complicating factor, and, in the absence of neuropathy or ischaemia, never gives rise to gangrene. Gangrene itself is of two types: one due to a localized arterial thrombosis resulting from trauma in a foot desensitized by neuropathy, and the other to generalized occlusive arterial disease; this second type may or may not be associated with neuropathy, and sepsis may complicate both types.

When the foot lesion is the result of neuropathy, and there is an adequate blood supply to the foot as a whole, local surgical measures with or without skin grafting give excellent results; when, however, there is generalized occlusive vascular disease, local surgery is attended by the serious risk of chronic ulceration, and more radical surgery, such as below-knee amputation, is likely to be required to cure the condition. The close relationship between age and the incidence of foot lesions in the diabetic, and the absence of any such relationship between duration and severity of diabetes, would appear to cast doubt on the generally accepted view that diabetes is itself a common cause of occlusive peripheral arterial disease. The high incidence of neuropathy seems to us to explain, in part at any rate, why lesions of the feet are more common in diabetics than in non-diabetics of comparable age; the susceptibility of the poorly controlled diabetic to staphylococcal sepsis may also be of some importance in this connexion.

Summary

The incidence of lesions of the feet in the diabetic population attending King's College Hospital Diabetic Clinic has been related to sex, age, and duration of diabetes.

Attention is drawn to the importance of neuropathy, alone and in association with ischaemia, as a factor in the production of localized ulceration and gangrene.

The treatment of lesions due to neuropathy and ischaemia is described, and the value of such operations as removal of all five toes and below-knee amputation are emphasized.

A method of protection of the heels in patients confined to bed is described and illustrated.

Reasons are given for doubting the validity of accepting the high incidence of so-called vascular lesions of the feet in diabetes as evidence that this disease by itself commonly causes peripheral occlusive vascular disease.

We would like to thank the editors of the *Proceedings of the Royal Society of Medicine* and of the *Annals of the Royal College of Surgeons of England* for permission to reproduce Figs. 2 and 3, and Fig. 5 respectively.

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PITFALLS IN MEDICINE*

BY

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How often are we wrong? One searches in vain for precise information pointing to the error-proneness of physicians, surgeons, and general practitioners. Some indication of consultant fallibility is offered by Scandinavian analysis based on a thousand consecutive necropsies. This reveals 67 completely faulty diagnoses and a higher number of incomplete assessments of the morbid processes during life. Carcinoma of the stomach and bacterial endocarditis in old people rank high in the list.

Mistakes largely due to vagaries of disease rather than to faulty approach by the physician can be traced as a rule to unusual patterns of symptoms—less often to puzzling physical signs.

Misleading Symptoms: Coronary Artery Disease

Rather surprisingly, perhaps, we find coronary artery disease may present in such strange ways, or be mimicked so closely by other conditions, that it provides a formidable pitfall even for those who devote themselves to diseases of the heart. A few case histories may be of interest.

A middle-aged man ran over a common in pursuit of his dog. He was pulled up short by intensely unpleasant pain across the middle of the chest. He walked home slowly, the pain abating in the meantime, but not disappearing until he had rested in bed for two days. Seen by a cardiologist on the second day, he was told he had angina pectoris and probably coronary thrombosis, in spite of a normal electrocardiogram. At the end of a week a further pain seized him in the same position, this time radiating into the left arm. It now fluctuated in intensity, but did not completely disappear even at rest. X-ray examination revealed carcinoma at the root of the left lung.

A man of 52 sought guidance on whether he had angina pectoris. His pain was felt across the chest at the level of the third and fourth ribs. It was constricting in character, never coming on during exercise, of which he took plenty, but occurring only when sitting in his chair. A complete overhaul and an electrocardiogram revealed no abnormality. He died three months later of coronary thrombosis.

Another man of 53 about to re-marry complained of pain on exertion of type and distribution typical of angina pectoris. There were no physical signs of disease and his electrocardiogram at rest and after exercise was normal. He was alarmed by being told that he had angina and must greatly restrict his activities. He married nevertheless and became a father, and had no attacks after the first day of his honeymoon, which was now seven years ago. Presumably fear of inadequacy produced these symptoms, but how is this to be distinguished from such a case as the following?

A man of 58 years was seized with agonizing constricting pain across the chest. He became pale and sweaty and the pulse was feeble and rapid. His blood pressure was 90/60. His doctor diagnosed coronary thrombosis and injected morphine. A cardiologist a few hours later agreed, but noted normal E.C.G. Apart from a little left pectoral soreness next day the man felt well. There was no pyrexia, leucocytosis, or raised sedimentation rate during the following week. The B.P. returned to his normal of 136/72 and

*The second of two Croonian Lectures delivered at the Royal College of Physicians of London on May 1 and 3, 1956. The first lecture was published last week (p. 895).

the electrocardiograms taken on the third and the eighth day were normal. His domestic background was that he had been at loggerheads with his wife for the last 10 years, and the doctor suspected that this might have in fact precipitated an attack simulating organic disease. He was a little short of breath after this seizure, and five weeks later the whole attack was repeated, as also were the normal findings. The obvious alternatives of gall-stone colic and hiatus hernia were excluded. He then went for a sea voyage and felt well, noticing, however, a little substernal tightening if he played deck tennis. Six months after the first attack he was seen in London, where he added to the above history that pain would occur in the usual anginal site if he walked quickly up an incline such as Regent Street. Electrocardiographic tracings failed to show deviation from the normal even after exercise. The general clinical examination revealed no disease. X-rays of the heart were likewise normal. He was told, nevertheless, that he suffered from angina pectoris and was advised to go slowly. He died suddenly in the street three weeks later, thus providing invaluable necropsy evidence. He had an extensive anterolateral infarct of the heart, a slight degree of coronary atheroma, but no sign of earlier infarction and no diffuse fibrosis of the myocardium.

Are his first two prolonged seizures to be attributed to coronary spasm? If not, how can we explain the remarkable course of events? How well this illustrates the enduring value of diagnosis based on symptoms in the face of contradictory instrumental revelations.

A different outcome is shown by a woman of 54 years who on exposure to cold winds, hurrying to catch a bus, or walking sharply after a meal, noticed what she described as a tight pain under the mid-sternum. She would then stand still, belch and recover, but if she walked quickly the pain would recur. A full clinical examination was unrevealing. The electrocardiogram was normal. She stressed that the pain never occurred except under the conditions I have mentioned. Angina pectoris was then diagnosed, but with a cautious afterthought that it was unusual in the female. This led to a cholecystogram which revealed gall-stones. Her appetite was unimpaired; she enjoyed rich food and never suffered from flatulent dyspepsia. Surgery has cured her.

Although the association of gall-bladder disease and angina has been recognized for half a century, it is seldom that such whole-hearted mimicking is encountered. Had the patient been a man it is doubtful whether the cause would have been searched for.

A retired bank manager of 62 suffered from recurrent pain in his front teeth. His doctor and dentist rendered him edentulous. He then had the pain in the jaws. The presence of pyorrhoea and lack of care in anamnesis directed attention to the wrong part of the body. In fact, the pain occurred only when he rolled the lawn, and was clearly anginal. The only occasion when it was felt in the chest was in the final fatal attack.

Here I will leave coronary disease, with a reminder in passing that spells of faintness or dizziness in old people are as often as not due to bundle-branch block and not, as is commonly supposed, to cerebral arteriosclerosis.

The Appendix

Passing to the digestive system in search of strange symptoms, we find, possibly with surprise, that appendicitis heads the list. The classical symptoms and signs of the disease are so well known that, when present, diagnosis is immediate; but what is not fully appreciated is that this organ may give rise to the most diverse and misleading symptoms with but few physical signs—for instance, pyrexia of unknown origin, ushered in with a little diarrhoea may be traced to a retrocaecally placed inflamed appendix. To this I would add two other examples.

One of these is a septicaemic variety in which the appendix lies in the pelvis, the offending organ being thus difficult

to affect by palpation through the abdominal wall. The onset of slight and transient abdominal discomfort, followed by swinging temperature, sweating, leucocytosis, shivering and rapid pulse, may well be all for several days. Rectal examination does not necessarily help at first. It is only by dogged perseverance and re-examination of the patient that the answer may be revealed, remembering always that the first symptom of a disease is, as a rule, the most helpful in elucidating the cause. Usually by the fifth day there is obvious tenderness on rectal examination. At operation one may find the appendix lying in the pelvis with a little serous effusion around it and thin vascular adhesions which have not adequately shut it off from the peritoneal cavity.

The other peculiar position of the appendix which causes trouble is when that organ runs upwards along the side of the ascending colon and, if unusually long, is actually attached to the liver or gall-bladder or to the transverse colon. In this position the inflammation causes severe high epigastric pain with tenderness over the gall-bladder, thus leading to the diagnosis of acute cholecystitis. Here a clue to the true nature of the trouble may be given by studying the course of the pain as it subsides. It usually moves downwards towards the right iliac fossa, whereas gall-bladder pain never moves in this direction.

Appendicular colic in the adult is diagnosed more often than not as colon spasm. The sudden intense pain felt across the mid-abdomen, lasting for perhaps half an hour and leaving no trace in its wake, is not readily explained. Only if the patient is seen in an attack is tenderness at McBurney's point likely to be found. The bouts occur at irregular intervals, often of long duration, and the complete freedom from discomfort between seizures lulls the practitioner into a sense of false security. Eventually the condition reveals itself by a frank attack of appendicitis, but not necessarily in less than several years.

A physician well known for his care and sound judgment told me that of 60 persons whom he had regarded confidently as sufferers from colon spasm no fewer than nine proved in fact to be suffering from appendicular colic and achieved cure through surgery.

Pancreas

Next to the appendix, the pancreas provides the majority of intra-abdominal pitfalls for the unwary, or indeed for the wary. The diagnosis of carcinoma of the head of the pancreas is usually a simple matter, because it is so commonly associated with increasing jaundice in the absence of pain. Occasionally, however, the common bile duct is not occluded by carcinoma, and a vague deep-seated discomfort may be the sole symptom to draw our attention to the abdomen. An x-ray film of the alimentary tract may be revealing to eyes which are trained to look, in that the loop formed by the duodenum is appreciably widened by the growth.

More difficult and more common problems associated with the pancreas, however, are presented when the carcinoma develops in the body. Here we have backache as a sole symptom, and it may be the only one for many weeks or even months before the true nature of the disease is clear. It has a peculiarly distressing boring nature and is felt in the upper lumbar region, although occasionally it is experienced between the shoulder-blades. It is not obviously affected by movement and does not as a rule radiate in any direction. It is just a persistent unpleasant backache felt day and night. Tenderness of the vertebrae is not present, neither is there abdominal tenderness. X-ray films of the spine and alimentary tract are normal. Examination of the stools is usually fruitless, and it is quite likely that the serum amylase will be found to be of normal value. No wonder, then, that so many of these patients are regarded as neurotic, and only later, when they start to lose weight or develop metastases in the liver, or when the growth spreads along to the head and causes jaundice, is

the organic cause of their symptoms apparent. Sometimes the growth spreads in the other direction, through the tail, and we may be faced with the puzzling condition of a deep-seated abdominal pain and an enlarged spleen. Enlargement of the spleen is due to direct involvement of that organ with growth or to invasion of the splenic vein. Direct spread from pancreatic carcinoma may be upwards towards the diaphragm and produce pain in the lower chest or even in the shoulder and downwards behind the peritoneum, so that it may in fact cause, as a presenting symptom, sciatica. It is fortunate that these symptoms and signs are associated with a disease for which little can be done in any case.

A woman of 60 was troubled with bouts of copious vomiting unaccompanied by pain. There was no recognizable pattern to her emesis, for it might occur twice in one day and then disappear for three or four days. An x-ray examination after a barium meal gave no clue to the nature of the trouble. There was no blood in the stools. Opinions on her condition were sharply divided. In the bouts she presented a picture of pyloric obstruction, and she had in fact lost weight. At this stage she was admitted to hospital under a physician who was much drawn to the study of psychosomatic disorders. On more than one occasion she was demonstrated as a classical case of hysterical vomiting. Later, under another influence she was subjected to laparotomy, and an unusual cause for such seizures was found. It was carcinoma which had so enlarged the head of the pancreas that its pressure produced obstruction, varying no doubt with her posture, of the second part of the duodenum.

Neuroses of the Digestive System

From time to time we meet patients who suffer from flatulent dyspepsia, a feeling of distension after food, and on occasion attacks of quite severe pain in the epigastrium which come on suddenly and which may last for two or three hours and then pass off, leaving a certain soreness in the upper abdomen. Sometimes, the next day, they are a little jaundiced. They are usually women, commonly in the late thirties. Examination between attacks will reveal some tenderness in the usual position of the gall-bladder, and in an attack it may be extreme.

It is not surprising that a diagnosis of cholecystitis and probably gall-stones is made, yet a normal cholecystogram may render this improbable. These patients form a section of a large and interesting group of individuals who do appear to suffer from spasm, here and there, of the various viscera. I have already mentioned that this diagnosis is a dangerous one, and we should be constantly on our guard against attributing to simple spasm what may be due to some serious disease. If there should be a history of headache, and if it be typically migrainous in character, then it is not far-fetched to attribute the condition to abdominal migraine. Presumably the fact that jaundice occasionally follows indicates that there is a true spasm of the sphincter causing a temporary hold up in bile flow.

Far more common than these cases of apparent cholecystitis are the bouts of colon spasm. It is wise to be chary of such a diagnosis unless the attack is felt on the left side of the abdomen, and unless, in a bout, the colon has been felt to be a hard, tender cord. It is unusual for colon spasm to involve the ascending colon, and only a little more usual for it to affect the transverse colon. We must never forget that the gut may go into spasm as the result of underlying disease. There is a form of spasm which can provide a great diagnostic difficulty. This is a ring contraction of the colon.

A middle-aged woman, known to be of anxious temperament but hard-working and capable, was seized with obstinate constipation, colicky abdominal pain, and inability even to pass flatus. Purges had been found unhelpful, and an enema had been returned uncoloured. Examination showed distension of the abdomen, a typically large intestinal distension, and an empty rectum. A

diagnosis of acute obstruction was made, the cause probably being diverticulitis or carcinoma. A barium enema showed a ring constriction about the level of the anterior superior spine on the left side which was confidently diagnosed as a string carcinoma. Nevertheless, the suddenness of onset without previous history is so uncommon in carcinoma that the surgeon in charge refused to be panicked into operation and ordered the administration of a bile enema. This resulted in copious emptying of the bowel, and a later x-ray examination showed a completely normal gut.

The reverse of the picture was provided by a man of 60 who had been having attacks of left-sided abdominal pain, colicky in nature, associated with intermittent constipation. He did not pass blood or mucus. The history was very suggestive, therefore, of partial obstruction of the large gut. Carcinoma was diagnosed on the symptoms, although the physical signs were unrevealing. A barium meal was given and followed down into the large intestine. At the junction of the descending and iliac portion there was some narrowing and hold-up of the meal, but a little had trickled through distally. No obvious irregularity pointing to growth could be observed. The radiologist's view was that this was suspicious but that he could not commit himself without a barium enema. This was carried out and the colon seen to fill well. The man was told that he had colon spasm. A month later he was seized with acute pain which was due to perforation of the large gut above a carcinoma of the colon.

This example illustrates the value of a clinical appraisal as opposed to specialized investigation, and also sets at naught the argument used by some radiologists that it is pointless to follow the barium meal beyond the ileo-caecal region, in that reliable information about the colon can be obtained only from a barium enema. This is utterly false, because they do not take account of the effect of a large amount of barium on the gut. When it is run into the colon it acts powerfully as a distensor, and an irregularity such as was shown in this case when the barium reached the bowel by the normal route is completely obliterated by hydrostatic pressure. The man's life could have been saved if that point had been appreciated.

Gall-bladder

The gall-bladder, like the appendix, has by no means a constant position in the abdomen, although it is less capable of wandering than is the latter. When it is in its customary position, inflammation or stone will as a rule produce the typical symptoms and signs. At other times, however, it lies a long way lateral to its usual point and may give rise to pain, not across the epigastrium, but well to the right side. Although visceral pain is usually felt fairly symmetrically across the middle line, at times the inflammatory process causes it to coincide with the actual position of the organ by involvement of the parietal peritoneum. Thus a gall-bladder placed laterally, the fundus lying approximately in the continuation of the anterior axillary line, is especially prone to cause acute pain in the right side of the chest aggravated by breathing and suggestive of pleurisy. As there is associated inhibition of the diaphragm, it is only a matter of an hour or two before impairment of resonance over the right lower lobe can be detected, as the result of the air's being rapidly absorbed from the partially immobilized lung. The physician may therefore be faced with a patient breathing rapidly and shallowly, clearly in pain, with diminished movement of the right side of the chest and impairment of resonance, and tenderness over the tip of the eleventh rib. It is not unknown for him to make a diagnosis of pneumonia with diaphragmatic pleurisy, when in fact the basic lesion lies in the abdomen. For the first 24 hours it may be extremely difficult to make a diagnosis on clinical grounds, and an x-ray film of the lungs will also be of no help in distinguishing this manifestation of cholecystitis from pneumonia. Acute pneumonia does not necessarily show in an x-ray picture in the first 24 hours. From then on the diagnosis becomes easier because there is an

absence of the normal adventitious sounds one would expect in a right basal pneumonia, the respiration rate tends to fall rather than to rise after the initial acceleration, there is no flushing of the face, and indeed jaundice may appear.

Gall-bladder disease may simulate so closely that of coronary thrombosis as to present an obstacle to diagnosis. This is especially so if the organ be medially directed. The pain may be constricting in nature and felt across the lower third of the chest and not in the abdomen at all. The patient will probably be of the same build and age that commonly is affected by one or the other disease. He may well be pale, sweaty, and vomiting in either. The blood pressure and pulse may not be affected by coronary thrombosis for several hours. When it comes to examination of the abdomen there will be tenderness over the area of the gall-bladder, but in acute coronary thrombosis there may be sudden congestion of the liver with expansion and stretching of the capsule. The distinction between liver and gall-bladder tenderness is not easy to recognize in an individual groaning in pain. On paper the differential diagnosis is easy; in practice it has felled more than one expert physician and surgeon. It should be remembered that there is a practical side to the differential diagnosis, because nowadays the treatment of acute cholecystitis is highly effective by the use of suitable antibiotics, whereas the administration of morphine is unwise when we bear in mind that its normal action is to cause a great rise of intrabiliary pressure.

Diaphragmatic Hernia

Heartburn, for many years an inexplicable form of indigestion, we now know to be more often than not due to reflux of acid contents into the oesophagus as the result of hiatus hernia. The fact that this has been overlooked for so long is as much of a reproach to physicians and radiologists as the inability to grasp the mechanical nature of sciatica was a discredit to us and the orthopaedic surgeons. Nowadays this presents no particular pitfall except by confusion with the phrenic ampulla. The para-oesophageal hernia is still providing a number of diagnostic mistakes in respect of anaemia. This form of hernia is often associated with a high-grade hypochromic or, rarely, a normochromic anaemia, which will on occasion respond to full doses of iron but sometimes is most intractable until surgical correction of the abnormality has been performed.

Peptic Ulcer

I shall not dwell on peptic ulceration, for the features of this condition, whether in the oesophagus, stomach, or duodenum, are well known, although perhaps it is not so widely appreciated, except by those who have practised our art for many years, that the distinction between gastric and duodenal ulcer on clinical grounds is not nearly as easy and straightforward as is suggested by the textbooks. I would like to refer to an extraordinary reflex from duodenal ulceration which I have met only five times in a series of 800 cases, and that is pain felt entirely in the lower abdomen but relieved by food and present when the patient is hungry. These patients have been trustworthy witnesses. There was in fact no suspicion of epigastric pain. Pain in two was felt in the hypogastrium, in three in the left iliac fossa. The explanation, I think, is revealed by the finding in these three, by x rays, of a ring spasm of the descending colon which was extraordinarily persistent. The barium had been taken by mouth, and when this spasm was seen the stomach was empty; when the patient was given a glass of milk to drink the abdominal pain vanished and signs of spasm also disappeared. When there was a relapse in two cases the spasm recurred. We are familiar with a reverse form of reflex in which acute lesions of the large gut cause pylorospasm and vomiting, but that which I have just described can be claimed to be a rarity.

Only twice in thirty years have I seen obstructive jaundice caused by a chronic duodenal ulcer. In one example the diagnosis was suggested by an associated profuse melaena

which had been attributed to the haemorrhagic tendency induced by such icterus. In point of fact obstructive jaundice never gives rise to appreciable melaena.

In both cases the common bile duct was found to be greatly distended, a state which was shared by the gall-bladder. The ulcer was close to the junction of the first and second parts of the duodenum, though in the former. The obstruction was not due to invasion of the bile papilla but due to inflammatory thickening and oedema of the gut wall. It is surprising that this is not commoner.

Diarrhoea

The symptom which is the most difficult to associate with a firm diagnosis at a single consultation is diarrhoea. Of the serious causes carcinoma comes to mind, and it is particularly the growth which is difficult to discover which is most likely to cause it without pain and without the passage of blood and mucus obvious to the naked eye. Carcinoma of the caecum seems singularly evasive to radiological investigation. From time to time a lump may be felt in the right iliac fossa, but on other occasions this sign has disappeared and the physician is apt to assume that he has just felt a loaded caecum, and an opportunity for a life-saving operation is lost.

No unexplained case of diarrhoea should be allowed to pass from observation without the most careful examination, and if all appears normal except for persistence of occult blood we should not shrink from laparotomy. If the diarrhoea be associated with anaemia the diagnosis of carcinoma in this position is made highly probable. In fact, the presenting symptoms here may be shortness of breath with pallor, only trivial reference being made to loose stools. Taking, however, the cases of diarrhoea as the only presenting symptom—that is to say, where no pain is felt—although occasionally we find the cause lies in uraemia or Addison's disease, the majority prove to be simply those of intestinal hurry. My impression is that this is increasing and possibly is associated with the apparent increase in states of anxiety which we see.

The story, then, is usually that for many years the stools have tended to be rather on the loose side and to occur especially on rising in the morning and perhaps once or twice after breakfast; there is peace for the rest of the day. As years pass the diarrhoea becomes a little more frequent, there is no associated anaemia occurring after all meals. There is no associated weight loss, but there is a feeling of exhaustion. Radiological examination by barium meal will show a remarkably rapid transit of barium from mouth to anus. The stomach is usually hyperactive, emptying itself in a quarter to half an hour, the caecum is reached in anything from half an hour to three hours, and the barium arrives at the splenic flexure a short time afterwards. As a rule these patients are not suffering from any profound disturbance of the psyche, but are those of intense personality, ambitious, hardworking, never relaxing in mind, and seldom taking exercise for the body. They carry their problems home with them and their work occupies them at week-ends. When they go on holiday they take the unwise of all—namely, in car-driving from one part of the Continent to another. In the minority we trace the matter to gnawing anxiety, which seems to reflect itself on the alimentary tract. Apart from dealing, if one can, with such underlying anxiety, the physical approach to this, which is nearly always successful, is the administration of one of the many drugs that will delay the rate of passage through the alimentary tract. Of the traditional remedies a combination of hyoscyamus and codeine will often prove effective, and in the more stubborn cases the powerful parasympatholytic agent tricyclamol will succeed.

Prognosis and Misleading Physical Signs

Failure in respect of prognosis dogs us throughout our professional life. This must always be so, for there are too many imponderables influencing the course and outcome of a disease to allow of accurate forecasting. Although a

fair degree of certainty can be expressed in relation to carcinoma of the stomach, motor neurone disease, pneumonia, and many other afflictions, cardiovascular diseases vary so greatly from patient to patient in their lethal power that it is wise to be a little vague and usually to lean towards optimism. Statistical evidence is singularly unhelpful in assessing the individual problem. My impression is that the physicians of the earlier generations who relied solely on experience and their five senses were far more accurate in their prognoses than most of us who practise to-day.

A remarkable example of prognostic failure was occasioned by a business man highly successful in his financial dealings, aged 59, limited in activity by virtue of visual defect, happily married, and living in comfort. He developed headaches, drowsiness, thirst, occasional loose stools, nausea, and loss of weight. His doctor, who examined him, found that the urine was of fixed low specific gravity (1004); it was loaded with albumin and contained some granular casts. The blood urea was 76 mg. per 100 ml., rising in a month to 110 mg. The blood pressure had risen from his normal of 150/80 to 190/106. The urea clearance test revealed 18% of normal function. He concluded that his patient had chronic nephritis, a view which was endorsed by the consultant to whom he brought the case. In the course of the next three months the symptoms became worse. Albumin was found in considerable quantity in nearly all specimens of urine. A bad prognosis was given. It was thought that the patient would die within the next three months. He was instructed in the traditional lines of dieting for chronic nephritis, and he followed these with care. After a week or two he asked his doctor if the consumption of Worcestershire sauce was in any way harmful. It seemed that he had been taking from half to one bottle of it daily for many years. He said he did so because he liked it. Whatever the reason for his consumption of this enormous quantity, the fact remains that he did take it as a beverage. It was promptly stopped. Within a month the albumin and casts disappeared, the blood pressure and the blood urea had returned to normal, the patient rapidly put on weight. Two years afterwards, he is symptomless, and the only sign of latent renal disease is occasional albuminuria. So far as I know, this is unique. It is, I think, an error in prognosis which might be forgiven.

Lumps in the upper left quadrant of the abdomen cause more trouble in diagnosis than masses elsewhere in the body, not only to the inexperienced but to physicians and surgeons of many years' standing. A slowly enlarging mass appearing from under the left costal margin, dull to percussion and seeming to have a well-defined edge, often proves to be a retroperitoneal sarcoma. The absence of a notch is a small point—that is to say, the finding of a notch stamps it as a spleen, or usually does, although I will give you an example in a moment where even this fails. Even in considerable splenomegaly it is not always possible to feel it. Furthermore, a very large spleen can be felt bimanually, the other hand being in the loin, and confusion with an enlarged kidney is readily made. It is a matter of interest to observe how few candidates for the Membership recognize polycystic kidneys, usually calling the left one spleen and the right one an enlarged liver.

A woman who had suffered from pernicious anaemia for many years started to go downhill, to become anaemic in spite of the usual treatment, and to lose appetite. She was known to have had a gastric ulcer many years previously. On examination, apart from signs of anaemia, she was found to present a lump which emerged from the left hypochondrium and which moved with respiration. It was firm to the touch and not completely dull, but had not the resonance of gut or stomach. It could not be felt in the loin and there was a notch on the inner border. It was postulated that this was a spleen enlarged from pernicious anaemia, which had escaped control owing to a faulty preparation of liver. I should add that this case dates to the days when only liver injections were available and were of varying quality. In spite of changing to more recent and highly potent preparations, she continued to go downhill

and the lump increased in size to an extent never met with in a spleen of pernicious anaemia. To cut a long story short, she had a carcinoma of the stomach. The point of special interest here is that at necropsy it was found that she had, as it were, a notch in the stomach, and it had been produced by cicatricial contraction arising as a result of a chronic gastric ulcer which had healed years previously and thus simulated the general structure of the spleen. This is a difficulty which is not likely to be met often.

A young man fell from his motor-cycle and cut his leg. His doctor administered antitetanic serum. Ten days later the patient noticed stiffness in the movement of his jaw, and pains and muscular aching in the back and limbs. The onset of all symptoms was simultaneous: this highly significant fact was overlooked at a hospital where he was given antitetanic serum intravenously on the strength of a misdiagnosis of tetanus. He died promptly of anaphylactic shock.

The confusion between serum sickness and tetanus is by no means uncommon, though fortunately not as a rule leading to such a lethal result.

The physical signs presented by changes inherent in old age will from time to time mislead the unwary. Petechial haemorrhages, anaemia, tremor, albuminuria with casts, bouts of giddiness, to mention but a few of the common manifestations of advancing years, are apt to lead the less experienced into searching for some far more serious cause than the march of time. We must remember also the great frequency with which degenerative changes occur in the spine in individuals over 50, and in fact with every ten years of age after that period of life the incidence of spondylosis mounts very rapidly. Although modern work has revealed the remarkable manifestations which may be directly due to cervical spondylosis, many of them in the neurological field, I observe here the same overswing of diagnostic enthusiasm that we met in connexion with the lumbar disk lesion. In the last year I have seen attributed to cervical spondylosis such diverse conditions as intraspinal tumour, senile tuberculosis of the spine, motor neurone disease, carcinoma of the stomach with metastases in the spine, and poliomyelitis.

Conclusion

I have purposely refrained from discussing failure to recognize rare diseases—in the first place because, for obvious reasons, this is uncommon, and, secondly, because it provides no help in facing the problem of rarities encountered in the future.

Lurking, however, in the diagnostic undergrowth are traps set by the appearance of well-known physical signs, which are usually, but not always, associated with readily recognized diseases. The examples which come to mind are atrial fibrillation as the first sign of bronchial carcinoma, and the clinical picture of Cushing's syndrome from the same cause.

Idiopathic thrombophlebitis migrans is very rare, but the accepted physical signs may be perfectly reproduced by metastases in the venous walls. This so often proves to be the case that every apparent example of the disease should be searched for primary growth, which in instances I have witnessed occurred in bronchus, pancreas, and rectum. Thrombophlebitis migrans may also herald in its recurrences over several years the ultimate development of thromboangiitis obliterans, just as the reverse process may be seen. In fact, a clear-cut distinction between these arterial and venous inflammatory states is no longer tenable.

Self-criticism is far more important than criticism of others, for, although we may learn by their mistakes, to criticize them directly or obliquely in the presence of colleagues or patients is surely the one unforgivable sin.

Criticism, writes Matthew Arnold, is a disinterested endeavour to learn and propagate the best that is known and thought in the world.

It is in that sense that I have endeavoured to pay tribute to William Croone.

DEVELOPMENT AND EVALUATION OF A POROUS SURGICAL DRESSING

BY

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This paper discusses the properties required of the ideal surgical dressing and describes the development, laboratory investigations, and clinical trials of a new dressing which largely meets the requirements.

Minor skin injuries result in a major national problem both in industry and in the home. It has been estimated that in this country nearly half a million skin injuries occur each day which require at least a first-aid dressing (Squire, 1951), but it is not possible to determine the working time lost and the inconvenience caused by lacerations, abrasions, incisions, puncture wounds, and small burns, particularly those minor injuries which occur and are treated in the home. The healing time of a wound is dependent on many factors, not the least of which is the type of dressing employed.

The functions of a dressing are to allow a coagulum to form and so prevent loss of tissue fluid, to protect the wound from further injury while it is healing, and to prevent infection.

When the epidermis is penetrated, damage of the dermal blood supply occurs, with loss of blood to a greater or less extent. Loss of tissue fluid by itself can result through damage of the deeper layers of the epidermis. Hartwell (1955) confirmed the view of Arey (1936) that the healing of human wounds depends primarily on the migration of the cellular elements of the epidermis across the damaged area, division of cells of the basal area of the epidermis being only of secondary importance. This migration of cells is dependent on a healthy dermal layer, free of infection and debris. Sepsis may ensue, following the introduction of organisms at the time of injury, by the passage of infected material through the dressing, during dressing procedures, and from the skin surrounding the wound. Dehydration of the protoplasm of the epidermal cells is essential for proper keratinization. It is important that wound dressings allow the evaporation of water vapour from the wound area. Beneath a dressing a considerable quantity of water can accumulate which arises (a) from the sweat glands of the skin surrounding the wound; (b) from normal insensible water vapour loss due to its transudation through the epidermis and from the dehydration of epidermal cells; and (c) from loss of tissue fluid from the wound itself.

Burch and Winsor (1944) showed that 1.63 g. of water is lost per square metre of the body surface every 10 minutes at a relative humidity of 50% and with an

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ambient temperature of 24° C. This would represent approximately 235 g. per square metre per 24 hours. They also found that the loss of tissue fluid from the floor of a blister raised by cantharides is nearly 10 times greater. Thus, from their figures, a dressing would need to have a porosity of 2,350 g. per square metre per 24 hours. This high porosity is, of course, needed only for that small area of the dressing which corresponds to the area of the wound. Bloom (1945) used waterproof vapour-permeable "cellophane" in the treatment of war wounds and stated that secondary infection was prevented. Bull, Squire, and Topley (1948) showed that if normal skin was covered with a dressing of a water-proof but vapour-permeable "nylon"† film, and the seal between the dressing and the skin was maintained for three days or more, *Staphylococcus aureus* could not be recovered from the area under the porous part of the dressing and that maceration of normal skin was prevented.

Schilling, Roberts, and Goodman (1950) reported that wounds covered with the nylon† film dressing healed more quickly than comparable wounds covered with an occlusive dressing. They left the nylon† dressings *in situ* till healing occurred, but changed the occlusive dressing after the first three days and then daily. Heifetz, Lawrence, and Richards (1952) noted that considerable epithelial debris accumulated under dressings after the third day, and they suggested that keeping dressings on for longer periods might have an adverse effect on wound healing. We have found that the healing rate of a wound appears to be delayed if the dressings are not changed after the first 24 hours following injury.

Properties of Ideal Dressings

The ideal dressing, which may be a composite structure—that is, a covering film plus a pad—should possess the following properties (Scales, 1954). (1) It should have a high porosity to water vapour, preferably at least 1,400 g. per square metre per 24 hours, measured at 37° C. with a relative humidity of 75% (P.A.T.R.A. (1948) tentative standard method). (2) It should not adhere either to blood clot or to granulating surfaces, nor should it allow the penetration of capillary loops. It must, however, absorb free blood or exudate and give "protection" to the wound. (3) It should be a barrier to the passage of micro-organisms. (4) It should be capable of following the contours around a joint during movement—for example, flexing of a finger. (5) It should be unaffected by domestic or industrial fluids—for example, detergents and oils. (6) It should not produce a tissue reaction when applied to normal skin or granulating surface, nor a state of allergy or hypersensitivity. (7) It should be non-inflammable. (8) It should be capable of being sealed to the skin. (9) It should be capable of being sterilized. (10) It should be available at a low cost.

The properties which the dressing should possess depend on the extent of the loss of the epidermal cell layer and of the damage to the dermis, and the events that occur following injury and during healing of a wound. With present materials it is impossible to produce the ideal dressing and it seems likely that future dressings will be a compromise. The dressing described in this paper has certain properties not possessed by any existing dressing. Plastic film dressings have certain advantages over traditional fabric dressings, but they also possess certain undesirable features—for example, the occlusive waterproof dressing causes maceration of the skin surrounding the wound and an increase in the bacterial flora of normal skin. Both nylon and cellophane are insufficiently permeable and flexible.

†Imperial Chemical Industries Limited C109/P nylon.

Microporous Polyvinyl Chloride Film

For some time a rigid microporous polyvinyl chloride sheet containing intercommunicating cavities has been manufactured as a separator for lead-acid batteries and as a filtration medium. Its porosity can be readily varied from 40 to 6,000 g. of water vapour per square metre per 24 hours at 37° C. and 75% relative humidity, by varying the particle size, the quantity of the filler, and the method of manufacture. The sheet is manufactured by incorporating a pore-forming ingredient such as starch or salt into the plastic mass prior to extrusion of the sheet. This pore-forming agent or "filler" is then removed, leaving a structure the porosity of which depends on the number and size of the intercommunicating pores between the cavities.

A microporous film which has been made flexible by the incorporation of a plasticizer and having a porosity of the order required for dressing purposes is unlikely to be a perfect bacterial filter under all conditions. The filler would have to be of a constant particle size and shape and be evenly dispersed throughout the plastic mass. If the pores are less than 1.5 μ , due to a molecular film of plasticizer on the surface of the pores, adhesion of the walls may occur with loss of porosity. Flexing and stretching of the film will also alter the dimensions of the pores. Owing to the large surface area exposed by a microporous structure, the usual phthalate type plasticizers were found unsuitable as they migrate into the adhesive mass and are removed by detergents and solvents. The dressing-film described is plasticized with a polymeric plasticizer—polypropylene sebacate.

Determination of Permeability to Water Vapour

The water-vapour permeability of the film was determined by the gravimetric dish method. Dishes containing anhydrous granular calcium chloride (mesh 10–14) were covered by a known area of the film and weighed. They were placed in a humidity cabinet at 37° C. and 75% relative humidity, with a wind speed in excess of five miles an hour. The rate of transmission of water vapour was found from the rate of increase in weight of the desiccant.

At 37° C. and 75% relative humidity the vapour pressure is 46 millibars. Since the atmosphere between the film and the desiccant is nearly dry, the water-vapour-pressure gradient across the film approximates to that given below for January.

The average atmospheric water-vapour pressure in January at 4.4° C. and 80% relative humidity is 6.7 millibars. In July, at 16.7° C. and 60% relative humidity, it is 11.4 millibars. Thus the water-vapour-pressure gradient across the dressing would be 44.6 millibars in January, and 39.9 millibars in July.

It has been found that there is a linear relationship between the permeability of the porous film and the relative humidity at a constant temperature.

The values for the porosities of the films used in the experiments are expressed as the number of grammes of water vapour which pass through a square metre of the film at 37° C. with a relative humidity of 75%, or a water-vapour-pressure gradient of 46.6 millibars.

Types of Dressings Used in Clinical Trials and Laboratory Investigations

Eighty different batches of material have been investigated in the development of this film. Only certain aspects of three of these are reported in any detail here. No. I was used in the investigation on normal skin flora and for the laboratory tests, and Nos. II and III were used in the clinical trial on wound healing. The porosities of these films are given in Table I.

An assessment of the value of dressings using these films was made by comparing them with a standard waterproof

TABLE I

Dressing	Porosities of Dressing	Film Ref. No.
I	1,400-1,800*	M.P.F. SNB/739/1
II	2,300-2,900	M.P.F. Film SN
III	1,000-1,500	M.P.F. Film SNA
IV	38-43	O.F. standard waterproof occlusive (control)

* A dressing with a porosity of 1,400-1,800 is now being marketed by Smith and Nephew Limited under the name of "elastoplast airstrip."

dressing of the type approved by the Chief Inspector of Factories. This occlusive dressing, No. IV, was completely spread with adhesive and had a base film of polyvinyl chloride plasticized with dibutyl phthalate; it was found to have a very low porosity.

Fig. 1 shows a porous dressing. The adhesive is spread in the form of a lattice which occludes approximately 50% of the porous film. It has been found technically very difficult to produce a dressing with the portion of the film beneath the pad free from adhesive. Thus the actual porosities of the film before they are lattice spread are approximately double the values quoted. All dressings carried a bleached knitted cotton interlock pad. For the investigation on normal skin flora half the number of dressings used were impregnated with 0.1% domiphen bromide B.P.C. Domiphen bromide has not been shown to produce any tissue reaction, allergy, or hypersensitivity reaction when applied to skin or minor wounds, and is itself a mild antiseptic in the concentration used. A trace of auramine was included to colour the pads yellow, so that those impregnated could be easily differentiated from the unimpregnated. This substance, in the dilution used, has been shown to have no bacteriostatic or bactericidal action. In the clinical trial the pads of all dressings were impregnated.

Effectiveness of the Dressing as a Bacterial Barrier

Sterility of Dressings

With the exception of those used in the clinical trial all dressings were sterilized by electron irradiation with a dosage of two mega rads, using a Van de Graaf electrostatic generator. The dressings are taken on a conveyor belt under the scanned electron beam. The output of the machine is sufficient to allow the required dosage to be given in about one second. This treatment seems to have no effect on the physical or chemical properties of the constituents of the

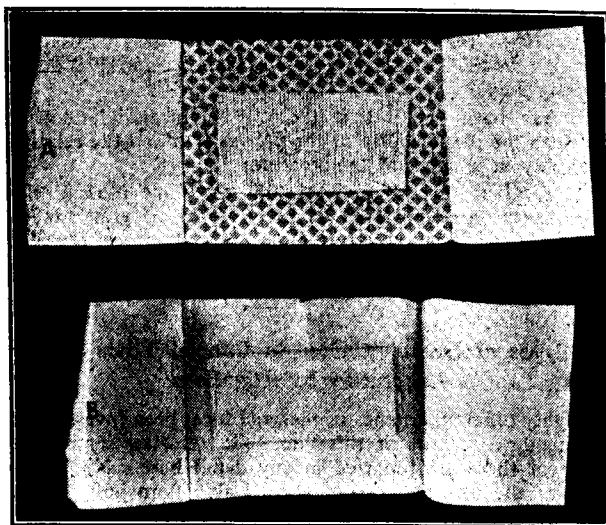


FIG. 1.—A, Pattern spread microporous dressing. (M.P.F. of text.) B, Standard occlusive waterproof dressing. (O.F. of text.)

dressing. Samples of each type were incubated in nutrient broth for four days at 37° C. No growth was obtained from any of the 35 samples tested. The dressings were sterilized by this method because half of them contained no domiphen bromide.

In the clinical trial non-irradiated dressings with impregnated pads were used. Twenty representative dressing pads were tested and found to be sterile.

Filter Test. Method I

The porosity of the microporous film dressing used was between 1,400 and 1,800 (film No. I) and that of the standard waterproof occlusive film between 38 and 43 (film No. IV). Both types carried impregnated pads. The apparatus was sterilized and set up as shown in Fig. 2 A with 2 ml. of sterile broth in the chamber. The outer surface of the dressing was contaminated by: (1) A swab dipped in 1:100 dilution of an 18-hour culture of the Oxford staphylococcus (8 tests, 4 with No. I and 4 with No. IV). (2) A swab dipped in 1:100 dilution of an 18-hour culture of *Ps. pyocyanea* (4 tests, 2 with No. I and 2 with No. IV). (3) A swab dipped in 1:100 dilution of an 18-hour culture of *E. coli* (2 tests, 1 with No. I and 1 with No. IV). (4) A wound swab infected with *Staph. pyogenes* and *Ps. pyocyanea* (2 tests with No. I). (5) A wound swab infected with *E. coli* (2 tests with No. I). (6) A swab of the scum from a washing-up basin (2 tests with No. I). (7) A swab of floor dirt (2 tests with No. I). (8) Coughing directly on to the exposed surface of the dressing (2 tests with No. I).

The tubes were incubated at an angle of 45 degrees in a moist atmosphere at 37° C. for 18 hours. The inner surface of the dressing-pad was then swabbed and plated, and the dressing-pad removed and dropped into sterile broth and incubated for 48 hours.

Results.—It was found that most of the broth diffused through the microporous film, though the dressing remained firmly adherent to the flange, but not at all through the waterproof dressing. No recovery of test organisms was obtained from any pad or pad swabbing. This test was designed to produce in a crude fashion the contamination to which hand dressings might be exposed. The number of tests of this nature was small (24 in all), but showed that under these conditions the microporous dressing acted as a bacterial barrier.

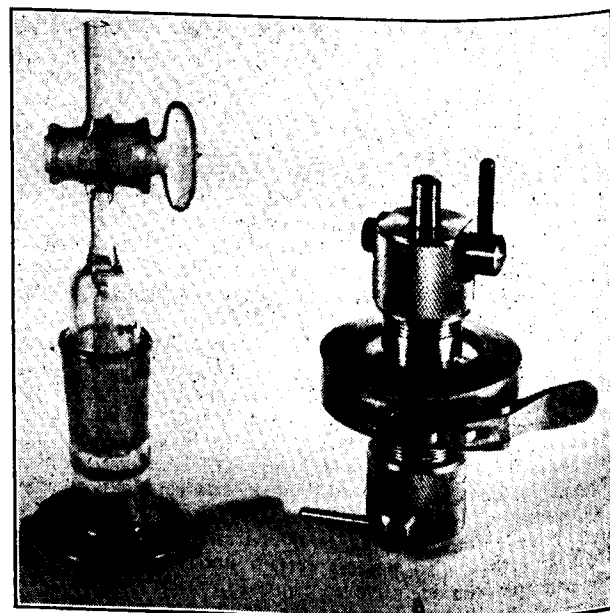


FIG. 2.—A, Glass filter, used in method I, with dressing on flange. B, Stainless steel apparatus, used in method II. Dressing clamped between two flanges, held together by toggle clamp.

Filter Test. Method II

In this test the conditions were far more stringent. The dressing was clamped between the flanges of two sterile stainless steel chambers, fitted with taps through which samples from either side of the membrane could be taken. Then 10 ml. of sterile broth was placed in the chamber on the pad side of the dressing and 10 ml. of an 18-hour culture of the Oxford staphylococcus in the chamber covering the outer surface of the dressing. The assembled apparatus (shown in Fig. 2 B) was incubated in a horizontal position at 37° C. Samples were taken at hourly intervals from the chamber containing the sterile broth. These were plated and examined after 24 and 48 hours' incubation at 37° C. Tests were made with No. I dressing carrying impregnated and non-impregnated pads.

TABLE II.—Results with No. I Dressing

Hours									
1	2	3	4	5	6	7	8	18	
Impregnated Dressings									
—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
Unimpregnated Dressings									
—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—

— No growth. + Recovery of test organism.

Results.—From Table II it can be seen that the No. I dressing in this experiment acted as a barrier to the passage of the Oxford staphylococcus for a period of seven to eight hours. (The domiphen bromide appears to have played no part in these experiments.) The broth acted as a wetting agent on both surfaces of the film. In neither of the tests was movement of the film possible. When a layer of cotton interlock impregnated with 0.1% domiphen bromide is substituted for the microporous film, organisms are recovered from the "sterile" side of the filter from one hour onwards. No samples were taken from the chamber before one hour.

Effect of Impregnation of Pad, etc.

Fig. 3 A shows the diffusion of the domiphen bromide in the agar and the inhibition of growth of the Oxford staphylococcus. Fig. 3 B shows the reduced zone of inhibition when the test is repeated using a blood-agar plate. Variations in the zones of inhibition have been found with different types of agar base. For all work on normal skin flora and laboratory investigations swabs were plated on Oxo agar. In the case of the clinical trial the swabs were plated on blood agar.

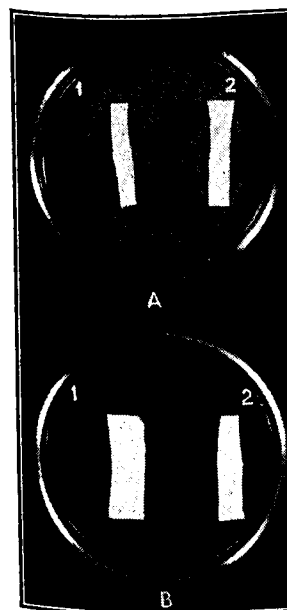


FIG. 3.—A, No. I dressing with stockinet pads. 1, Unimpregnated. 2, Impregnated with 0.1% domiphen bromide. B, Plain agar plate (Oxo). Inhibition of activity of domiphen bromide by blood incorporated in the agar.

Normal Skin : Bacteriological Studies

In order to compare the effect of a microporous film dressing (M.P.F.) with an occlusive film type of dressing (O.F.) on the bacteria of the skin, the following procedure was carried out. The normal skin flora of both forearms of 39 male and female patients, who were either ambulatory or confined to bed, was determined by daily swabbing for four or five consecutive days. The swabs were moistened with sterile saline and well rubbed over the flexor surfaces of both forearms and wrists. The swabs were plated on Oxo agar and incubated in 7%–10% CO₂ at 37° C. Final readings were made after 48 hours. The results are shown in Tables III and IV. Fig. 4 shows classification of growth.

TABLE III

No. of Patients Swabbed	Total No. of Swabs Examined	No Growth	Scanty	Heavy
39	346	25 (7.2%)	220 (63.6%)	101 (29.2%)

TABLE IV.—Distribution of Normal Flora in 346 Swabs

Coagulase + Staph.	Coagulase - Staph.	Other Micrococci	Other Organisms: Diphtheroids, Coliforms, Aerobic Spore-bearers
21 (6.1%)	276 (79.7%)	262 (75.7%)	23 (6.6%)

Four types of dressings were used: (1) No. I, with non-impregnated pad (M.P.F.), (2) No. I, with impregnated pad (M.P.F.), (3) No. IV, with non-impregnated pad (O.F.), and (4) No. IV, with impregnated pad (O.F.). The day before using the dressings the forearms were shaved. Twelve dressings, three of each type, were applied, care being taken that no one group was on the same forearm, otherwise a random distribution was made. One of each type of dressing was removed at 24, 48, and 72 hours. Swabs were taken from the area of the skin under the dressing-pad; these were plated, incubated, and examined as before.

From Fig. 5 it can be seen that the bacterial growth obtained from the skin is reduced when covered by a microporous film carrying the impregnated pad, compared with that obtained from under the occlusive film with a similar pad.

Fig. 6 shows results obtained when neither of the pads were impregnated, but the porosities of the two films differ. There is a marked increase in growth obtained from skin covered by the occlusive dressing. Table V expresses as

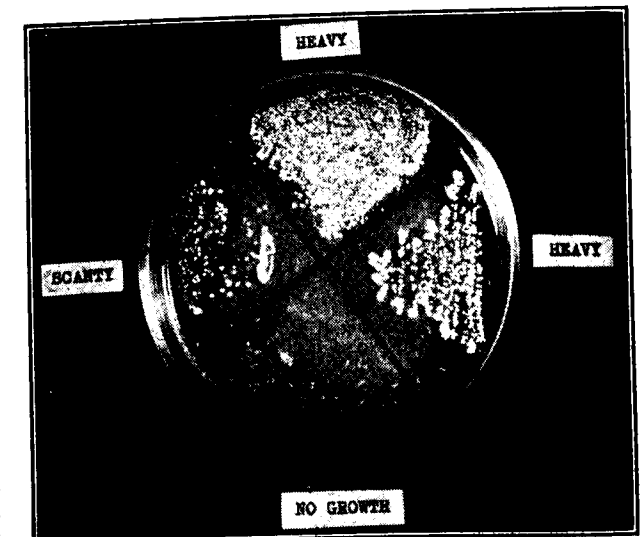


FIG. 4.—Classification of type of growth.

a percentage the number of swabs from which no growth was obtained. It can be seen that there is a marked rise in the number of "no growth" swabs obtained from the skin under the microporous film.

Coagulase-positive staphylococci were recovered 21 times (6.1%) from the 346 swabs obtained from normal skin. They were never recovered from the skin under the microporous dressing with a non-impregnated pad. The low

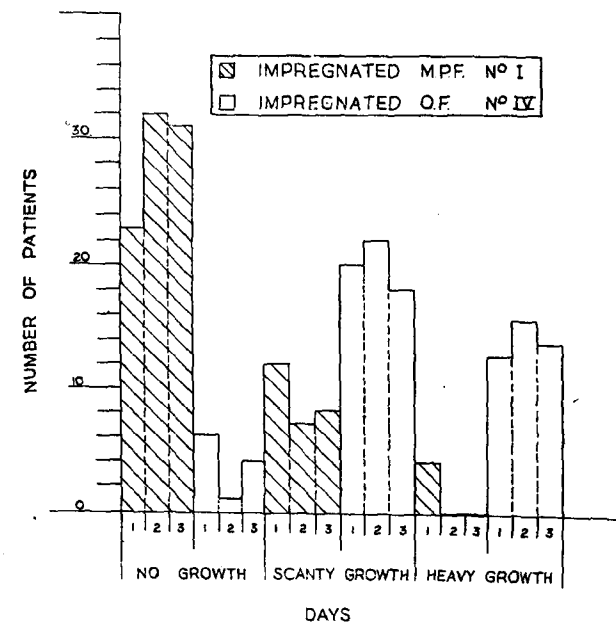


FIG. 5.—Comparison of bacterial growth from skin covered with impregnated M.P.F. No. I and with unimpregnated O.F. No. IV.

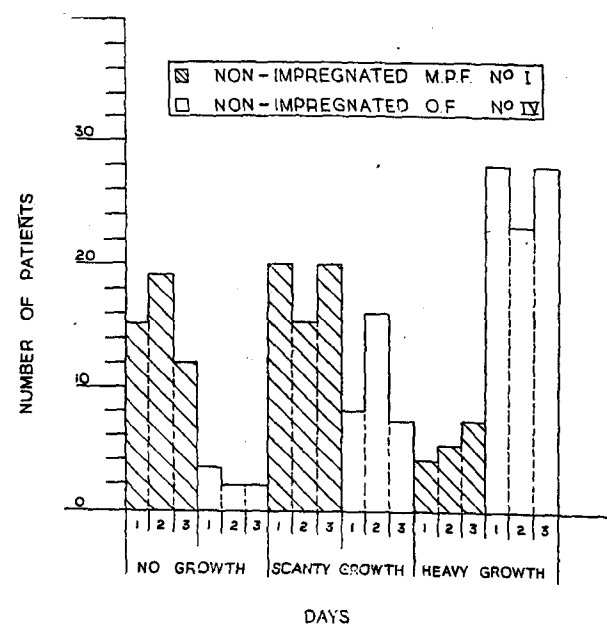


FIG. 6.—Comparison of bacterial growth from skin covered with non-impregnated M.P.F. No. I and with non-impregnated O.F. No. IV.

TABLE V.—No Growth Recovery Rate Expressed as a Percentage

	24 Hours	48 Hours	72 Hours
Normal skin ..	7.2%	—	—
M.P.F. non-impregnated ..	38.5%	48.5%	31%
.. impregnated ..	59%	82%	74%
O.F. non-impregnated ..	7.5%	5.1%	5.1%
.. impregnated ..	15.3%	2.55%	10.2%

incidence on normal skin may be due in part to the fact that this hospital is situated on the top of a hill and the wards are light and well ventilated, and the patients spent much of their time in the open air during this investigation.

Clinical Trial

During the course of the work on microporous dressings several clinical trials have been undertaken to assess various factors. The small trial reported here was carried out at the Body Repair Depot of the London Passenger Transport Board Executive at Aldenham, Hertfordshire, in June-July, 1955.

The object of the trial was to compare the healing of minor injuries treated with microporous film dressings with a similar group treated with standard waterproof occlusive dressings. In particular it was desired to obtain information regarding (1) the healing-times of wounds, (2) the state of the skin under both types of dressings, (3) the opinion of the users, and (4) the changes in the bacterial flora under the dressings.

Method

The patients were employed by the London Transport Executive and by contractors working on the site. Those who had sustained an injury one hour or less previously were treated in the factory surgery. If a dressing had been applied by one of the first-aid workers in the factory, these patients were not included in the trial.

For bacteriological purposes a sterile swab moistened with saline was taken before cleaning the skin with methylated ether. Excess blood and dirt were removed; no cleaning agents such as cetavlon were used.

So far as possible alternative patients were treated with M.P.F. dressings. The remainder were treated with O.F. dressings. Where applicable a tube gauze protective dressing was applied, or a cotton bandage. Certain injuries—for example, those on the forehead and buttock—could not be covered.

The patients were asked to report at the end of the shift for a clean protective covering if their job was a particularly dirty one. They were asked to leave the protective covering on until seen the next morning. At week-ends each patient was given sufficient bandages and asked to keep the dressing covered. Dressings were removed at 24-hour intervals during the working week. The wound was swabbed with a sterile swab moistened with saline and a new dressing applied.

Most of the employees worked a five-day week, and hence the wound examined on Friday morning was not seen again until the following Monday morning—a period of three days. A few of the employees were examined on Saturday and Sunday. All patients were asked to report back to the surgery at once if their protective dressing came off. The wound was judged to be healed when, in the opinion of the sister, the wound could be left without a dressing.

After approximately 30 patients had been treated with M.P.F. No. II dressings, the lower porosity No. III dressings were used on all new patients. A standard "tick" form was used to record all data. This was done to reduce personal opinion to a minimum.

Selection of Cases and Method of Assessment

A total of 113 wounds were treated—59 had M.P.F. Nos. II/III dressings and 54 had O.F. dressings. Of these, 12 with M.P.F. and 17 with O.F. dressings were rejected from the series because the patients discontinued to report (mainly because of absence or holidays) or because they re-dressed the wound themselves. Two cases, originally dressed with O.F., were excluded as, owing to excessive granulation or maceration, the dressings were changed to M.P.F.

The number of wounds finally used for the assessment of healing times was 47 with M.P.F. II/III and 37 with O.F. dressings. A number of these healed over the week-end or

TABLE VI.—Sites of the Injury

	M.P.F.		O.F.	
	Week-end Healing		Week-end Healing	
	No	Yes	No	Yes
Finger ..	18	2	15	7
Hand ..	6	3	3	1
Wrist ..	3	1	2	0
Forearm ..	5	1	4	1
Face ..	1	3	2	0
Leg and thigh ..	3	1	1	1
Total ..	36	11	27	10

after an absence of a day (Table VI) and have thus been excluded from the healing-time figures, as they could have healed at any time during these three days.

As dressings on the fingers have a more harsh treatment than on other sites, the finger wounds are considered separately.

Finger Wounds

Healing-time (excluding those healing over a week-end).—M.P.F.: 18 wounds, average healing-time 4.1 days, standard deviation 2.1. O.F.: 15 wounds, average healing-time 6.3 days, standard deviation 3.0. This difference is just significant ($t=2.3$, $P=0.03$). This indicates that M.P.F. is better than O.F. for finger wounds. The two series were examined with respect to other factors which might affect healing-times; there was no appreciable difference in any aspect (Table VII). All but two fingers with either type of dressing

TABLE VII

	M.P.F.	O.F.
Total dressings ..	18	15
No. near joint ..	10	5
Protected by cotton bandage ..	16	13
No. stitched ..	0	0
Type of wound:		
Puncture ..	1	2
Incision ..	10	9
Laceration or abrasion ..	5	3
Burn ..	2	1
Length of wound:		
0-1 in. (0-6 cm.) ..	7	5
1-2 in. (0.6-1.25 cm.) ..	6	8
2-3 in. (1.25-2.5 cm.) ..	5	1
Unrecorded ..	0	1

were covered with a cotton bandage to protect the dressing. This had a greater adverse effect on M.P.F., as when the bandage became saturated there could be no drying of the skin and wound underneath the dressing, thus reducing one of the main advantages of the microporous film. The average healing-time of finger wounds with this protective bandage was 4.4 days for M.P.F. and 6.3 for O.F. Those wounds on the fingers which healed over the week-end had an average healing-time of 5.0 days under M.P.F. (2 cases) and 8.0 days under O.F. (7 cases).

Condition of Wound and Skin.—The condition of the wound and skin was recorded after cleaning the wound and before the initial dressing, and again at each renewal of the dressing. From Table VIII it can be seen that the skin surrounding wounds dressed with M.P.F. was never soggy. At

TABLE VIII

	M.P.F.	O.F.
Total No. ..	20	22
Before initial dressing:		
Wound clean ..	20	21
Skin dry ..	19	21
During healing:		
Wound:		
Dry ..	14	11
Moist ..	5	9
Soggy ..	0	2
Unrecorded ..	1	0
Skin:		
Dry ..	18	2
Moist ..	1	3
Soggy ..	0	17
Unrecorded ..	1	0

each change of M.P.F. dressing it was noticed that some wounds were reopened because of adhesion. This did not occur under the O.F. dressing, because the wound remained moist. There were no cases of skin reaction under either the pad or adhesive of either type of dressing covering fingers. There was one case of clinical sepsis, a finger covered by an O.F. dressing.

Patient's Opinion.—During the course of treatment the patients were asked their opinion of dressings that had been applied. The replies favoured the M.P.F. dressing (Table IX), but since it is a new type of dressing this novelty may have affected the answers.

TABLE IX

Opinion	M.P.F.	O.F.
Poor ..	0	2
Satisfactory ..	0	11
Good ..	16	9
Unknown ..	4	0
Total ..	20	22

"Other Sites" Wounds

Healing-time (excluding those healing over a week-end).—M.P.F.: 18 wounds, average healing-time 6.3 days, standard deviation 3.0. O.F.: 12 wounds, average healing-time 5.1 days, standard deviation 2.5. This difference is not statistically significant. It is interesting to note that the four leg wounds in these groups had the longest healing-time of all wounds, three were in the M.P.F. series with healing-times of 9, 10, and 13 days, and one in the O.F. series taking 9 days to heal. This partly accounted for the higher M.P.F. average for "other sites." Another factor which influenced the healing-time was that 11 of the 18 cases treated with M.P.F. were lacerations, compared with 4 of the 12 treated with O.F. dressings. It has been found that adherence of dressings to wounds is most pronounced in the case of lacerations and abrasions.

Condition of Wound and Skin.—In this assessment all wounds, including those healing over the week-end, are given (Table X). There was no case of clinical sepsis among the

TABLE X

	M.P.F.	O.F.
Total dressings ..	27	15
Before initial dressing:		
Wound clean ..	24	13
Skin dry ..	27	15
During healing:		
Wound:		
Dry ..	19	10
Moist ..	8	3
Soggy ..	0	1
Unrecorded ..	0	1
Skin:		
Dry ..	26	9
Moist ..	1	3
Soggy ..	0	3
Skin reaction:		
Under pad ..	0	0
Under adhesive ..	0	4

"other sites." The relatively wet state of the skin under O.F. during healing was noted, but there was actually a greater proportion of dry skins under O.F. for "other sites" than for fingers. There were four cases of skin reaction under O.F. dressings and none under M.P.F.

Patient's Opinion.—The patients' opinion of the dressings are shown in Table XI. The opinions are less divergent for the two types of dressings for "other sites" than for the finger group.

TABLE XI

Opinion	M.P.F.	O.F.
Poor ..	2	1
Satisfactory ..	2	5
Good ..	23	7
Unknown ..	0	2
Total ..	27	15

Healing-time

With finger wounds, those covered with an M.P.F. dressing had a significantly shorter average healing-time than those with an O.F. dressing. With wounds on "other sites" the reverse was the case, but the difference here was not statistically significant.

In this and other trials the present type of dressing-pad tends to adhere to the wound when it is covered by a microporous film in situations where free evaporation is possible. In finger dressings the pads never completely dried out. There was no statistical difference found in the healing-times of the wounds under the two types of microporous film used in the treatment of the 47 patients.

Bacteriological Methods and Results

Methods and Materials.—(1) Cotton-wool swabs moistened in sterile saline were used to take wound swabs (a) initially before any cleaning or dressing, and (b) immediately after the old dressing was removed at the daily inspections. (2) 2% blood-agar plates: the swabs were plated and incubated aerobically and anaerobically at 37° C. Final readings were made after 48 hours. (3) Coagulase production by staphylococci was tested by slide/tube method.

Results

Of the 80 cases which were swabbed initially, 39 (49%) produced no growth. Twenty of these 80 cases were rejected for various reasons. The remaining 60 were divided into three groups—those receiving M.P.F. dressings II and III, and those receiving the control O.F. dressings. The results are given in Table XII.

TABLE XII

Type of Dressing	Initial Swab		24-hour Swab		48-hour Swab	
	Growth	No Growth	Growth	No Growth	Growth	No Growth
II (15 cases)	8	7 (47%)	8	7 (47%)	5	10 (67%)
III (14 ")	10	4 (28%)	12	2 (14%)	11	3 (21%)
IV (31 ")	14	17 (55%)	26	5 (16%)	27	4 (13%)

It can be seen from Tables V and XII that when normal skin and wounds are covered with a microporous film carrying a pad impregnated with 0.1% domiphen bromide, the "no growth" recovery rate is increased. It also appears from the results that the higher the porosity of the film the lower the recovery rate of organisms from the wounds.

No *Staph. pyogenes* was isolated from any wound swabbed initially or during the first 48 hours of healing, or from the M.P.F. group at any time. It was recovered subsequently from five cases, all treated with O.F. dressing; in one finger wound this organism was recovered on the third day and appeared consistently in all subsequent swabs until healing had taken place on the tenth day. No beta-haemolytic streptococci or anaerobes were recovered from any site at any time.

Summary

A new microporous film wound dressing is described. The results of various experiments in the laboratory, on normal skin, and on minor injuries are given for films of varying porosities.

A microporous film with a porosity of 1,400–1,800 g. per square metre per 24 hours, carrying a cotton interlock pad impregnated with 0.1% domiphen bromide and having an overall pattern spread adhesive, results in a dressing which largely fulfils the criteria stated earlier and is an improvement on other first-aid dressings, with respect to both wound healing and ability to reduce bacterial flora.

The problem of adhesion of the pad to the wound has yet to be overcome. This adhesion depends on a variety of factors which are being investigated.

While this report deals with the clinical and bacteriological aspects of a first-aid skin dressing, other applications of the film as a pre-operative skin covering, as a pressure bandage in the treatment of varicose ulcers, and as a dressing for burns merit investigation.

The development of this dressing has been made possible only by the co-operation and efforts of many people and patients. Our thanks are due to all these, and in particular to Professor R. E. Lane, of the Nuffield Department of Occupational Health, University of Manchester; to the medical officers and sisters of the following organizations: Vauxhall Motors Limited, Luton; Ford Motor Company, Dagenham; London Passenger Transport Board Executive; Messrs. Pritchett and Gold and E.P.S. Company Limited, Dagenham; to Mr. L. W. Plewes, Luton and Dunstable Hospital; to Messrs. Pritchett and Gold and E.P.S. Company Limited, in particular Mr. F. Sharp, and to Messrs. Smith and Nephew Research Limited, especially Mr. J. Dow, who have produced large quantities of equipment, material, and dressings, including all dressings used in this trial, and without whose assistance none of the work could have been undertaken; to Mr. S. Holt, of the Plastics Division of Imperial Chemical Industries Limited, who suggested that a microporous plastic battery separator, known as "porvic," might have medical application; to Dr. A. Charlesby, of Tube Investments Research Laboratories, Hinxton Hall, Cambridge, who undertook the sterilization of the dressings; and to Dr. C. H. Lack, pathologist to the Royal National Orthopaedic Hospital, in whose department the bacteriological investigations were made, with technical assistance from Mr. B. J. Newman. Finally, but not least, we wish to acknowledge the invaluable technical help of Mr. G. D. Winter, of the Department of Biomechanics and Surgical Materials.

This work has been supported by a grant from the Medical Research Council.

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The Minister of Agriculture, Fisheries, and Food, the Minister of Health, and the Secretary of State for Scotland have approved for publication a report presented to the Food Standards Committee by its preservatives subcommittee recommending that the use of emulsifying and stabilizing agents in food should be subject to statutory regulations. The subcommittee considers that control should be secured by specifying the substances which may be used—that is, by adopting a "permitted list." Apart from certain substances which are natural constituents or already common ingredients of food and need not be regulated, the subcommittee recommends that official approval should for the present be restricted to the following substances: super-glycerinated fats, synthetic lecithin, propyleneglycol alginate, propyleneglycol stearate, methyl cellulose, methyl ethyl cellulose, sodium carboxymethyl cellulose, stearyl tartrate, diacetyl tartaric acid esters of super-glycerinated fats, monostearin sodium sulphacetate, and sorbitan esters of fatty acids. The report recommends that the addition of emulsifying and stabilizing agents to milk should not be allowed, and that of the permitted substances only super-glycerinated fats and stearyl tartrate should be allowed in bread. It is not considered necessary or practicable to specify limits to the amount of a permitted emulsifying or stabilizing agent which may be present in food, although the amount used should always be the smallest quantity consistent with the best commercial practice. Before deciding what action should be taken on the subcommittee's recommendations the Ministers concerned will consider any representations from interested parties. The report may be obtained from H.M. Stationery Office, price 9d. net.

**FLUOTHANE*: A NON-EXPLOSIVE
VOLATILE ANAESTHETIC AGENT**

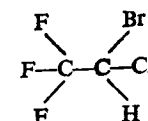
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"Fluothane" is a new volatile anaesthetic agent developed and manufactured by Imperial Chemical Industries (Raventos, 1956; Raventos and Suckling, 1956). It is the most promising member of a series of agents with non-flammable and non-explosive properties which are being investigated independently by the Medical Research Council. It is a clear, colourless, heavy liquid with a specific gravity of 1860 (cf. chloroform 1500), a boiling-point of 51° C., and a sweetish odour not unlike that of chloroform. Chemically, it is a halogenated ethane with the structural formula

**Clinical Trials**

Fluothane has been administered as the sole or the principal anaesthetic agent to a number of volunteers and to 310 patients (varying in age from 7 months to 91 years) for a variety of surgical procedures (lasting from 3 to 150 minutes). There were no deaths under anaesthesia in the series, although many of the patients came to operation in a poor physical state. The pre-operative conditions included diabetes, obstructive jaundice, cardiac failure, thyrotoxicosis, and asthma, but none were affected adversely by the anaesthetic.

One patient died during the post-operative period, but this was probably not attributable to the anaesthetic.

An 84-year-old man received open drop fluothane for the amputation of a gangrenous toe. The administration was uneventful and lasted for 15 minutes. The patient recovered consciousness before leaving the operating theatre and was quite well for the next four days. He then became increasingly irrational, developed bronchopneumonia, and died on the seventh post-operative day.

The object of this investigation was to confirm the promising results obtained in animal trials; to ascertain in humans the effect of known concentrations of fluothane vapour; and to exploit the administration of the drug by simple methods.

Methods of Administration

Since it was known that the administration of fluothane in conjunction with nitrous oxide and oxygen from a standard Boyle apparatus was being investigated elsewhere (Johnstone, 1956), we have limited our attention to the administration of the drug by the "open drop" method and by its use in an E.M.O. inhaler (Epstein and Macintosh, 1956) modified and calibrated to deliver known concentrations of fluothane vapour in air. In this way it has been possible to observe the action of fluothane without the complication of other anaesthetic agents, and to obtain an im-

*The trade name given by Imperial Chemical Industries to 2-bromo-2-chloro-1,1,1-trifluoro-ethane. The drug is not yet freely available.

pression of the effects produced by known concentrations of the agent.

Open Drop Induction.—Fluothane has been administered by the open drop method to 63 patients and to a further 29 after the preliminary injection of a "sleep" dose of thiopentone (rarely more than 0.2 g.). In most instances, induction was smooth and pleasant, producing unconsciousness in about one minute. Swallowing during induction was not uncommon, but this did not interfere with the administration and was not followed by vomiting. Coughing was rare and was always relieved by raising the mask. Struggling and breath-holding were unusual. Surgical intervention could often be tolerated after three to four minutes, although a further eight to ten minutes was necessary if the surgical stimulus was to be severe. We found that the rate of drop should be somewhat faster than when chloroform is administered, but otherwise the same general principles should be followed—that is, the head turned to one side and no Gamgee tissue placed between the face and mask. In 58 cases open drop anaesthesia was maintained throughout the operation. In 31 other cases open drop induction was followed by maintenance with the inhaler.

Fluothane Calibrated E.M.O. Inhaler.—Twenty-three cases were induced with the inhaler without the preliminary injection of thiopentone. Induction was slightly slower than with the open drop method, and an excitement stage was seen rather more often; but in either case a small preliminary dose of thiopentone makes induction smoother and pleasanter for the patient. An advantage in using the inhaler and its associated bellows (Macintosh, 1953) is the ease with which respiration can be assisted or controlled. When respiration is depressed from any cause the bellows is a great help in ensuring efficient respiratory exchange.

Anaesthetic Concentrations of Fluothane

The concentrations of fluothane required to produce certain effects were tested on volunteers, and these findings were confirmed in clinical practice.

The inhalation by volunteers of 0.5% fluothane in air (v/v) for periods up to five minutes did not produce unconsciousness. In most instances the subjects noticed flushing of the face and a general sensation of warmth after 10–12 breaths, and shortly afterwards sounds became accentuated. There was no "muffling" or the effect of distance so common during the inhalation of weak mixtures of nitrous oxide or trichlorethylene. There was a slight reduction in sensation to pin-prick after one minute, but this was not considered to be of clinical value. Even after continuous inhalation for five minutes it is doubtful whether any worth-while analgesia was produced.

In volunteers the inhalation of 1% fluothane in air invariably produced loss of consciousness. The onset of a light level of unconsciousness usually occurred in the second minute, and the depth did not alter appreciably during a further four minutes' inhalation. Volunteers were unaware of painful stimulation during this period, although it often increased the rate or depth of respiration. Consciousness was regained almost as soon as the mask was removed and mental alertness returned rapidly. A not unpleasant sensation of lassitude persisted for a further two to three minutes, after which the subject could sit and stand unaided. Most, however, complained of diplopia during this period, even though other muscle activity seemed to have returned to normal. Dryness of the mouth was often noticed for a further 15–20 minutes, but there were no other unpleasant sequelae.

Concentrations of up to 1.5% fluothane in air were well tolerated by all volunteers and evoked no unpleasant sensations of suffocation or irritation of the respiratory tract.

In most patients 2% fluothane in air provided a satisfactory level of surgical anaesthesia, although it was necessary to administer 3% for short periods to robust subjects and those in whom an extreme degree of relaxation was necessary.

Airway

Although the majority of our patients received some form of premedication, 20 cases did not have atropine. Even in these, the absence of pharyngeal secretions was noticeable.

There was rapid relaxation of the masseter muscles and a depression of the pharyngeal reflexes: an oral airway was therefore tolerated early. A laryngoscope blade could be introduced after four to five minutes, although the passage of an endotracheal tube usually required a further three to four minutes of anaesthesia. Even when intubation was attempted at a light level of anaesthesia, laryngeal spasm was short-lived and was more commonly an adduction of the cords rather than true spasm. It was therefore possible to cocaineize the cords at an early stage, thus facilitating the introduction of a tube within five to six minutes of the beginning of an administration without response. Out of a total of 132 patients who were intubated, less than half received succinylcholine chloride for this purpose, and even then its use was usually dictated by the demands for speed during long surgical lists.

Premedication

Several combinations of drugs for premedication were used in this series:

No premedication	8
Atropine only	27
Morphine and atropine	28
"Omnopon" and scopolamine	135
Pethidine and atropine	66
Others (barbiturates, barbiturates and atropine, etc.)	46
	310

If respiration is not to be assisted or controlled, we are impressed by the advantages of using "light" premedication, which avoids undue respiratory depression. Thus, in patients who received atropine only, or pethidine (50 mg.) and atropine, induction was smooth and rapid; moreover, recovery was not delayed. We advise that drugs with a marked central respiratory depressant effect should not be given within one and a half hours of the induction of anaesthesia.

Effect on Cardiovascular System

We have come to expect a slowing of the pulse under this anaesthetic, and rates of 60-70 were common soon after induction. The pulse rate appears to fall as the depth of anaesthesia increases, and on occasion we have observed rates as low as 40 a minute. To some extent, atropine counteracts this effect, and on these grounds we believe that premedication with atropine is advisable although not essential.

Patients with cardiac irregularities were anaesthetized without alteration in their rhythm. Dropped beats persisting for periods of about two minutes were observed in two patients during anaesthesia. They occurred after unwise attempts at intubation under very light anaesthesia which provoked vigorous bouts of coughing and breath-holding. The irregularities might well have been provoked by a similar insult under light anaesthesia with any other agent.

A fall in blood pressure was common, and systolic pressures in the region of 90 mm. Hg were usual within five minutes of starting an administration, and occurred both with and without the preliminary administration of thiopentone. Just as the pulse rate tended to slow with deeper anaesthesia, so also did the blood pressure tend to fall, but we found experimentally that as a rule this could be reversed by the administration of atropine or methylamphetamine. The consequent dry, bloodless operating field is similar to that obtained with hypotension deliberately induced by other methods. With the exception of a brief period of mental confusion in one elderly patient, no ill-effects were seen from either the slow pulse or the low blood pressure.

Respiratory System

Concentrations of 1% fluothane and higher caused well-marked changes in the character of respiration. During light anaesthesia in volunteers breathing 1% fluothane in air the rate generally increased or stayed within a range of 18-24 a minute. On a few occasions the rate fell to 4-6 a minute. In patients undergoing surgical stimulation these slow rates were never seen: 30 a minute was common, and we considered this normal, but higher rates were observed on occasion.

In both volunteers and patients the depth of respiration decreased whenever the rate increased or remained normal. This was apparent clinically, although it was not until the volume of inspired gases was measured with a spirometer that the full extent of the respiratory depression was appreciated. Neither the rate nor the depth of respiration could be related to the depth of anaesthesia, and thus these signs of anaesthesia, so well recognized with many other anaesthetic agents, became meaningless. As is to be expected, surgical stimulation during light anaesthesia increased the rate and depth of respiration, but even in these circumstances the minute-volumes recorded were much below the expected values. Thus a recording as low as 1.2 litres a minute was made in one volunteer after breathing 1% fluothane in air for only three minutes, while several of our patients gave readings of 3-4 litres a minute during the course of an operation.

With such a degree of respiratory depression, cyanosis was seen frequently unless respiration was assisted or oxygen added to the inspired mixture, and in the second alternative carbon dioxide retention might be occurring insidiously. Such degrees of respiratory depression also limit the depth of anaesthesia obtainable during spontaneous respiration using either the open drop technique or a draw-over inhaler. Thus it may become necessary to assist or control respiration to circumvent these hazards. By increasing the respiratory exchange at the end of an administration it is possible to excrete fluothane at an increased rate and thus hasten recovery.

Under fluothane/air anaesthesia, respiration was usually smooth, quiet, and regular. No irritation is caused to the respiratory tract, and it was therefore possible to control respiration with the greatest of ease.

Occasionally, however (in 12 cases), the induction was interrupted by periods of apnoea, sometimes lasting for one to two minutes. These never occurred after induction with thiopentone nor after the second minute of inhalation. The apnoea differed from active breath-holding in that inflation could still be performed with perfect ease. Spontaneous respiration usually restarted after applying a painful stimulus to the patient. No explanation can be offered for this phenomenon, although it occurred with remarkable frequency in previous experiments on dogs (A. B. Bull, 1955, personal communication).

Muscular Relaxation

On occasion it was difficult to achieve an adequate degree of muscular relaxation while respiration was spontaneous. On the other hand, respiration could be controlled easily, and it then became possible to provide adequate conditions for surgery quickly in most cases. This suggests that fluothane behaves in a similar manner to cyclopropane in that a quiet, depressed respiration limits the intake of the agent and thus the depth of anaesthesia.

An additional factor occurs when the E.M.O. or other inhaler with similar characteristics is being used. Such inhalers operate efficiently within certain ranges of inspiratory flow rates (usually about 7-12 litres a minute). If the flow rate falls below this range, so also does the concentration of vapour leaving the inhaler, and these circumstances were experienced in our series when low inspiratory minute-volumes were demonstrated.

During intra-abdominal operations in which muscular relaxation was adequate, peristalsis was seen on several occasions.

Use of Muscle Relaxants

Succinylcholine chloride was administered (20-100 mg.) to 68 patients under fluothane anaesthesia. The effects were identical to those seen when this muscle relaxant is used with other anaesthetic agents.

Twenty patients received gallamine triethiodide, and, in view of reports suggesting that profound blood-pressure and pulse-rate changes might be expected with the use of relaxants, it was given with caution. Injections of 40 mg. caused the usual slight rise in pulse rate, and little or no change in the blood pressure. Larger doses (up to 120 mg.) sometimes caused a slight fall in blood pressure, although this was no more pronounced than that to be expected with fluothane by itself.

On the other hand, when neostigmine was used at the end of the operation to counteract the effect of any residual gallamine triethiodide bradycardia was particularly noticeable. Preliminary doses of atropine should therefore be able. Greater than the usual 1/100 gr. (0.65 mg.). When doses of 1/75-1/50 gr. (0.97-1.3 mg.) were used severe bradycardia was avoided, but we would stress the advisability of giving neostigmine cautiously, and in divided doses (0.5 mg. at a time, with a total dose not exceeding 2.5 mg.).

D-Tubocurarine was administered in doses of 7.5-15 mg. to 20 patients. More than half showed little or no change in their blood pressures despite the use of controlled respiration. However, in some, particularly the elderly, there was a fall in blood pressure of 30 mm. Hg or more. When spontaneous respiration remained, this fall was not serious, but it was frequently aggravated by the establishment of a controlled respiration. Thus in a 77-year-old man with a pre-operative blood pressure of 220/105, a systolic pressure of 45 mm. Hg was recorded 15 minutes after the injection of 10 mg. of D-tubocurarine with subsequent control of respiration. However, the patient looked well and the blood pressure started to rise as spontaneous respiration returned. With one exception, the general appearance of all these patients was satisfactory:

A 45-year-old woman undergoing vaginal hysterectomy received thiopentone, 0.25 g., followed by 2% fluothane/air from the inhaler. After intubation, 15 mg. of D-tubocurarine was injected and respiration controlled with 1% fluothane. Ten minutes later her systolic pressure had fallen from 145 mm. Hg to 55. Her pulse rate was 64 and she appeared pale and slightly cyanosed. Atropine, 1/50 gr. (1.3 mg.) raised her pulse rate to 120 without affecting the blood pressure. Neostigmine in divided doses raised her systolic pressure to 75 mm. Hg before spontaneous respiration restarted and her colour improved. The patient made a satisfactory recovery.

Thus, in view of the profound changes which may occur on occasion, further investigation is required on the use of muscle relaxants and in particular D-tubocurarine during fluothane anaesthesia.

One patient who was receiving mephenesin in the course of the treatment of tetanus was anaesthetized with fluothane/air without any unusual response.

Recovery

Consciousness may be expected to return within ten minutes of stopping the administration. However, depressed respiration due either to the fluothane itself or to unnecessarily heavy premedication increased the time interval by as much as three-quarters of an hour in 15% of our cases.

Nausea and vomiting were strikingly rare, and most patients stated that they felt very fit. The rapid return of mental alertness has already been mentioned. Apart from a few frontal headaches—which may well have been co-

incidental—only two attributable post-anaesthetic sequelae were observed in this series:

Shivering.—Fourteen patients had generalized attacks of shivering as consciousness was returning. These were sometimes quite violent and lasted three to four minutes.

Restlessness.—Six children were confused and restless for up to an hour after return to bed. This might be due to a rapid recovery from the anaesthetic, with no residual analgesia while the effect of a barbiturate premedication still persisted. Restlessness did not occur when an analgesic was administered soon after the return of consciousness.

Effect on Sympathetic Nervous System

As a rule, a flush starts in the face and neck within the first minute of the administration and the skin feels warm to the touch. Later there is a noticeable injection of the conjunctivae and the superficial veins become prominent. Sweating is absent or minimal, and when present there was usually an accompanying respiratory depression, so that the cause might well have been carbon dioxide retention.

Miscellaneous Observations

From the evidence of volunteers, fluothane appears to have little value as an analgesic agent. Loss of consciousness occurs before there is any appreciable diminution in sensitivity.

Fluothane has been spilt in the eyes inadvertently. No harm resulted, although the response by a lightly anaesthetized subject was vigorous.

Solutions of adrenaline in which the total dose did not exceed 0.5 ml. (1/1,000 concentration) were injected subcutaneously into 14 patients to provide haemostasis (thyroidectomy, mastoidectomy, and antrostomy). The only noticeable response was a small rise of pulse rate in two cases.

On 19 occasions fluothane was employed as an induction agent before administering ether. The change-over was always effected rapidly and smoothly, and was followed by a rise of pulse rate and blood pressure to normal.

Under ideal conditions, fluothane is a stable compound, but in the presence of air, moisture, and light it can decompose slowly into the various acids of the halide group. In consequence, the drug should be stored in a cool place in amber-tinted bottles. These decomposition products can affect some metals, including tin and aluminium, both of which may be found in everyday modern anaesthetic apparatus. In addition, fluothane may be taken up by rubber, causing it to soften and to swell. The rubber reverts slowly to its previous state when exposed to air. This effect has been noted on the standard rubber corks found in drop-bottles, and in the corrugated hose of anaesthetic apparatus, which then tends to slip from metal connexions. We have seen no adverse effects on patients attributable to decomposition products, but on theoretical grounds one should bear in mind the toxic effects of these acids.

Conclusions

Fluothane is a volatile anaesthetic agent which, like ether, can be administered by the simplest possible methods. It has the advantage of being both non-flammable and non-explosive.

Since it does not stimulate pharyngeal secretions, premedication with atropine is not essential: on the other hand, atropine is advisable to counteract the marked bradycardia encountered in deep and protracted anaesthesia.

Induction is smooth, rapid, and not unpleasant even by the open drop technique. Recovery is similarly rapid and unassociated with unpleasant complications.

The range of anaesthetic concentrations lies between 1 and 3% fluothane in air, and within these limits adequate conditions can be provided for most types of

surgery. Unfortunately, few upper abdominal cases were encountered, and in these the muscular relaxation was not always perfect. The fault here may well have been due to our inexperience in the use of this new drug.

Fluothane causes a slowing of the pulse rate and a fall in blood pressure in most instances, but these do not appear to be harmful. In fact, the hypotension has often been appreciated by the surgeon, who has remarked on the dry operating field. Excessive falls in blood pressure or pulse rate can quickly be treated by the injection of atropine or methyl amphetamine, or the administration of ether.

The greatest disadvantage exhibited by fluothane is the depression of respiration which occurs not infrequently and may be sufficient to cause cyanosis and CO₂ retention. These undesirable features may be overcome by assisting or controlling respiration, which will also enable greater depths of anaesthesia to be obtained and thereby increase the scope of this agent.

In our opinion, this disadvantage is great enough to warrant limiting the use of the agent to all but skilled anaesthetists until more is known about its properties. It is possible that the disturbances of respiration which we encountered can be avoided by refinements in technique. If this is so, we believe that fluothane may become a valuable anaesthetic agent with a wide variety of uses. By virtue of its non-flammability and the simple method by which it can be administered, it could then attract the general practitioner for use in minor operations, provided he is equipped to treat the respiratory depression which may be encountered. Because of its flexibility it may be preferable to trichlorethylene except in respect of its analgesic properties. Indeed, with the high cardiac safety factor which has been suggested (Johnstone, 1956) fluothane compares advantageously with chloroform.

The pleasant and rapid induction is of particular value in children. A smooth change-over to ether can be effected if required, but when used as the sole anaesthetic agent it provides uniformly good muscular relaxation.

We wish to express our gratitude to Imperial Chemical Industries for the supplies of fluothane; to Dr. H. G. Epstein for his willing help and assistance in matters relating to the inhalers; and to Sir Robert Macintosh for his encouragement and advice.

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The General Council of the Press, at its meeting on October 17, considered a complaint from the Town Clerk of Ayr against the *Sunday Mail* of Glasgow in respect of an article about a visit to the Ayr Welfare Home and Hospital. The ground of the complaint was that the article would create a false impression of the institution. The editor had refused to publish any withdrawal of the allegations and criticism because he was satisfied that the article was fair comment on a matter of public importance. The Council expressed the view that the *Sunday Mail* had approached the matter in a responsible manner and held that the article was fair comment on a matter of public interest.

THE PHYSIOLOGICAL CASTRATION SYNDROME IN BREAST CANCER

BY

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The treatment of metastatic breast cancer is still rather empirical. It can be put finally on a scientific basis only when specific tests for the various factors which influence the growth of breast cancer can be easily performed. At present, however, clinical observation of these cases under treatment can yield valuable information on the course of the disease.

This paper describes clinical observations on a series of cases of metastatic breast cancer treated by a variety of methods. An overall picture of the course of the disease is available, as they are for the most part completed cases.

Introduction

Scowen (1955), in his Langdon-Brown lecture at the Royal College of Physicians in 1955, showed from his experience that the occurrence, either naturally or artificially, of the menopausal state was one of the main factors in regression of tumour growth. This state is manifested by a fall in oestrogen production and change of function of the anterior lobe of the pituitary with a great rise in gonadotrophin activity. It was suggested that the regression probably resulted from a combination of these circumstances rather than a simple oestrogen withdrawal, and that the conception of simple oestrogen dependence could not be fully substantiated.

At some time, from a matter of months to five years, after the menopause the oestrogen level rose and the gonadotrophin fell, giving a pattern similar to the pre-menopausal state. At this stage progress of the growth of metastatic breast cancer occurred, as it did before the menopause. The induction of a further menopausal state by adrenalectomy at this time caused a further regression of the growth.

This sequence of changes is summarized by the accompanying diagram (Scowen, 1955) which shows the classical effect

of a castration or the menopause, followed later by a reversal to the pre-menopausal state but without menstrual bleeding. Although true for the majority of cases, there were a few patients who did not follow this pattern.

All the patients in our series developed a carcinoma in the pre-menopausal period. It has been shown by Clemmesen (1948), Clemmesen and Busk (1949), and Anderson *et al.* (1950) that there are two peaks of incidence in breast cancer. They occur roughly in the five-year periods before and after the menopause. It would seem that the fall in incidence of breast cancer at the menopause occurs with the consequent drop in oestrogenic activity at this time. Of course this can influence only those carcinomata which are primarily hormone-dependent, and so generally affects only about 45% of the patients.

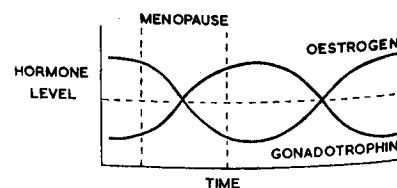


Diagram showing the commonest menopausal pattern induced by castration or occurring naturally. A further follow-up of this shows a reversal to the pre-menopausal state.

In an effort to enhance the results of local treatment by the natural but temporarily beneficial effects of the menopause, radical mastectomy combined with the removal of the ovaries has been tried (Taylor, 1932; Smith and Smith, 1953) in pre-menopausal women. Comparison of these cases with those treated only by radical mastectomy showed that oophorectomy lowers the incidence of metastases developing in the 3-5 years' post-operative period.

Huggins (1954) has shown from an analysis of his patients treated by adrenalectomy that the chance of regression is proportional to the mastectomy-adrenalectomy interval. Where this interval was five years the chance was 60%.

These observations fit in very well with the histories of patients with breast cancer and explain the variability of the progress of the disease.

Present Investigation

Table I summarizes the histories of 19 hormone-dependent tumours treated by removal of ovaries or adrenals, or both.

TABLE I.—Oestrogen-dependent Tumours

Case No.	Interval before Menopause		Progress of Secondaries after Menopause or Castration	Duration of Post-menopausal Regression Yrs. Mths.	After Adrenalectomy Secondaries Regressed for Yrs. Mths.	Dead
	Primary Treated Yrs. Mths.	Secondaries Appeared Yrs. Mths.				
1	2	4	Regression (C)	3	5	Dead
2	—	10	" (M)	2	7	Dead
3	—	10	" (M)	1	10	A/W
4	—	11	" (M)	1	11	A/W
5	9	—	" (M)	3	8	Dead
6	2	6	" (C)	9	1	A/W
7	2	6	" (M)	1	1	A/W
8	4	2	" (C)	4	9	A/W
9	4	2	" (C)	2	6	A/W
10	3	6	" (M)	3	8	A/W
11	1	9	" (M)	1	7	Dead
12	3	8	" (C)	1	2	Dead
13	3	3	" (M)	1	9	Dead
14	10	2	" (M)	3	7	A/W
15	1	6	" (C)	3	5	A/W
16	1	3	" (C)	2	4	Dead
17	6	5	" (M)	4	3	A/W
18	10	2	" (M)	4	6	Dead
19	4	2	" (C)	—	—	—

C=Surgical castration. M=Menopause. A/W=Alive and well.

In order to make the interpretation of the tables clear, Case 1 from Table I will be taken as an example. It shows that the primary growth was treated two years and four months before the menopause. Secondaries appeared seven months before the menopause, which in this case was produced artificially by castration and caused a regression of the secondaries for a further three months; a further regression occurred for five months after adrenalectomy. The patient is now dead.

The time of appearance of the various steps in the history of the cancer process in the patient is related in years to the menopause. This is done rather than giving the patient's age in years, as there is so much variation of the time at which the menopause occurs.

The time of the menopause was obtained from the patient's history. In those which were considerably post-menopausal a single date was given when the periods ceased, and this time was used as the date of the menopause. In the younger ones, however, the usual menopausal history of an episode protracted over some months was given. In of these cases the end of that time was taken as the date of the menopause.

The case histories seem to show the following common features: (1) Regression of metastases with the menopause or castration. (2) Reactivation of metastases, from a matter of months up to five years later, which can be controlled by adrenalectomy. In addition, stilboestrol administration sometimes aggravated metastatic growth. If it does so this suggests that a response is likely to be obtained from the removal of ovaries or adrenals.

TABLE II.—Oestrogen-independent Tumours

Case No.	Interval before Menopause		Progress of Secondaries after the Menopause	Post Menopausal Regression	Progress of Secondaries after Adrenalectomy			
	Primary Treated Yrs. Mths.	Secondaries Appeared Yrs. Mths.						
20	2	7	1	3	No effect (C)	None	No effect	Dead 2/12 after Adx.
21	—	—	9	—	" (C)	"	"	Dead 4/12 after Adx.
22	—	7	5	—	" (C)	"	"	Dead 3/12 after Adx.
23	1	9	1	2	" (C)	"	"	Dead 7/12 after Adx.
24	1	3	4	—	" (C)	"	"	Dead 11/12 after Adx.
25	2	—	6	—	" (M)	"	"	A/S 4/12 after Adx.
26	—	3	3	—	" (M)	"	"	Dead 6/12 after Adx.
27	2	8	7	—	" (M)	"	"	Dead 11/12 after Adx.
28	3	11	1	—	" (C)	"	"	Dead 5/12 after Adx.
29	1	10	7	—	" (C)	"	"	Dead 3/12 after Adx.
30	—	8	3	—	" (C)	"	"	A/S 6/12 after Adx.

A/S=Alive with active secondaries. Adx.=Adrenalectomy.

TABLE III.—Cases With Regression on Stilboestrol Therapy

Case No.	Interval after Menopause		Results
	Primary Treated Years	Secondaries Appeared Years	
31	9	13	Complete regression for 5 yrs. Now A/W.
32	5	14	Regression for 2 yrs. then reactivation.
33	19	20	Regression of skin secondaries for 2 yrs. then reactivation.
34	8	9	Regression for 2 yrs. followed by reactivation.
35	10	18	Regression for 2 yrs. Now A/W.
36	12	13½	" " 1 2/12. Now A/W.
37	14	26	" " 1½ yrs. Now A/W.

Table II summarizes the histories of eleven hormone-independent tumours. Here again the following common features were present: (1) No effect on metastases with the menopause or castration. (2) No effect obtained by hormone addition or deprivation. (3) Rapid and relentless progression of metastases.

Table III shows some cases in which regression has been produced by stilboestrol. The majority of these were in the ten-year post-menopausal region. The regression was striking, and often lasted for a number of years, but this response appears to be the exception rather than the rule. One may wonder whether these cases are of primary pituitary-dependent nature, the stilboestrol serving to lower the secretion of mammatrophic hormone by the pituitary.

Summary and Conclusion

This paper records clinical observations on a series of cases of metastatic breast cancer treated by various methods.

It is suggested that the behaviour of metastatic breast cancer during a natural or artificial menopause indicates the probability or otherwise of hormone dependence.

Our thanks are due to the surgeons and members of the staff of the Department of Radiotherapy of the Bristol Royal Hospital for permission to use their cases for this study, and to Professors Sir James Paterson Ross and R. Milnes Walker for their help and advice in preparing this paper.

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CIRCULATION IN THE HANDS IN HYPERTENSION

BY

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Despite its great importance the peripheral circulation in chronic arterial hypertension has not yet been adequately investigated in man. Available studies show no general agreement; thus the circulation in the extremities in essential hypertension has variously been described as low (Mendlowitz, 1942; Stewart, Evans, and Haskell, 1946), normal (Pickering, 1936; Stead and Kunkel, 1940), and raised (Abramson and Fierst, 1942). This disparity is at least partly attributable to a failure clearly to distinguish the stage of the disease, although it is over forty years since Volhard and Fahr (1914) drew attention to the red complexion of patients with benign hypertension by contrast with the pallor of those in the malignant phase.

There is no satisfactory method of accurately measuring the calibre and condition of those blood vessels in the face and neck that determine the complexion, but a good indication of the cutaneous circulation may be obtained by studying the blood flow in the hands, feet, and digits.

The present paper describes some quantitative observations on the volume of blood flowing through the hands of patients with various grades of hypertension, by comparison with a group of healthy subjects.

Methods

Because of the ease with which various local and systemic influences may cause vasoconstriction in the hands, the experimental conditions were controlled so far as was possible (Neumann, Cohn, and Burch, 1942). Each subject had eaten more than two and a half hours prior to the investigation and rested on a couch in a room maintained at $23 \pm 1^\circ \text{C}$. during and for one hour before the period of observation. Metal plethysmographs (Barcroft and Edholm, 1943; Duff, 1952) were fitted to both hands, which were elevated to a comfortable position just above the level of the heart. The plethysmographs were filled with water kept at $34 \pm 1^\circ \text{C}$., and inflatable rubber cuffs were applied around the wrists. At regular half-minute intervals the cuffs were inflated at a pressure of $55 \pm 10 \text{ mm. Hg}$ to occlude temporarily the venous outflow from the hands. The resulting increases in hand volume due to arterial inflow were transmitted from the plethysmographs to volume displacement recorders inscribing on a kymograph. At the end of the test the instruments were calibrated and the displacement volume of each hand was measured. The blood flow was then calculated and expressed as ml. per minute per 100 ml. hand volume. Each value reported in this paper is the average of six observations.

Under these conditions 36 healthy subjects and 25 untreated hypertensive patients (with blood pressures consistently above 200/100 mm. Hg) were studied. The normal subjects had no clinical evidence of cardiovascular disease and included medical students, Civil Servants, and colleagues. They comprised 31 men and 5 women, aged between 20 and 50. The hypertensive group included patients of all grades of severity between those without symptoms or clinical abnormality (other than the elevated blood pressure) and those with papilloedema and marked enlargement of the heart. Patients with gross congestive failure or recognizable

hormonal disturbances such as thyrotoxicosis, Cushing's disease, or phaeochromocytoma were excluded from the series.

When the heart size, electrocardiogram, and urine were normal and the retinal vessels appeared healthy or to have only minimal changes the hypertension was graded *benign* irrespective of the height of the blood pressure, provided it had remained stationary for at least six months. With fluoroscopic or electrocardiographic enlargement of the left ventricle, or symptomatic or electrocardiographic evidence of coronary insufficiency, or albuminuria, or gross irregularity of the retinal vessels, especially with perivascular exudate or haemorrhage, the condition was graded *progressive*. In the presence of gross cardiovascular damage, including ophthalmoscopically measurable swelling of the optic disks, the disease was considered *malignant*.

Results

Blood Flow in the Hands of Healthy Subjects.—The resting blood flow was measured in both hands of 36 healthy subjects. In the great majority the circulation was approximately equal on both sides, although in a few there were distinct differences, the flow usually being higher in the right

TABLE I.—Blood Flow in Hands of Healthy Subjects

Subject	Age	Sex	R.H.	L.H.
1	38	M	9.5	8.3
2	25	F	5.9	7.3
3	31	M	9.3	8.3
4	32	M	8.8	10.0
5	21	M	7.3	8.1
6	37	M	13.0	14.8
7	22	M	14.8	21.7
8	50	M	10.9	5.9
9	22	M	15.1	17.1
10	35	M	16.4	12.7
11	20	M	3.4	3.5
12	21	M	15.0	10.2
13	34	M	6.9	5.8
14	22	F	8.2	6.2
15	27	F	2.9	2.2
16	34	F	6.4	5.8
17	25	F	6.2	9.3
18	25	M	19.2	19.1
19	21	M	4.7	4.9
20	22	M	12.9	15.7
21	20	M	6.7	6.4
22	21	M	10.8	9.5
23	23	M	19.5	12.4
24	20	M	17.5	23.7
25	30	F	4.9	3.5
26	30	M	7.0	6.8
27	20	M	12.8	14.6
28	21	M	12.5	9.8
29	20	M	18.8	15.8
30	21	M	6.0	5.5
31	21	M	14.5	13.3
32	22	M	2.7	3.5
33	27	M	3.6	3.4
34	36	M	11.0	9.7
35	20	M	22.2	20.1
36	29	M	12.4	14.7
Average			10.5	10.3

R.H., L.H. = hand blood flow in ml./100 ml./minute in right and left hands.

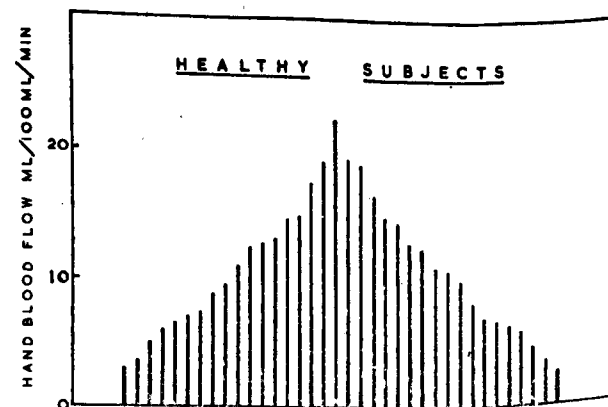


FIG. 1.—Blood flow in right hands of 36 healthy individuals.

hand (Table I). The mean flow in the hands varied widely between different individuals, ranging, in the right hand (Fig. 1), from 2.7 to 22.2 ml./100 ml./minute. The average for the whole group was 10.5 ml./100 ml./minute.

Blood Flow in the Hands of Hypertensive Patients.—The hand blood flow differed widely in the 25 hypertensive individuals, but the range of 2.1 to 22.5 ml. (Fig. 2) in the right hand was similar to that of the healthy subjects, despite the disparity in age of the two groups. In the majority the difference between the two sides was small, but in nine it amounted to more than 3 ml. (Table II). When the patients were graded according to the severity of structural damage it was seen (Table II) that those in the (B) phase tended to have higher blood flows than those in the progressive (P) or malignant (M) category. An even closer relationship was found between hand blood flow and diastolic blood pressure: the average flow in the right hands of 11 patients with diastolic pressures under 130 mm. Hg was 14.2 ml.; that of 11 with diastolic pressures between 130 and 160 mm. Hg was 9.2 ml.; while in the three with diastolic pressures over 170 mm. Hg it averaged 3.3 ml.

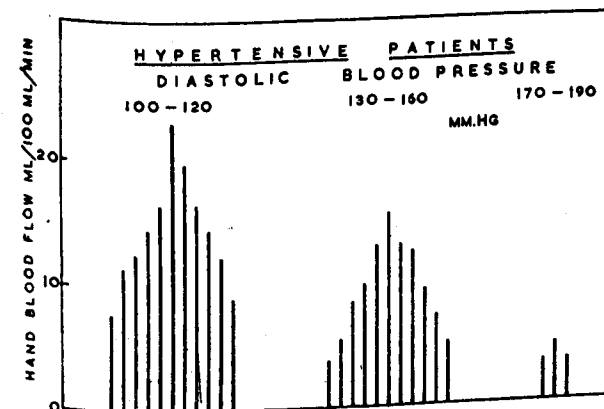


FIG. 2.—Blood flow in right hands of 25 hypertensive patients grouped according to diastolic blood pressure.

TABLE II.—Blood Flow in Hands of Hypertensive Patients

Subject	Age	Sex	B.P.	Grade	R.H.	L.H.
Diastolic Blood Pressure 100-120 mm. Hg						
1	74	F	250/100	B	19.8	13.9
2	51	M	200/110	B	11.4	5.0
3	61	M	200/110	B	14.5	8.8
4	25	M	210/116	B	16.3	17.1
5	25	F	220/120	B	16.4	10.7
6	41	F	230/120	B	7.7	8.9
7	34	F	240/120	B	8.9	3.4
8	68	F	240/120	B	12.5	12.8
9	41	M	250/120	P	14.4	10.5
10	33	F	240/120	P	12.1	12.3
11	35	F	220/120	P	22.5	28.2
Average	49		227/116		14.2	12.1
Diastolic Blood Pressure 130-160 mm. Hg						
1	43	F	260/130	B	12.9	11.5
2	39	F	240/140	B	7.2	4.8
3	64	M	230/130	B	8.3	7.7
4	41	F	230/130	B	3.7	6.0
5	63	F	260/140	B	9.9	5.6
6	67	F	270/140	B	12.3	10.3
7	47	F	260/150	P	9.2	7.4
8	33	M	230/150	P	5.4	8.2
9	67	F	205/160	M	12.8	13.8
10	53	F	290/160	P	4.5	6.6
11	57	F	270/160	P	15.3	21.0
Average	52		249/145		9.2	9.4
Diastolic Blood Pressure 170-190 mm. Hg						
1	41	F	270/176	P	2.1	3.5
2	43	F	250/190	M	2.3	3.4
3	48	M	270/190	M	5.5	4.6
Average	44		263/185		3.3	3.8

B=Benign; P=progressive; M=malignant phase. R.H., L.H.=hand blood flow in ml./100 ml./minute in right and left hands.

Discussion

The first interesting finding of the present study was that the volume of blood flowing through the hands of members of a fairly large group of healthy adults extended over a very wide range (Table I). The lowest individual blood flow (right hand) was 2.7 ml. and the highest 22.2 ml./100 ml./minute, a range of over 800%. Even on the assumption that the level of arterial pressure was directly related to hand blood flow in these healthy subjects, inequalities in their blood pressures could not account for differences in blood flow greater than 50%. Clearly, therefore, the differences in blood flow between various individuals were much too great to be attributed to any inequality of blood pressure at the time of examination. None of these subjects suffered from high blood pressure, although doubtless a small proportion might be expected, on actuarial grounds, to develop hypertension before they die. The possibility that a tendency to hypertension, not yet manifest, might have influenced the blood flow in these individuals cannot therefore be entirely excluded.

It was next found that in patients with hypertension of all degrees of severity the hand blood flow varied from case to case, with an overall range (2.1-22.5 ml./100 ml./minute) similar to that of the healthy subjects. When, however, the hypertensive group was subdivided into three categories according to the level of diastolic blood pressure it was seen that on average the higher the pressure the lower the hand blood flow (Table II). Those with high blood

TABLE III.—Right Hand Blood Flow of Groups of Subjects

	Healthy Subjects	Hypertensive Patients		
		Diastolic Blood Pressure (mm. Hg)		
		100-120	130-160	170-190
No. of subjects	36	11	11	3
Mean blood flow (ml./100 ml./min.)	10.5	14.2	9.2	3.3
Standard error	0.87	1.3	2.9	3.3
Coefficient of variation	49.8%	49.5%		

flows and relatively low pressures may well correspond to the "red" hypertensives, while, at the other extreme, those with low blood flows and very high diastolic pressures could exemplify the "pale" hypertensives of Volhard and Fahr (1914).

The level of blood pressure was fairly closely related to the incidence of cardiovascular damage, none in the "benign" phase having a diastolic pressure over 140 mm. Hg and only a few individuals in the "progressive" phase (with vascular lesions or left ventricular hypertrophy) having diastolic pressures lower than 140 mm. Hg (Table II).

Information on the pressure/flow relationship in the peripheral circulation in man is still too inadequate for precise evaluation of these findings, but some inferences may be drawn.

The patients with diastolic pressures under 130 mm. Hg were seen to have hand blood flows averaging more than that of the healthy subjects (Table III). There can be little or no reduction in the calibre of the blood vessels in the hands of these patients. In the group of patients with diastolic pressures of 130 to 160 mm. Hg the blood flow in the hand was of the same order as that of the majority of normal subjects. It may be deduced that the blood vessels in the hands of such patients are on the whole of smaller calibre than normal. The great reduction of blood flow in those with still higher diastolic pressures suggests that the mean vascular calibre tends to be disproportionately reduced as the disease advances.

The blood flow in the hands under ordinary conditions is largely dependent upon the level of sympathetic vasomotor activity. In a healthy person at rest in a comfortable environment (such as that in which the present study was under-

taken) fluctuations in vasomotor tone cause striking variations in the volume of blood flowing through the hands. These are not accompanied by any corresponding change in arterial pressure. After surgical sympathectomy the blood flow in the hands may increase fivefold, without any significant alteration in blood pressure (Barcroft and Walker, 1949; Duff, 1951). In some healthy subjects the prevailing level of sympathetic vasoconstrictor tone is unusually high, so that the volume of blood flowing through their hands tends to be low (Table I). But these individuals do not have higher blood pressures than others with less sympathetic tone.

These considerations support the conclusion of Pickering (1936) that increased vasomotor tone is not an important factor in the production of chronic hypertension. It is more likely that the increased peripheral resistance in hypertension is related to a functional abnormality of the vessels themselves rather than overactivity of the vasomotor nerves. Some direct evidence of this has recently been obtained. In patients with hypertension a tendency to increased adrenaline sensitivity was demonstrated in blood vessels of the hands (Duff, 1957). There is also some indirect evidence of abnormal vascular sensitivity to pressor hormones in the nailfold (Greisman, 1952) and bulbar conjunctiva (Lee and Holze, 1951) in hypertension.

The abnormality of vascular function in essential hypertension may, of course, be a result rather than a cause of the elevated blood pressure. Studies of vascular sensitivity in patients with early hypertension—that is, with hyperaemic hands and relatively slight increases in pressure—may be expected eventually to decide whether this phenomenon predisposes to hypertension or develops after hypertension has been established.

Summary

The resting levels of blood flow in the hands of 36 healthy and 25 hypertensive subjects were measured by venous occlusion plethysmography under standard conditions.

In the healthy subjects the blood flow varied widely between different individuals, but averaged 10.5 ml. per 100 ml. hand volume per minute for the entire group.

In the hypertensive patients the level of hand blood flow tended to be inversely related to the height of the diastolic arterial pressure; in those with mild hypertension the flow was on average higher than in the healthy subjects, while in those with severe hypertension the hand flow was much below normal.

The results are interpreted as evidence that in hypertension a functional abnormality of the vessels themselves is probably more important than excessive activity of the vasomotor nerves.

I am grateful to Dr. Geoffrey Bourne and Dr. Graham Hayward for advice and encouragement, to Professor Sir James Paterson Ross for making available some of the apparatus, and to Professor Henry Barcroft for laboratory facilities. I am indebted to colleagues, patients, students, and friends who acted as subjects and helped in other ways, and to Mr. D. F. Kerridge for statistical advice.

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UNILATERAL SWEATING OF THE SUBMENTAL REGION AFTER EATING (CHORDA TYMPANI SYNDROME)

BY

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Various reports of sweating and flushing of the face after eating have been published, but these have almost entirely concerned cases of the auriculo-temporal, or Frey's, syndrome. It would appear, however, that only one case of unilateral sweating confined to the submental region after taking food has been recorded, and that was by Uprus, Gaylor, and Carmichael (1934). Their patient was a young woman of 22 who at the age of 5 had had enlarged cervical glands removed from the right side of her neck, and some two years later began to suffer from profuse sweating under the chin on the same side as a constant response to the stimulus of eating.

An almost identical case is now presented and discussed.

Case Report

The patient, a young healthy girl aged 12½ years, was referred to me by Dr. Warner Smith on October 13, 1954, on account of profuse sweating of the right submental region after eating.

She had been admitted to the Lister Hospital on January 5, 1944, when she was nearly 2 years old, for the removal of tonsils and adenoids. Readmitted on February 23, 1944, on account of enlarged tuberculous glands of the right side of the neck, she underwent an operation for the removal of the glands on March 10, the right submandibular salivary gland being removed at the same time. The wound broke down, but during the next ten weeks it slowly healed.

She kept well until 1952, when she was readmitted on account of enlargement of the liver. There was no jaundice, but cervical glands were palpable on both sides. Various investigations were carried out, but as the findings were within normal limits the patient was detained in hospital for only eight days.

Towards the end of 1952—that is, when she was 10 years old—it was noticed that at mealtimes the chin on the right side became red, and beads of perspiration formed on it, which a little later would drop unless dabbed by a handkerchief. This phenomenon occurred at every meal, and, though some types of food seemed to bring it on more quickly than others, it occurred with any kind of food. There was no pain.

On examination the girl seemed perfectly healthy and of normal size for her age of 12½ years. There were two scars on the right side of the neck; one 3 in. (7.5 cm.) long, extending from below the mastoid process to within 1 in. (2.5 cm.) of the midline, and the other, very short, 1 in. (2.5 cm.) inferior (Fig. 1). There was no loss of cutaneous sensation over the affected area.

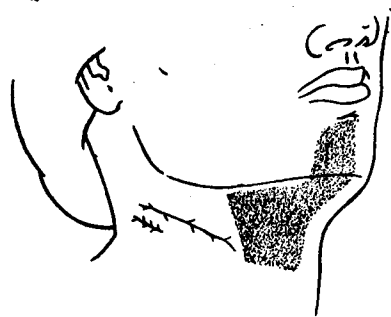


FIG. 1.—Diagram showing extent of abnormal sweating (shaded area) and site of scars.

She was given two biscuits and an apple to eat, and within one or two minutes of her finishing these the skin over the right submental area, ending exactly at the midline, began to get red followed by profuse sweating. If nothing further was eaten, the erythema gradually faded and sweating ceased. Figs. 2 and 3, taken before and after eating, show the scars, site, and extent of the reaction.

Investigations

The patient was admitted for further observation and tests in November and December, 1954, and again in October, 1955. These tests consisted of: (1) reaction to various substances chewed and/or swallowed; (2) reaction after taking tincture of belladonna; (3) reaction after sympathetic block; and (4) reaction after lingual nerve block.

Reaction to Food or Other Substances.—After eating a normal meal flushing of the affected area was observed 10 to 15 minutes, and sweat exuded from under the chin on the right side about three minutes later. An apple would bring on the reaction in three to five minutes on most occasions. Sucking a lemon produced erythema in three minutes, followed rapidly by sweating. This continued for further five minutes, and then ten minutes after beginning to suck the lemon the erythema began to fade and sweating ceased. A similar reaction occurred on sucking cotton-wool soaked in 0.5% acetic acid. Drinking a small quantity of tea without food produced no erythematous reaction. Reaction to sucking a lemon half an hour after taking 30 min. of tincture of belladonna showed little or no difference—erythema and sweating appeared in three



FIG. 2.—Photograph taken before eating.



FIG. 3.—Photograph taken after eating, showing site and extent of reaction.

minutes. After 60 min. (3.6 ml.) of the tincture, however, a lemon produced erythema but not sweating. Local applications of antiperspirant lotions or ointments did not prevent the reaction.

Sympathetic Block.—A stellate ganglion block was carried out on the right side, using 0.5% lignocaine hydrochloride, and Horner's syndrome was produced. However, it had no effect in stopping the flushing and sweating after ingestion of foods as above.

Lingual Nerve Block.—Right lingual nerve block was carried out, and this did succeed in stopping the reaction. Even sucking a lemon produced no erythema or sweating.

Present Condition

When last seen (January 16, 1956) the patient stated that the disability was just the same, but it did not seem to be worrying her unduly. Eating an apple brought on the reaction as before.

The Literature

Unilateral sweating of part of the face or neck may occur following trauma or suppuration involving the parotid gland or after cervical sympathectomy; it may even be connected with disturbance of the central nervous system—for example, in cephalitis (Vámos, 1938) and epilepsy. An interesting example of the latter condition was described by Maggiolo *et al.* (1954). Their patient was an epileptic who suffered from sweating of the left cheek one to one and a half minutes after eating. There was no previous history of an operation on the neck or face, nor any sign of cranial injury. Treatment for the epilepsy by sedation with phenobarbitone, etc., did not affect the reflex unilateral sweating.

Wilson (1936), in an interesting article on facial sweating, describes and discusses four cases, two of which manifested unilateral sweating after eating. One was a case of syringomyelia, and sweating involved the left side of the face; the other followed right superior cervical ganglionectomy, when sweating occurred on the right side of the face during eating. (In this latter case section of the sensory root of the right trigeminal nerve, and also removal of an extracranial portion of the right glossopharyngeal nerve, had been carried out several years previously.) In both these cases sweating occurred after any stimulus to salivation.

However, over the past hundred years, beginning with Baillarger (1853), most of the numerous reports in the literature on unilateral sweating of the face on eating have been concerned with lesions of the parotid gland; and, because the area of hyperhidrosis corresponds more or less to the cutaneous distribution of the auriculo-temporal nerve, these have come to be known as manifestations of the auriculo-temporal syndrome. There is no need to describe this syndrome in detail, as it is now well known.

Langenskiöld (1946) describes two cases of the auriculo-temporal syndrome, one of which, interestingly enough, also presented features similar to the case reported by Uprus *et al.* (1934), and the one recorded here. The patient was a farmer aged 33 who came under his care in 1924 on account of gustatory local hyperhidrosis, having been operated on when 16 years of age for bilateral tuberculous cervical lymphadenitis. About two years later he began to get trouble after eating; this caused perspiration over the right cheek, which remained intensive over a small area underneath the chin on the right side. This affected area under the chin was treated with success by excision of the portion of the skin from which the sweat appeared. When examined 21 years later the patient stated that he had been much improved by the operation, but that the skin in front of the ear and along the right mandible still perspired to a certain degree, as did the left cheek occasionally, after eating something acid.

Langenskiöld, before discussing the mechanism and pathogenesis of the auriculo-temporal syndrome, says that the term is not fully correct, as the hyperhidrosis in some

cases comprises also regions of the skin innervated by the cervical plexus. Summing up the various theories on causation, he is inclined to support the suggestion of List and Peet (1938) that it is a humoral reflex closely connected with the functions of the salivary glands. By "humoral" he explains "that there is an increased irritability in the autonomic synapses in a limited skin area near the big salivary glands after an injury in the parotid region, or on the sympathetic. When the patient is eating, acetylcholine is constituted in the salivary glands in connexion with their function, and this substance diffuses in the surrounding tissue enough to cause sweat secretion and hyperaemia in the supersensitive area."

Various other theories on the cause of the auriculo-temporal syndrome may be summed up here. Wilson (1936), with reference to his cases mentioned above, concludes that the sweat glands of the human face have a double nerve supply—the sympathetic secretory fibres and an accessory set of fibres. He states that both these sets of fibres are cholinergic and believes the cause of the sweating to be due to a reflex. He also suggests that an abnormally reactive condition of the sweat glands may follow degeneration of sympathetic secretory nerves. Fulton (1949), however, points out, as have other physiologists, that there is no anatomical evidence of a double innervation of sweat glands.

Ford and Woodhall (1938) suggest that when the auriculo-temporal nerve is injured various groups of nerve fibres contained in it may be severed and in the process of regeneration may become misdirected along pathways other than those they originally pursued, so that they form connexions with the sweat glands and blood vessels of the skin. Thus nervous impulses passing over the parotid fibres, as when eating, may cause paroxysmal sweating and vasodilatation in the distribution of the auriculo-temporal nerve.

Payne (1940), in an article entitled "Pneumococcal Parotitis and Antecedent Auriculo-temporal Syndrome," regards the syndrome as a reflex from taste stimuli from the posterior third of the tongue.

Goatcher (1954), after describing a case of typical auriculo-temporal syndrome following excision of a portion of parotid gland for parotitis, sums up the various views held concerning its causation and then finally states: "It becomes apparent that the mechanism of the auriculo-temporal syndrome is not fully explained."

Bell, Davidson, and Scarborough (1953) state: "Although the fibres to the sweat glands are in fact post-ganglionic sympathetic fibres, they act in most animals, including man, by releasing acetylcholine"; or, as Fulton (1949) puts it, "sudomotor sympathetic fibres, in contrast to vasomotor and pilomotor fibres, are cholinergic."

Incidentally, it should be noted that gustatory reflex sweating may occur physiologically as when eating spicy foods, but it is ordinarily confined to the face, the upper lip, and tip of the nose (List and Peet, 1938).

Discussion

Unilateral submental sweating on eating as observed by Uprus *et al.* and by Langenskiöld and in the present case would seem to be analogous to the auriculo-temporal syndrome but due to damage to the submandibular salivary gland as distinct from the parotid gland. (In Langenskiöld's case there was probably damage to both the parotid and the submandibular salivary glands on the right side, as the scar on that side extended from just below the lobe of the ear and sweating was not confined to the submental region.)

Uprus *et al.* carried out numerous tests on their patient, one of which was the effect of atropine. They found that after the administration of the drug (2 mg. subcutaneously) flushing but not sweating occurred on eating an apple. (It has been shown that a corresponding test in the present case produced similar results.) They point out that the effect of atropine pharmacologically on the salivary glands is to render stimulation of the chorda tympani ineffective in causing secretion without impairing its vasodilator activity,

for the chorda tympani is known to have true vasodilator fibres as well as secretory fibres. They also state that in all cases with such abnormal flushing and sweating injury has occurred to or in the vicinity of nerves which are known to contain true vasodilator and secretory fibres, and unknown to occur within the neighbourhood of a nerve which does not contain vasodilator fibres. Whilst they have no evidence to connect the fibres of the chorda tympani with the vessels and sweat glands of the abnormal area they consider that the period of latency between the original trauma and the onset of symptoms is consistent with an unusual regenerative phenomenon having occurred. They conclude that it is an abnormal reflex and that it has been identified with that of the salivary reflex, and that the abnormal effect is related to activity in the chorda tympani.

In the case presented above it is of particular interest to observe that the right submaxillary gland was removed and that the wound did not heal by first intention. It is possible that some portion of the gland remains, and in any case the surrounding area must have suffered trauma at the time of the original operation.

From perusal of the literature and after consultation with others it seems there is as yet no completely satisfactory explanation of the phenomenon, but the theories regarding the cause of the auriculo-temporal syndrome could be applied to these cases of unilateral submental sweating, except that a different nerve is involved—namely, the chorda tympani and not the auriculo-temporal.

In the three cases of submental sweating which have been described there was a long interval between the original operation and the onset of symptoms. This supports the theory that some abnormal regeneration of fibres had occurred. Further, in the case of Uprus *et al.* and in the one presented here, blocking the lingual nerve (chorda tympani) caused temporary total abolition of the abnormal response, whereas blocking the cervical sympathetic did not. This would support the theory that the syndrome is a salivary reflex related to activity in the chorda tympani. This nerve contains a few preganglionic parasympathetic (secretomotor) fibres which enter the submandibular ganglion which sends post-ganglionic fibres to the submandibular and sublingual glands (Gray, 1949).

Therefore it is suggested that the phenomenon of unilateral submental sweating on eating, following a previous operation on the neck involving one or other submandibular salivary glands, be known as the "chorda tympani syndrome" as distinct from the auriculo-temporal syndrome, which is related to lesions of the parotid gland.

Treatment

Treatment of such a condition is difficult. Destruction of the lingual nerve would lead to undesirable side-effects. Belladonna also has side-effects and cannot be taken indefinitely but might be used on special occasions. X-ray application to the skin has been suggested, but the radiotherapists consulted thought this might harm the skin, altering its texture without affecting the symptoms.

Another suggestion was to reflect the skin affected and divide all nerves supplying this skin. Excision of the affected skin area was carried out in Langenskiöld's patient with apparently good effect. This has not been tried in the present instance, and in any case might lead to undesirable scarring in a young girl. The condition therefore persists, but the child is not seriously worried about it at present. Time may prove to be a healer, but this does not seem to have been so in the other cases mentioned.

Summary

A case of flushing and sweating of the right submental region after eating is described. The various responses to the intake of certain foods before and after atropine administration, stellate ganglion block, or lingual nerve block were observed.

The history of one identical case, and another somewhat similar case recorded previously by other authors, are summarized, and theories of causation are discussed particularly in relation to the analogous auriculo-temporal syndrome.

The aetiology is somewhat uncertain, but the phenomenon would seem to be due to a reflex definitely related to the chorda tympani and abnormal regeneration of nerve fibres. It is suggested that the symptom-complex be termed "the chorda tympani syndrome."

I am indebted to Dr. E. A. Carmichael for his advice and for the photographs, which were taken at the National Hospital, Queen Square; to the librarian of the Royal Society of Medicine; to Mr. D. S. Hawke, my registrar; and to the sisters, house-surgeons, and colleagues at the Lister Hospital, who have helped with various tests, or have given suggestions regarding aetiology and treatment of the syndrome described in this paper.

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SIMPLE CLINICAL TEST FOR THE DIAGNOSIS OF EARLY PREGNANCY

BY

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In 1953 Matthew and Hobson published their observations on the effects of intramuscular injections of progesterone and oestrogen ("disecron") as a means of diagnosing pregnancy. Although this test was associated with a high degree of accuracy and was more reliable than the Hogben test in the early weeks of pregnancy, it involved the disadvantages of two consecutive daily injections. To overcome this element of discomfort and inconvenience to the patient a further series of cases has been accumulated to show the effects of the administration of oral progesterone and oestrogen in circumstances similar to the earlier trial.

Present Series

As a dosage reasonably comparable with the injected preparation, a total amount of 100 mg. of ethisterone and 0.5 mg. of ethinyloestradiol has been given over two consecutive days. This entailed the administration of five tablets ("orasecron") each containing 10 mg. of ethisterone and 0.05 mg. of ethinyloestradiol on each of the two days. The tablets were taken singly at three-hourly intervals and in this way caused no real upset, although a few patients complained of mild nausea. In all, 94 patients have so far been subjected to this test. The interval from the last menstrual period did not exceed 16 weeks (112 days) in any instance; in fact, cases have not been included in which the diagnosis of pregnancy would be reasonably certain as a result of pelvic examination.

Patients have been derived mainly from the sterility clinic, and the average age of the total series was 27.6 years.

The cases have been divided into two groups according to whether uterine bleeding was associated with the administration of the test dosage of combined progesterone and oestrogen or not.

Time Menstrual Period Overdue

Days Menstrual Period Overdue	No. of Cases	
	Group 1	Group 2
1 to 7	9	10
8 " 14	28	13
15 " 21	18	4
22 " 28	3	1
29 " 84	4	4
Total	62	32

Group 1 consists of 62 patients (average age 27.7 years) in whom follow-up examination established the ultimate diagnosis of pregnancy (see Table). In this group there were no instances of uterine bleeding associated with the administration of progesterone and oestrogen in the dosage prescribed. It should be noted from the Table that in 37 patients (60%) the calculated interval between the first day of the missed period and the administration of the tablets was within 14 days, the period of pregnancy during which the Hogben biological test is not regarded as being reliable (Matthew and Hobson, 1953).

Group 2 consists of 32 patients (average age 27.5 years) in whom follow-up examination excluded the presence of pregnancy (see Table). Although cases of short-term secondary amenorrhoea in the absence of pregnancy are less often encountered, and thus the total number included in this group is smaller than in group 1, it would seem that the two series are comparable, especially in the timing of the test (see Table). In every patient in this group uterine bleeding occurred within a reasonable time from the taking of the progesterone/oestrogen tablets. The time interval before bleeding occurred varied up to a maximum of 14 days. Six patients began bleeding on the second day of the test, four on day 1 after completion of the course of tablets, one on day 2, six on day 3, three on day 4, one on day 5, two on day 6, and two on day 7. Thus in 78% of the cases bleeding occurred within a week of the test. Of the remainder, one patient had bleeding on day 8, one each on days 9, 10, 11, and 14, and two on day 12.

Summary

A further step has been taken in investigating withdrawal bleeding following the administration of progesterone and oestrogen in women of child-bearing age complaining of short-term amenorrhoea. Parenteral administration used in the previous trial has now been succeeded by oral administration and the results observed in a series of 94 cases. When amenorrhoea was due to pregnancy no withdrawal bleeding occurred and no untoward effects upon the pregnancy were noted. In cases of non-pregnancy amenorrhoea withdrawal bleeding occurred within a varying period of time up to a maximum of 14 days. Thus the oral administration of combined progesterone and oestrogen in the dosage prescribed would appear to constitute a reliable clinical method of diagnosing early pregnancy.

Generous supplies of orasecron were kindly made available by British Schering Ltd. for use in this trial.

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GRANULOMA INGUINALE (VENEREUM)

BY

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Granuloma inguinale is endemic in the West Indies and other subtropical areas and in the southern part of the United States, but was rarely seen in this country until the West Indians began to immigrate in substantial numbers. In the second half of 1951, the first period for which records are available, no cases of granuloma inguinale were reported in England or Wales. Six cases were reported in 1952, two in 1953, nine in 1954, and twelve in the first six months of 1955. Since the beginning of July, 1955, eight male cases have been seen in Birmingham and Wolverhampton. Because of this rising incidence it is thought worth while to recall briefly the main features and treatment of the disease.

Granuloma inguinale is generally regarded as a venereal infection with an incubation period of two days to eight weeks, but other modes of transmission have been suggested (Fergusson and Roberts, 1953). The disease is commoner in women than in men and in coloured than in white races. The infectious agent, *Donovania granulomatis*, is a Gram-negative pleomorphic rod which grows readily on media containing egg yolk (Goldberg *et al.*, 1953). In Giemsa- or Leishman-stained films of scrapings or sections from the lesion the organisms tend to occur in pairs and are found lying free in the tissues and, characteristically, encapsulated in vacuoles in the cytoplasm of large monocytes.

The disease predominantly affects the inguinal, genital, crural, perineal, and perianal regions. The primary lesion is a vesicle or papule which is surrounded by an area of induration and erythema. The overlying epithelium soon disintegrates and the lesion develops either as a tumour consisting of vegetative granulations or as a slightly raised ulcer with a rolled edge and clean, smooth granulosomatous floor. Pain and tenderness are not features of the lesion unless it becomes secondarily infected. In the latter event, too, the edge of the ulcer may become undermined and the floor covered with a

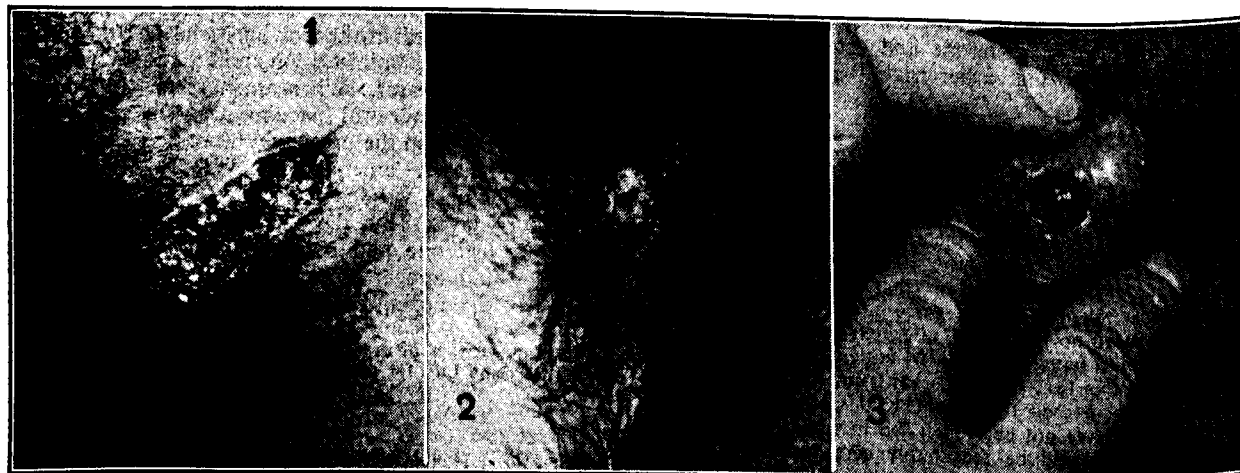
grey foul-smelling slough. The lesion progresses slowly by peripheral extension and also by the formation of satellite lesions due to auto-inoculation. The lymph nodes are not affected, but an indurated subcutaneous swelling may follow a lesion on the genitalia, the pseudobubo of Greenblatt's school. Complete recovery does not occur without treatment, but there may be partial healing with the formation of thick scar tissue. Later marked deformities may arise as a result of this scar tissue contracting.

Present Series

Seven of our patients were from the West Indies and one was from East Pakistan. The Pakistani had been treated for a similar condition one year previously in his own country and he denied any extramarital coitus. Five of the other patients had not indulged in sexual intercourse since leaving the West Indies. Three of these developed the lesion during the voyage to Britain, as did the Pakistani; the other two had been in this country for three and four weeks respectively before the lesion was noticed. The possible incubation in these five cases was 15, 21, 25, 63, and 84 days. The two remaining patients had been in England for over two years. One of these men gave a history of coitus with a Jamaican consort five weeks and with a white consort four weeks before the lesion developed. The other had indulged in very frequent coitus with coloured and white women up to the time the lesion appeared.

One of these patients presented a typical granulomatous ulcer in the inguinal region (Fig. 1). Another had a perianal ulcer with hypertrophic granulations growing in towards the centre from the edge, which was undermined (Fig. 2). The lesion was situated on the penis in the other six cases. In one case there was a small raspberry-like tumour over the fraenum (Fig. 3). In another the granulations were also proliferative, and were situated in the coronal sulcus on either side of the fraenum. The lesion was ulcerative in the remaining cases and involved the fraenum in two cases, the coronal sulcus in one case, and the free edge of the prepuce in one case. In one of these cases the ulcer was grossly secondarily infected. In the others it consisted of a slightly raised plaque with an eroded clean surface and a narrow surrounding area of induration. In two cases two lesions were present, while in another there was a slightly tender subcutaneous swelling in the inguinal region.

In every case the diagnosis was established by demonstrating Donovan bodies in the cytoplasm of larger monocytes. Greenblatt *et al.* (1951) recommend that a piece of clean granulation tissue should be obtained by biopsy punch and the under surface smeared on a slide. In these cases we obtained satisfactory results with material obtained by drawing a needle deeply through the tissues near the edge of the lesion.



FIGS. 1, 2, and 3.—Different clinical aspects of granuloma inguinale.

Medical Memoranda

A Rare Type of Muscular Dystrophy

In the following case the clinical picture corresponded with that occurring in the distal type of myopathy first described by Gowers (1902), the diagnosis being substantiated by laboratory and electrical investigations.

CASE REPORT

A soldier aged 24 was admitted to hospital complaining of weakness of both lower limbs and difficulty in walking. These symptoms had begun at the age of 6 and had continued to date. The weakness had fluctuated a little from time to time, but had not progressed in severity to any marked degree. Earlier it had been said that pes planus was the most probable cause for his unusual gait. There were no other symptoms relating to muscular or nervous dysfunction. In his family history a relevant fact was that his niece, aged 3, had experienced difficulty in walking, and it was stated that she was suffering from hereditary muscular dystrophy. The rest of his family were quite well.

Examination of his nervous system showed that he had marked wasting of both calves and also of the lower third of both thighs, thereby giving the appearance resembling an "inverted champagne bottle" frequently seen in patients suffering from peroneal muscular atrophy. The power of his calf muscles was considerably diminished, more on the left than on the right. On contraction of his quadriceps femoris a well-marked "bunching" of the muscles was seen, a sign which is ascribed to the wasting of the distal end of the muscles. The deep reflexes in his lower limbs were unexpectedly brisk and the limbs were slightly spastic. Both plantar responses, however, were flexor and his abdominal and cremasteric reflexes were normal. His gait was "waddling" in character, resembling the gait seen in bilateral congenital dislocation of the hip-joints, and the paces were shorter than normal. When asked to stand on his feet from the lying (supine) position no Gowers's figures were present. Clinically there was no abnormality in his facial musculature, the sternomastoids, shoulder-girdle musculature, or the muscles of his upper limbs. All his cranial nerves appeared intact. Sensory changes were not discovered in any region of the body, and muscle co-ordination was quite normal. All other systems were normal on examination.

Investigations.—(1) Cerebrospinal fluid : no increase in pressure ; quite clear ; protein, sugar, and chloride contents were within normal limits : the cells seen were less than 1% lymphocytes ; the Lange colloidal gold curve was negative. (2) Urinary studies of creatine showed a 24-hour excretion of 60 mg. (normal value usually nil) ; urinary creatinine excretion showed a 24-hour value of 1.7 g. (normal 0.4-1.8 g. in 24 hours). (3) Electrical muscle responses :—Rheobase-chronaxie studies showed abnormalities of the following muscles compatible with a diagnosis of myopathy : tibialis posterior and flexor hallucis longus, and to a less extent in the extensor brevis digitorum, extensor hallucis longus, soleus (left only), and peronei longus and brevis ; all changes noted were bilateral with the exception of the soleus. (4) Biopsy of muscle tissue taken from the left gastrocnemius showed the changes of muscular dystrophy by the presence of swollen muscle fibres, increased sarcolemmar nuclei, and marked interstitial fat. (5) X-ray examination of the long bones of the upper and lower limbs showed no rarefaction.

COMMENT

In Gowers's distal myopathy, wasting begins in the legs and is usually followed later by involvement of the hands and forearms. It is still doubtful, however, whether Gowers's original case was in fact one of true distal myopathy; his patient was a youth of 18 who not only had weak anterior

Treatment

American authorities have shown that streptomycin, chlortetracycline, chloramphenicol, and oxytetracycline are more effective in the treatment of this infection than the antimony preparations. Greenblatt *et al.* (1952) treated a large number of cases with these antibiotics and found that the average total amount of each necessary for cure was streptomycin, 23.96 g.; chlortetracycline, 35.5 g.; chloramphenicol, 36.1 g.; and oxytetracycline, 31.6 g.; and that approximately 9%, 15%, 24%, and 6% of the cases treated with these four substances respectively required re-treatment. They also found that 5% of the cases treated with streptomycin were resistant to this antibiotic, and one case (2.2%) was resistant to chloramphenicol. Later Greenblatt and Barfield (1952) concluded that oxytetracycline was probably the treatment of choice and that the optimal dosage was 2 g. daily for 10 to 20 days. In a small series of cases Wright *et al.* (1951) obtained good results with oxytetracycline 1 g. daily for 28 to 35 days. Niedelman *et al.* (1951) considered that 40 g. was the minimum amount of oxytetracycline necessary for complete recovery, although one of their patients was cured with 2 g. daily for nine days.

The dosage of oxytetracycline used in our series was 2 g. daily and of streptomycin 1 g. daily. With a migrant population like the Jamaicans effective follow-up is difficult. One case treated by streptomycin defaulted before healing was complete. Two cases given streptomycin for nine and fourteen days respectively defaulted two weeks after the lesion had healed. One case treated with streptomycin for three weeks has remained healed for four months. One case treated with oxytetracycline defaulted before healing was complete. One case given a three-weeks course of oxytetracycline defaulted a week after healing had occurred. Two cases given a four-weeks course of oxytetracycline have remained healed during an observation period of two months.

It is obvious that we cannot offer any comment of value on the treatment of granuloma inguinale, but we wonder if 1 g. of oxytetracycline daily for 30 days or longer would not prove more effective than a larger amount in a shorter period.

Earlier it was mentioned that the manner in which granuloma inguinale is transmitted is uncertain. If, however, it is a venereal disease the low incidence in the white population of endemic areas leads one to believe that it should not become a serious social problem here, although it may provide occasional diagnostic difficulties unless the possibility of its occurrence in white people is borne in mind.

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The Research Defence Society has published a pamphlet, *Anti-poliomyelitis Vaccination* (price 3d.), which poses and answers outstanding questions on this subject. The society exists to publicize the advances in medical knowledge due to animal experiments, and the fact that this involves no cruelty "in spite of the allegations to the contrary made by those who would like to bring this sort of medical research to an end." The questions and answers deal with the making of the vaccine, the chance of a child getting poliomyelitis, the proportion of paralytic to non-paralytic cases, and the conditions under which the monkeys needed for the vaccine travel and live. Inquiries to the Secretary, Research Defence Society, 11, Chandos Street, Cavendish Square, London. W.1.

tibial muscles but also had atrophied sternomastoids, paresis of frontalis and orbicularis muscles, and a wasted tongue. It is quite probable, therefore, that that case may have been an unusual type of dystrophia myotonica. The predominance of involvement of the leg muscles in the present case indicates that it is an example of distal myopathy. In view of the electrical abnormalities found in the peronei muscles, and the "inverted champagne bottle" appearance of the lower limbs, the diagnosis of Charcot-Marie-Tooth syndrome was excluded by the absence of any sensory changes and by the normal upper limbs.

An interesting point in the above case was the presence of slight spasticity and hyperreflexia in the lower limbs. In most cases of muscular dystrophy the tendon jerks are reduced or lost *pari passu* with the muscle-wasting. A number of cases have, however, been recorded in which muscular dystrophy was associated with spasticity in Friedreich's ataxia (Bramwell, 1893; Hodge, 1897; Rook and Dana, 1890). There was in this case, however, no evidence of cerebellar ataxia or of any of the commonly found features of Friedreich's disease. Creatinuria is a common finding in muscular dystrophy, and is found even on a creatine-free diet (Boothby, 1932). It is often associated with a diminished urinary excretion of creatinine. These findings have been attributed to the loss of muscle tissue occurring in the disease. This patient's urine showed an increased creatine excretion, but the amount of creatinine present in the urine was within normal limits. Bony changes of rarefaction and increased fragility have been described in muscular dystrophy by Spiller (1905a, 1905b) and Merle and Raulot-Lapointe (1909), but these were not evident in this case.

My grateful thanks are due to Major-General R. Priest for his valuable criticism and advice on this case report.

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Desmoid Tumour Resembling a Pseudo-Pancreatic Cyst in a Male

A man aged 40 was first examined on March 27, 1954, when he was complaining of swelling of the upper abdomen with discomfort and nausea for a month. Two months previously he had been hit in the epigastrium by a small child, but there was no history of major trauma or any surgical scars. The upper abdomen contained a palpable mass which extended down to the umbilicus. This mass was hard and smooth. His general condition was very good. Barium-meal examination showed pressure on the stomach from below and a greatly widened duodenal loop (Fig. 1). Various pathological tests were normal.

On April 2, under general anaesthesia (Dr. T. Lamrock), a biopsy was performed, and the tumour, which was infiltrating the posterior rectus sheath and rectus muscle for at least 15 cm. of its length, was found to be firm, pink, very vascular, and filling the upper half of the abdomen. Macroscopically the tumour resembled an invasive, rapidly growing sarcoma. The microscopical appearances of the sections were similar to those of a desmoid tumour. The tumour had not extended through the anterior rectus sheath, but the overlying subcutaneous tissues contained numerous very dilated veins. There was no increased peritoneal fluid, and, as was to be expected, there was no indication of metastases.

On June 4, under general anaesthesia (Dr. J. Bowen) and through an inverted T incision, the old wound, the tumour, the upper half of each rectus muscle with its sheath, the adjacent peritoneum, and adherent omentum were all removed en

bloc. The gap in the abdominal wall (23 cm. long, 5 cm. wide at the upper end, and 13 cm. wide at the lower end) was covered with tantalum gauze. The skin was then closed and the wound drained. Convalescence was uneventful.

The excised tumour (Fig. 2) was encapsulated on its deeper aspect and measured 30 by 24 by 10 cm., with a portion of the rectus sheath and muscles 23 cm. long attached. The tumour had a fairly tough greyish-pink cut surface with coarser fibrous bands in places, and weighed 11 lb. 14 oz. (5.3 kg.). Microscopical examination showed rather vascular loose fibro-cellular tissue. The nuclei were small and uniform and mitoses were difficult to find. The appearances were consistent with a diagnosis of desmoid tumour.

Since then there has been no indication of an incisional hernia or of any recurrence of the tumour.

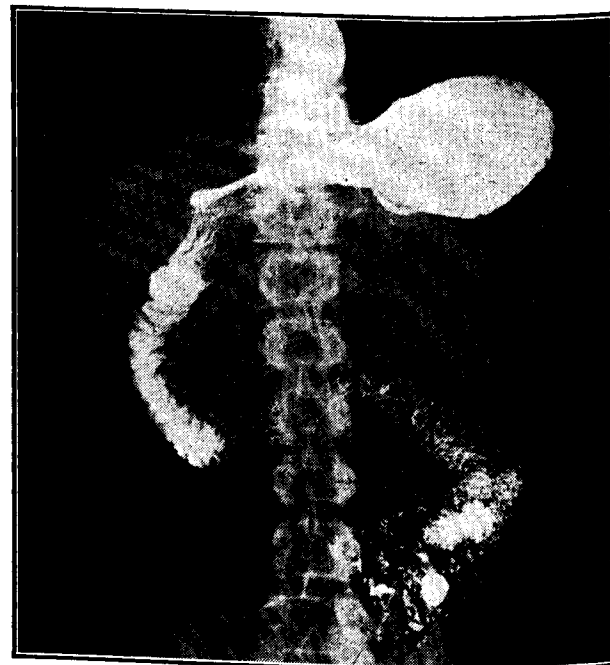


FIG. 1.—Barium-meal examination showing that the stomach was displaced upwards and that the duodenal loop was considerably widened.



FIG. 2.—Anterior aspect of the tumour showing the adherent strip of skin and rectus muscle. The scale is in inches.

COMMENT

Desmoid tumours are not common and may present difficulties in diagnosis, especially when occurring in males or in situations other than the anterior abdominal wall. In this case the tumour projected posteriorly into the abdominal cavity and prior to operation appeared to be a pseudo-pancreatic cyst. When exposed at operation the macroscopic appearances of the tumour resembled those of a rapidly growing malignant neoplasm.

Wide removal of a desmoid tumour is imperative if recurrence is to be prevented (Strode, 1954), but after such removal the magnitude of the gap in the abdominal musculature and peritoneum may be so great as to preclude any attempt at simple closure. In this case the underlying gap was bridged with a piece of tantalum gauze which overlapped the aponeurosis by at least 3 cm. all round. This gauze was fixed in position with numerous cotton sutures. Although the tantalum was left in direct contact with the stomach, bowel, and omentum, no evidence of any adverse reaction to this has been noticed. The skin of the abdominal wall had not been involved by the tumour, and thus there was no problem with its closure.

Other materials available for closing such a gap in the abdominal musculature include fascia lata, skin, polyvinyl sponge (Schofield *et al.*, 1954), and steel mesh (Burnell, 1951); but no material could have been any more effective to date than the tantalum gauze has been here. The abdominal wall is firm and the patient is free of symptoms despite resumption of his usual activities as a general practitioner.

Although Touroff (1954) has suggested phrenicectomy to reduce tension in such a wound until it becomes firm, this manoeuvre was not employed, as it is considered that lateral tension on the wound may be reduced sufficiently by bands of adhesive plaster encircling the body. Such encircling bands have previously been used in many cases of repair of extensive incisional herniae without deleterious effects, and were also used in this case.

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Aneurysm of the Pulmonary Artery Resulting from a Chronic Pulmonary Embolus

The following case is an example of chronic cor pulmonale developing as a result of pulmonary embolism, and we feel that it is of interest because of its rarity and because of the time that elapsed between the original embolism and death.

CASE HISTORY

The patient, a spinster, was born in 1902. She was admitted to hospital on February 28, 1945, suffering from a paranoid psychosis. A frontal leucotomy was performed in January, 1947, operation and convalescence being uneventful. Her mental state did not improve very much, but she was active and industrious.

In March, 1950, she was seen to be limping and was found to have a thrombosis of the left femoral vein. This was treated with paravertebral injection of procaine hydrochloride and support with an elastic stocking, and the symptoms and signs subsided. In January, 1953, thrombosis of the left femoral vein was diagnosed, and on one occasion she complained of tightness of the chest and unproductive cough. The oedema of the leg subsided and she again became ambulant, continuing to wear an elastic support. In December she was noticed to be dyspnoeic on exertion and slightly cyanosed, and in February, 1954,

oedema of both ankles developed. In April she had one attack of vomiting and became gradually more dyspnoeic. X-ray examination of the chest in July showed an aneurysmal dilatation of the left pulmonary artery. She now presented clinically as a case of chronic cor pulmonale, and a second x-ray examination in November showed further cardiac enlargement. In January, 1955, she collapsed and died.

Post-mortem Findings.—The body was that of a well-nourished middle-aged woman. The face and extremities were intensely cyanosed and both legs were oedematous to the thighs. The trachea and larynx were congested, and the lungs, though showing fibrotic changes throughout, did not contain any areas of infarction. Very marked hypertrophy and dilatation of the right ventricle and a small patent foramen ovale were found. There was a large embolus at the bifurcation of the pulmonary artery extending into both main branches and almost completely occluding the left. The clot was organized and organizing, largely endothelialized on the inner surface. It had clearly been *in situ* for some time, long enough for hypertrophy of the right ventricle to occur. Apart from a little atheroma there was no underlying disease of the vessel. The liver and spleen showed chronic congestion and the spleen showed scars of old infarcts. The left femoral and popliteal veins were thickened and fibrosed, with obstructed lumen, the result of past thrombosis and partial recanalization.

COMMENT

The almost complete occlusion of the first part of the left pulmonary artery by clot and the resultant dilatation behind the stricture gave rise to a striking radiological appearance suggestive of aneurysm. Aneurysms of the pulmonary artery are uncommon lesions, though simple dilatation may occur in mitral stenosis (Watkins and Harper, 1954). Brenner classifies the causes as traumatic, mycotic, congenital, and syphilitic. Others consider atheroma to be a significant aetiological finding.

Clifford *et al.* (1950) described a case of aneurysm of the pulmonary artery due to multiple emboli, and Boucher *et al.* (1951) reported a case due to embolism and diagnosed radiologically.

Our thanks are due to Dr. E. P. H. Charlton for permission to publish this case report.

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Several new Italian journals dealing with medicine and its allied sciences have been announced recently. *Minerva Fisioterapica*, a quarterly journal devoted to physical therapy and nuclear medicine, is an addition to the series published by Edizioni Minerva Medica, 83, Corso Bramante, Turin. Annual subscription is 3,000 lire. *Il Bassini*, a quarterly journal from the Pio Istituto Bassini, 1, Via Recordi, Milan, contains clinical and biological papers, preferably of surgical interest. Annual subscription is 1,000 lire. *Anatomia e Chirurgia*, another quarterly journal, contains papers on surgery with special reference to its anatomical relations. It is published from 1a, Via Palestro, Rome, 305 (annual subscription 4,000 lire). *Archives Italiennes de Biologie*, founded in 1882 by Angelo Mosso and suspended in 1935, is to recommence publication in 1957 under the editorship of Professor G. Moruzzi, Pisa. Its past volumes contain many important contributions from Mosso, Bizzozzero, Golgi, Grassi, Luciani, and other eminent figures in Italian medical science. It will publish original work on physiology, in either French or English. Annual subscription \$10 (Sala delle Stagione, 1, Lungarno Paccinotti, Pisa).

Reviews

NORADRENALINE

Noradrenaline: Chemistry, Physiology, Pharmacology, and Clinical Aspects. By U. S. von Euler, M.D., F.A.C.P. (Pp. 382+xxi; illustrated. 87s. 6d.) Springfield, Illinois: Charles C. Thomas. Oxford: Blackwell Scientific Publications, 1956.

Professor von Euler demonstrated in 1946 that noradrenaline was present in the body and that there were large amounts in the nerves of the sympathetic chain. This very important discovery has led to work in different parts of the world which has been published in no fewer than 750 papers and of which an account is given in this book. The chemistry of noradrenaline and the chemical methods of estimating and of discriminating between noradrenaline and adrenaline are described in great detail, and the figures for the occurrence of these two amines in tissues throughout the body should be valuable to many. The author is a man of clear opinions, and it is a pity that these are not expressed more frankly; the book would have gained in interest if they had been. For example, he points out that figures obtained for the amines in blood by the method of Weil-Malherbe and Bone show very small variations, although biological estimates of the amounts in the blood of the adrenal vein show very great ones. This implies doubt about what Weil-Malherbe and Bone actually measure, but the author does not point out the implication. Since the number of workers anxious to have a chemical method for estimating noradrenaline and adrenaline in blood is large, it would seem wiser to have emphasized the doubt.

An interesting, though rather short, account of the physiological action of noradrenaline is given, with evidence for the existence of separate hypothalamic secretory centres for noradrenaline and adrenaline—a subject to which the author has made an important contribution. There is a valuable discussion of the excretion of noradrenaline in the urine. The author's discovery that large amounts of noradrenaline are contained in the urine of patients with adrenal medullary tumours has been of great help in diagnosing the presence of these tumours. Finally the therapeutic use of noradrenaline, including its value for raising the blood pressure, is described. On the point that prolonged infusion of noradrenaline is followed by a fall in blood pressure in animals, the author quotes Churchill-Davidson that this does not happen in man. There are many, however, both in this country and in the United States, who have observed such a fall, and have found it necessary to continue the infusion for days on end. It seems important to discontinue the infusion very gradually if the fall is to be avoided.

The author is to be congratulated on this useful book.
J. H. BURN.

PHYSIOLOGICAL APPROACH TO CARDIOLOGY

Cardiac Diagnosis: A Physiologic Approach. By Robert F. Rushmer, M.D. (Pp. 447+vi; illustrated. 80s. 6d.) Philadelphia and London: W. B. Saunders Company, 1955.

The present physiological approach to cardiology suffers from an inadequate number of competent teachers. The student learns physiology before he can appreciate its practical significance, and by the time he has achieved specialist status he is apt to have forgotten these basic principles. The modern cardiologist may become an amateur physiologist in his field, but he is rarely a professional. Unfortunately, however, the professional physiologist usually knows remarkably little about cardiology, and his floundering in that practical world are apt to be as naive and clumsy as those of his amateur colleague.

Dr. Robert Rushmer, who is an associate professor of physiology and biophysics, courageously takes up the challenge to teach cardiologists the basic physiology of their subject, but, although he collates much that is valuable and helpful, has merely emphasized the observations made above

when he enters cardiological fields with which he is obviously unfamiliar. The section on heart sounds and murmurs illustrates this very well, for it would be difficult for a cardiologist to write so unhelpfully and with so little insight on so important a clinical subject. Unfamiliarity with many of the cardiologist's real physiological problems is equally evident in the chapters or sections on rheumatic carditis, aortic stenosis, and congenital heart disease. The author is more at home in the first half of the book, which deals with normal anatomy and physiology, heart failure, and certain physiological techniques, and much of this is admirable. Electrocardiography might have been better omitted in a book of this kind, for the subject is more than adequately covered by a large number of excellent monographs. Although the book is called *Cardiac Diagnosis*, only Part V (136 pages) is allotted to the diagnosis of cardiac disease, and in this section there are chapters on myocardial ischaemia, myocarditis, valvular disease, congenital heart disease, and possible heart disease; but none on hypertension, pericardial effusion, constrictive pericarditis, syphilitic aortitis, cor pulmonale, or the hyperkinetic circulatory states. No explanation is given for this curious selection.

No doubt much labour has been expended in the preparation of this book, and it may seem ungenerous to be too critical about it; but the fact remains that a physiologist has set out to teach the cardiologists the scientific basis of their subject, and has revealed that it is well-nigh impossible to do this unless he understands the subject itself.

PAUL WOOD.

SPLENIN EXTRACT IN RHEUMATIC FEVER

Splenin A in Rheumatic Fever. The Testing of Splenin A as an Anti-inflammatory Agent. By Alvin F. Coburn, M.D., Lucile V. Moore, M.D., Judith Wood, M.D., and Mary Roberts, R.N. (Pp. 87+xii; illustrated. 27s. 6d.) Springfield, Illinois: Charles C. Thomas. Oxford: Blackwell Scientific Publications, 1955.

This monograph, as its subtitle indicates, describes the clinical evaluation of the action of a splenic extract originally prepared by Ungar on the inflammatory manifestations of rheumatic fever. According to Ungar the spleen elaborates two substances, splenins A and B, which are antagonistic to one another, the former having a cortisone-like action on inflammation. Coburn has previously claimed that in animals splenin A would suppress anaphylactic arthritis after splenectomy when cortisone would not, suggesting that the latter exerts at least part of its action on inflammation via the spleen.

In the work under review no attempt has been made to adopt the method of the controlled clinical trial comparable to that employed by the Medical Research Council for the evaluation of cortisone and A.C.T.H. in rheumatic fever. It is stated that this method was not applicable under the particular circumstances, and that it was therefore necessary to rely on clinical judgment. No very sweeping claims are made, but the extract seems to be non-toxic, and in adequate dosage it appeared to exert some anti-inflammatory action in a majority of cases of acute rheumatic fever. Whether the effect is equivalent to that obtainable with A.C.T.H., cortisone, or salicylates is not clear, but it is claimed to be of the same order. The supplies of splenin A were strictly limited and it is not available commercially. Further work on a much larger scale would be required to determine whether this substance has any therapeutic advantage over remedies at present available, and in particular whether it is suitable for long-term treatment of cases of rheumatoid arthritis.

F. E. T. SCOTT.

The *Britannica Book of the Year, 1956* (Encyclopaedia Britannica Ltd., 84s.), includes a short account of important developments in medicine during 1955. Mention is made of poliomyelitis prophylaxis, retrolental fibroplasia, drowning, mitral valvotomy, etc. Advances in surgery and the other principal specialties give the layman an authoritative picture of the progress made during the year.

BRITISH MEDICAL JOURNAL

LONDON

SATURDAY OCTOBER 27 1956

INHERITANCE OF RAISED BLOOD PRESSURE

Since more people than formerly are reaching old age, the incidence of hypertension is probably increasing. This points to a difficulty in assessing the role of inheritance in determining the blood pressure of any individual, for the parents and relatives of a middle-aged patient may not themselves be available for examination, and past records and death certificates are notoriously unreliable in establishing the level of blood pressure during life. W. Weitz,¹ writing in 1926, considered that essential hypertension was inherited as a dominant characteristic, but that dominance could not always be demonstrated. This view was supported by W. Allan,² who thought that hypertensive cardiovascular disease might be a dominant trait. R. Platt,³ noting the difficulties of clinically elucidating a hereditary factor in the aetiology of hypertension, emphasized that the familial factor was obvious, that early familial studies of patients with hypertension had shown a hereditary factor in about 80%, and that the family history was useful in separating essential from other varieties of hypertension. In a well-documented hypertensive family recently reported⁴ all members of three generations were considered to be hypertensive. Others writers⁵⁻⁸ have considered that there was a familial factor; hypertension has been found to occur three times as frequently among the siblings of hypertensive individuals as among those of persons with normal blood pressure. Platt³ thought that his data were compatible with the hypothesis that essential

hypertension is conveyed as a Mendelian dominant with a rate of expression of more than 90%, though they did not prove this. Furthermore, he stated that the inherited factor might merely represent a tendency to arterial or arteriolar change, in the renal, coronary, or cerebral vessels, as opposed to its being specific for hypertension.

P. Sjøbye,⁷ in an exhaustive survey of heredity in essential hypertension and "nephrosclerosis," studied both clinically and genetically 200 propositi who were suffering from "nephrosclerosis" (the propositus is the member of a family from whom a genetic investigation begins). "Nephrosclerosis" appears to approximate to what would be termed malignant hypertension in Britain. He concluded that essential hypertension and nephrosclerosis constituted a clinical entity which was probably always due to a dominant hereditary gene, and that the age at which essential hypertension developed, within the groups of siblings, which he studied, depended on hereditary factors. Recent studies by G. W. Pickering and his group⁸⁻¹² have re-emphasized the uninterrupted gradation of normotension into hypertension. They claimed that their investigation, which was based on data collected by themselves and by Sjøbye,⁷ showed that arterial pressure is inherited as a characteristic whose variation throughout the range is continuous.

Various factors may affect the blood pressure of an individual. A study of the general population by Pickering and his colleagues⁸ showed that considerable variation existed in the rate of rise of blood pressure with age. They firmly state that any sharp dividing line denoting raised blood pressure is arbitrary. No natural dividing line was found in any decade; rather, there appeared to be a gradual merging of normal into high blood pressure. Thus an adjustment must be made in this type of study of arterial blood pressure both for age and for sex.⁹ In recording blood pressure indirectly, by a cuff, the reading may be affected by the thickness of the arm. Pickering and his colleagues¹¹ found that with increasing age women's arms tended to become fatter and men's to become thinner. However, in their study a correction for this did not significantly alter the findings on the growth rate of arterial pressure with age. In assessing the role of inheritance in the aetiology of essential hypertension Pickering recorded^{10, 12, 13} the blood pressure in the first-degree relatives of 109 patients with essential hypertension and 102 subjects with normal blood pressure; the age distribution of each group was similar, and higher pressures were found to occur in the relatives of subjects with essential hypertension. When the blood-pressure readings of the hypertensive propositi were

¹ Weitz, W., *Hypertension*, p. 38, 1926, Leipzig, quoted by Fishberg, A. M., *Hypertension and Nephritis*, p. 697, 1954, London.

² Allan, W., *Arch. intern. Med.*, 1933, 52, 954.

³ Platt, R., *Quart. J. Med.*, 1947, 16, 111.

⁴ Wear, L. E., *Lancet*, 1956, 1, 83.

⁵ Hines, E. A., Jr., *Proc. Mayo Clin.*, 1940, 15, 145.

⁶ Thomas, C. B., and Cohen, B. H., *Ann. intern. Med.*, 1955, 42, 90.

⁷ Sjøbye, P., *Heredity in Essential Hypertension and Nephrosclerosis*, 1948, Copenhagen.

⁸ Hamilton, M., Pickering, G. W., Roberts, J. A. F., and Sowry, G. S. C., *Clin. Sci.*, 1954, 13, 11.

⁹ ———, *ibid.*, 1954, 13, 37.

¹⁰ ———, *ibid.*, 1954, 13, 273.

¹¹ Pickering, G. W., Roberts, J. A. F., and Sowry, G. S. C., *ibid.*, 1954, 13, 267.

¹² ———, *Ann. intern. Med.*, 1955, 43, 457.

¹³ ———, *High Blood Pressure*, 1955, London.

¹⁴ Miall, W. E., and Oldham, P. D., *Clin. Sci.*, 1955, 14, 459.

¹⁵ Uchigasaki, S., *Tohoku J. exp. Med.*, 1955, 61, 245.

¹⁶ Szant-Györgyi, N., *Circulation*, 1956, 14, 17.

adjusted for age, hypertension appeared to occur as a graded characteristic. Pickering considered that the family histories provided evidence not of the inheritance of high blood pressure but of vascular disease. His observations led him to agree that heredity plays some part in the inheritance of hypertension, but not that inheritance is by means of a Mendelian dominant. For blood pressures in the higher ranges Pickering and his colleagues considered that some resemblance between the arterial pressures of first-degree relatives was proved. They added that the genetic element in the determination of arterial blood pressure had probably many aspects, including that of environment, which had not yet been fully investigated, and that the contribution of inheritance was probably slight. W. E. Miall and P. D. Oldham¹⁴ considered that the tendency of relatives to resemble each other in developing hypertension merely reflected a general tendency in these groups to have similar blood pressures. The importance of the environmental factor has been stressed by S. Uchigasaki,¹⁵ who also noted the prevalence of a hereditary predisposition. N. Szent-Györgyi¹⁶ claimed that different racial groups born in the U.S.A. have an incidence of hypertension which is higher than for each group if born in their own country of origin.

Several points of clinical importance emerge from this mass of painstaking work. None appears to surpass the value of Platt's observations on the value of the family history in separating essential from other forms of hypertension. There is a reluctance to regard essential hypertension as a distinct disease, but this is not to say that a high blood pressure is harmless. The view that essential hypertension is not a disease entity is helpful only if it is held in proper perspective, which must be that the finding of raised blood pressure is only one clinical sign; it may be of slight significance, or it may point to other evidence of hypertensive disease. The need for further field studies on the aetiology of hypertension, with particular regard to the effect of environment, is apparent.

UNITS OF RADIATION DOSAGE

Hitherto the unit of radiation dosage for both x and gamma radiations has been the roentgen or r . This unit is dependent upon the ionizing effect of radiations on air, and is in fact based on the measurement of the number of ions produced by the radiation per unit volume of air. Since the chief effect of the passage of radiation is the formation of ions, whether in air or in solid tissues, and since the biological effect of radiations is dependent upon ionization, there is a relationship between the ionization produced by a given dose

of a given radiation as measured in air and the biological effect produced by that dose in a given tissue. The unit based on this relationship, the r , has proved serviceable and sufficiently accurate for clinical purposes, and dependable within certain limits. However, recent developments in radiotherapy, and in particular the advent of megavoltage therapy, have surpassed these limits, with the result that the r is no longer an accurate reflection of the biological dose over the range of radiations now in use.

What matters in relation to biological effect is the dose of radiation actually absorbed—that is, the amount of energy imparted to the tissues by the ionizing particles. While over a considerable range the absorbed dose runs parallel with the air-ionization dose, it is this relationship which varies for different types of radiation. In order to meet this difficulty a new unit has been introduced which is known as the "rad." This unit is defined as "the amount of energy imparted to matter by ionizing particles per unit mass of irradiated material at the place of interest." It is an absolute unit, one rad being equivalent to 100 ergs per gramme. "The rad is the simplest possible unit of dose. If a dose of 1 rad is given to a cell, a portion of tissue, or an organ, then irrespective of its chemical composition and position in the body, irrespective of its proximity to lead, bone, or any other high atomic number materials, and irrespective of the kind of radiation used, each gram of the irradiated tissue will have received an increase in energy of 100 ergs."¹ The rad has now been internationally agreed upon as the unit for dosimetry of all radiation, though the relationship between it and the roentgen has yet to be established accurately.

Although in certain centres in Britain the rad has already been adopted as the unit of dosage, the uncertainty about its relationship to the r , as well as the replacement of the familiar and well-tried ionization methods of measuring radiation by other and more exacting methods—calorimetric and chemical—suggest that the time has not yet come for its universal adoption. Indeed, Dr. Ralston Paterson, in the opening paper to a symposium recently published, sounded this note of warning: "It is dangerous for clinicians to make any changes until both the confusion about röntgens and the indecision as to the rad have been thrashed out, for we will only get clinically into all sorts of muddles."² Since that was written, progress has been made in solving these difficulties, and doubtless they will soon be completely overcome. When this has been achieved we shall be a great step nearer a universally applicable unit of measurement of dosage of ionizing radiations. Nevertheless, the r

¹ Gray, L. H., *Brit. J. Radiol.*, 1956, 29, 355.
² Paterson, R., *ibid.*, 1956, 29, 353.

will not disappear from the scene, for at the recent International Congress of Radiology in Mexico City it was redefined so as to serve as the unit of radiation exposure—that is, as the measurement of the output of the radiation source.

FLUOTHANE AND FLUOROMAR

The possible risk of an explosion whenever ether or cyclopropane is administered, particularly in conjunction with oxygen in high concentration, has stimulated research to find an anaesthetic which would be non-explosive yet combine with this property the potency and ease of administration of cyclopropane and the pharmacological safety of ether. The first reports on the clinical use of some new fluorinated compounds came from the United States, where "fluoromar" (trifluoro-ethyl-vinyl ether) has been given with successful results.^{1,2} However, it is unlikely to gain widespread popularity because it is almost as inflammable as ether. From Great Britain J. Ravenöf has described³ the pharmacological properties in animals of a halogenated hydrocarbon—"fluothane" (2-bromo-2-chloro-1,1,1-trifluoroethane)—which fulfils many of the desired criteria. Among these are the fact that it is non-explosive in the presence of 50% oxygen, it does not decompose in the presence of warm soda-lime, and it does not irritate the mucous membrane of the respiratory tract; onset of anaesthesia is rapid, while recovery is quick and without nausea or vomiting. All these findings augur well for the advent of this new agent, but much more work still remains to be done before it can be considered suitable for general clinical use.

A report by M. Johnstone on the cardiac effects of fluothane in 500 cases⁴ gives a salutary warning that hypotension and bradycardia must be expected if concentrations reach as high as 2-4%, and similarly it may prove dangerous if combined with D-tubocurarine. In this issue of the *Journal* Drs. R. Bryce-Smith and H. D. O'Brien report at p. 969 a further series of 310 patients anaesthetized with fluothane. Their conclusions suggest that this agent may prove to be a useful general anaesthetic, but they draw attention to the severe respiratory depression that may follow its use, particularly in the presence of heavy premedication.

These two series alone are insufficient to enable any judgment to be passed on the general safety of this drug, but they offer an encouraging stimulus to further investigation. At present hypotension, bradycardia, and respiratory depression are the chief undesirable features that have been mentioned, though these do not seem to be prominent during light planes of anaesthesia. The constant search for safer anaesthetic agents continues. Meanwhile these preliminary reports suggest that fluothane may well rival trichloroethylene as a supplement

¹ Krantz, J. C., Carr, C. J., Lu, G., and Bell, F. K., *J. Pharmacol.*, 1953, 108, 488.
² Orth, O. S., and Dornette, W. H. L., *Fed. Proc.*, 1955, 14, 376.
³ Ravenöf, J., 20th International Physiological Congress, Abstracts of Communications, p. 751, Brussels, 1956.
⁴ Johnstone, M., *Brit. J. Anaesth.*, 1956, 28, 392.
⁵ *British Medical Journal*, 1956, 2, 868.

to anaesthesia with thiopentone, nitrous oxide, and oxygen, or it may replace ether in obstetrical anaesthesia. However, the dangers already mentioned serve only to emphasize that the most important single factor in the safety of anaesthesia is the skill and competence of the administrator rather than any particular property of the agent used.⁵

DIAGNOSIS OF EARLY PREGNANCY

Before the introduction of the Aschheim-Zondek test¹ in 1928 the diagnosis of early pregnancy rested on the sum total of symptoms and signs, general and local. Other biological tests followed, the mouse being replaced successively by the rabbit,² the female toad,^{3,4} the rat,^{5,6} and the male toad.⁷ All these tests, performed with urine or serum, have a very high degree of accuracy, but technical and financial disadvantages attached to the use of laboratory animals led to the search for a simple biochemical method. But none of the methods tried proved reliable, and it seemed rational as well as economical to use the patient herself as the test animal. Examinations of vaginal smears⁸ and of cervical mucus^{9,10} have both been described as practical tests, but they need specialist interpretation. As the first symptom which brought the patient to seek medical advice was usually amenorrhoea, methods were sought which would produce uterine bleeding only if the patient were not pregnant and which would not harm the pregnancy if present. The injection of neostigmine for this purpose was at one time popular, and recently the use of physostigmine and atropine has been advocated.¹¹ In 1942 B. Zondek¹² reported a quick method of treating secondary amenorrhoea by inducing a withdrawal bleeding with progesterone or oestrogen or both. Several workers saw in this a basis for a pregnancy test when the amenorrhoea was of short duration, and in 1953 G. Douglas Matthew and B. M. Hobson¹³ claimed that two consecutive daily injections of progesterone and oestrogen could be used as an accurate diagnostic test of pregnancy, and was more reliable in the earliest weeks of gestation than the Hogben test (the injection of urine into the female African toad, *Xenopus laevis*). In this issue of the *Journal* Dr. Matthew reports on the results obtained since oral administration of the hormones was substituted for injections. Ninety-four women with amenorrhoea of less than 112 days' duration were given 50 mg. of ethisterone and 0.25 mg. of ethinylloestradiol by mouth on each of two consecutive days. In 62 there was no subsequent uterine bleeding and all these proved pregnant; but in the 32 in whom follow-up excluded pregnancy there was uterine bleeding within 14 days—in the majority within a week.

¹ Aschheim, S., and Zondek, B., *Klin. Wschr.*, 1928, 7, 8.
² Friedman, M. H., and Lapham, M. E., *Amer. J. Obstet. Gynec.*, 1931, 21, 405.
³ Hogben, L. T., *Trans. roy. Soc. S. Africa*, 1930, Ser. A, 5, 19.
⁴ Shapiro, H. A., and Zwarenstein, H., *Nature (Lond.)*, 1934, 133, 762.
⁵ Salmon, U. J., Geist, S. H., and Frank, I. L., *J. clin. Endocr.*, 1942, 2, 167.
⁶ Aschheim, S., and Varangot, J., *Gynec. et Obstet.*, 1949, 48, 17.
⁷ Galli-Mainini, C., *J. Amer. med. Ass.*, 1948, 136, 121.
⁸ Bonimo, R. G., *Amer. J. Obstet. Gynec.*, 1949, 58, 524.
⁹ Sprague, L. D., *Obstet. and Gynec.*, 1954, 4, 117.
¹⁰ Zondek, B., and Cooper, K., *ibid.*, 1954, 4, 484.
¹¹ Finkler, R. S., *J. Amer. med. Wom. Ass.*, 1953, 8, 88.
¹² Zondek, B., *J. Amer. med. Ass.*, 1942, 118, 705.
¹³ Matthew, G. D., and Hobson, B. M., *J. Obstet. Gynaec. Brit. Emp.*, 1953, 60, 363.

This clinical test for early pregnancy has much to commend it, including simplicity and relative economy. It will therefore no doubt be welcomed, especially by the general practitioner. Some qualifications must, however, be made. Dr. Matthew writes that when the amenorrhoea was due to pregnancy no withdrawal bleeding occurred and no untoward effects on the pregnancy were noted. This could only be stated with complete confidence if in all the women who did have a withdrawal bleeding the flow was examined microscopically and an endometrial biopsy carried out. It might therefore be worth while repeating a clinical trial including these precautions, in addition to carrying out simultaneous Hogben tests on all the women. It would also be interesting to apply the test to patients in whom sterility is associated with infrequent periods, in order to find out whether withdrawal bleeding merely interrupts the current cycle or whether it brings it to a premature end. A more obvious drawback to the type of test described by Dr. Matthew is that it cannot be used in the case in which the aid of a pregnancy-diagnosis test is perhaps most often sought—that is, when there has already been some vaginal bleeding and the clinical picture is not typical of pregnancy. Finally, there is usually no urgency for a certain diagnosis of early pregnancy, and if the family doctor cannot make a confident diagnosis re-examination of the patient in three or four weeks' time is nearly always conclusive. Pregnancy, like murder, will out.

OZONE POISONING

Recently the potentiality of ozone as an occupational hazard to the health of human beings has been recognized, though it has long been known that it decreases the rate of pulmonary ventilation, lowers output of carbon dioxide, and in large amounts damages the respiratory system of experimental animals. Three cases of illness in welders using a new technique in welding exemplify the clinical features and the difficulty in diagnosis of this relatively infrequent industrial disease.¹ These three welders had been using, for the previous three to fourteen days, a new consumable electrode for welding, which gave rise to a concentration of ozone in the working environment of 9.2 parts per million. (The present threshold limit, according to most recent acceptable standards, is 0.1 part per million.) All three presented with similar symptoms of severe headache, dyspnoea, cough, and substernal oppression. Clinical examination revealed some adventitious sounds in the lungs and loss of weight in two of the men; chest radiographs gave no help in the differential diagnosis from pulmonary oedema, acute myocardial infarction, or congestive heart failure. The most common causes of pulmonary oedema—phosgene and nitrous fumes—were excluded by air analyses at the working point. Acute myocardial infarction, strongly suspected in one case, was inadmissible in the light of a normal electrocardiogram and a subsequently negative cardiac history. The increased bronchovesicular markings and an area

of consolidation in the x-ray films of one case were consistent with bronchopneumonia, and also compatible with the pulmonary inflammatory disease known to be a possible effect of exposure to ozone.

A feature which has not hitherto been emphasized in cases of ozone poisoning was the delay in disappearance of residual symptoms. When all clinical and roentgenological abnormalities had disappeared one man was still complaining, nine months after exposure, of moderate fatigue, cough, dyspnoea on exertion, and loss of weight. This man's initial symptoms had been exceptionally severe, and he had a transient renal injury manifested by proteinuria, scattered white and red cells in the urine, and finely granular casts. Treatment of such cases is essentially symptomatic—rest in bed, analgesics for the severe headache and chest pain, administration of oxygen, cough mixtures, and, if necessary, antibiotics. Prevention is a matter of isolating the manufacturing process and providing local exhaust ventilation.

WOUND DRESSINGS

Many thousands of wound dressings are applied every day. How many of them achieve their purpose? Studies of the course of healing show how actively the skin reconstitutes its structure. Within a few hours migrating epithelial cells begin to cover an abraded surface. In deeper wounds invasion by fibroblasts and capillary loops is a little slower, but in suitable conditions is still quite fast. An ideal dressing would provide conditions helpful to these processes. Its full specification is still not known, but some requirements are evident. The wound must be protected from further physical damage; chemical interference must be avoided; infection must be prevented. Dressings in use to-day commonly fail in one or more of these simple functions.

The routine dry dressing of gauze, cotton-wool, and bandage has the great virtue of simplicity, and is good while it remains dry. Dry cotton-wool protects the wound and keeps out bacteria, but let the housewife put her hands in water, or the factory worker do an oily job, and the dressing fails completely. At the other extreme is the adhesive impermeable film. This also is good at first; it is neat, easily applied, and it protects the wound from noxious materials, but it often becomes an impermeable reservoir of moisture whether from the skin, from the wound, or through accidental leakage from outside. This excessive moisture leads to a sodden wound, which is liable to infection. The fact that certain plastics such as "cellophane" and "nylon" can be prepared so as to be permeable to water vapour has been the basis of attempts to achieve a dressing which provides an effective barrier to bacteria but allows drying of exudate.^{1,2} The nylon dressing was shown to be practical and effective in many industrial wounds.³ A fresh attack on this prob-

lem is described by Dr. J. T. Scales and his colleagues at p. 962 of the *Journal* this week. The new dressing includes a microporous polyvinyl chloride plastic which is more flexible and more permeable than the nylon film, over which it is claimed to have practical advantages.

The clinical impression that wounds heal better when kept dry is supported by evidence that drying destroys commonly occurring bacteria.⁴ This effect is less marked if serum is present, but may still have some relevance to the surprisingly satisfactory results of leaving certain wounds open to the air. If drying is obtained with scab formation, then abrasions and burns sometimes heal without clinical sepsis, though contamination with organisms can often be shown. Should these organisms obtain a foothold under the scab, the full picture of sepsis may be seen.⁵

Experiments with these plastics permeable to vapour have shown further the self-sterilizing power of the skin. When the normal skin is sealed under a nylon dressing, it rids itself of *Staphylococcus aureus* previously present and other organisms are reduced in numbers. At least part of this effect is attributable to the unsaturated fatty acids of the skin, though their action is impaired by serum albumin such as might escape from a wound.^{6,7} The results which Scales and his colleagues report confirm that this self-sterilizing action of the skin is present with their new vapour-permeable dressing, whereas organisms persist under impermeable dressings. It is not enough for dressings to meet ideal requirements in the laboratory. They must stay in place wherever the wound may be on the body and resist the wear-and-tear of working life. A useful advance has been the development of flexible adhesive dressings which mould to the contours of the skin and permit movement of the part without breaking their seals. The new dressing incorporates these advantages, though there may still be room for improvement. It would, for instance, be preferable for a non-adherent surface to be presented to the raw areas. Tearing of the delicate migrating epithelial layer when a dressing is removed may well defeat some of the advantages gained by an otherwise good design. Nevertheless, dressings on the lines of those described promise to be an advance on anything previously available.

HEPARIN IN MYOCARDIAL INFARCTION

Discussions about anticoagulant therapy in myocardial infarction, and in particular whether "good risk" patients do not require it, have too seldom taken account of the fact that anticoagulant therapy has two distinct phases in which two entirely different anticoagulant drugs are used. The indications for treatment with heparin need not be the same as those for treatment with coumarins. It is important to consider the object of therapy with each of these agents, with a view to deciding what is the most reasonable action a doctor should take when confronted with a case of acute myocardial infarction within a few hours of its occurrence.

It now seems clear that "good risk" cases, as defined by H. I. Russek and colleagues¹ (those showing no

serious complications within the first twenty-four hours) do not benefit from coumarin therapy; or at any rate no benefit is reflected in the mortality rate, which is very low in these patients however they are treated. These patients are less liable to thrombo-embolic complications, whether from intracardiac thrombosis or thrombosis of the deep veins of the leg, than the group classified as "poor risk," in whom coumarin treatment reduces the death rate dramatically. It seems most likely that coumarin drugs produce their benefit by preventing these secondary thrombotic complications rather than by any direct action on the infarct itself or the coronary arteries. There is not yet any conclusive evidence that they will prevent a further infarction.² Coumarin drugs are therefore not for treating the acute infarction and its immediate hazards. They are given in an attempt to reduce, during the three or four weeks following the acute emergency, the mortality in the group of patients who are most likely to develop the later thrombo-embolic complications.

The action of heparin, and the object of treatment with it, are quite different. Its interference with the clotting mechanism is immediate and more dramatic than the action of the coumarins. In addition to an anti-thrombin action, it may have vasodilator activity and also actions on the blood lipids that are possibly of clinical importance. Its immediate effects in myocardial infarction are not well documented, and the nature of the problem makes unequivocal evidence difficult to obtain. Whether its beneficial effects are due to its anticoagulant or to its other properties, or what precise effect it has on the occluded vessel and the infarcted muscle, is uncertain. Nevertheless, suggestive evidence in favour of heparin does exist, and more than one observer has noted rapid improvement in the patient's condition, including relief or diminution of pain, after an injection given early in the attack.

At present, when anticoagulant therapy is decided upon, it is customary to begin with heparin by intravenous injection of 10,000–15,000 units, repeating this every six hours for 48 hours, or alternatively 20,000 units intramuscularly at eight-hour intervals for 48 hours.³ By this time orally administered coumarin preparations should be exercising their effects on the thromboplastin-prothrombin system in the blood. The chief usefulness of heparin, therefore, is in the emergency treatment of the infarction, not only as a means of covering the interval before coumarins act, but possibly as a beneficial measure for other reasons.

These considerations are relevant to the controversy on whether the selection of patients for anticoagulant therapy according to their assessment as good or bad risks is justifiable. The chief objection to this method of selection, urged especially by I. S. Wright,⁴ is that twenty-four hours must elapse before it can be applied, during which time the situation may change rapidly and confident prognosis is impossible. During these hours

¹ Russek, H. I., Zohman, B. L., White, L. G., and Doerner, A. A., *J. Amer. med. Ass.*, 1951, 148, 390.

² *British Medical Journal*, 1956, 1, 731.

³ Holten, C., *Acta med. scand.*, 1956, 155, 1, 15.

⁴ Wright, I. S., *Amer. J. Med.*, 1953, 14, 720.

⁵ Gilchrist, A. R., and Tulloch, J. A., *Scott. med. J.*, 1956, 1, 1.

¹ Kleinfeld, M., and Giel, C. P., *Amer. J. med. Sci.*, 1956, 231, 638.

² Bloom, H., *Lancet*, 1945, 2, 559.

³ Bull, J. P., Squire, J. R., and Topley, E., *ibid.*, 1948, 2, 213.

⁴ Schilling, R. S. F., Roberts, M., and Goodman, N., *ibid.*, 1950, 1, 293.

⁵ Lowbury, E. J. L., and Fox, J. E., *J. Hyg. (Lond.)*, 1953, 51, 203.

⁶ Crockett, D. J., and Jackson, D. M., *Lancet*, 1954, 2, 1151.

⁷ Burtenshaw, J. M. L., *Brit. med. Bull.*, 1945, 3, 161.

⁸ Ricketts, C. R., Squire, J. R., and Topley, E., *Clin. Sci.*, 1951, 10, 89.

serious complications may occur, such as extension of the infarction, which might have been prevented by heparin. This objection does not affect the validity of Russek's classification at twenty-four hours, or the influence it may have on the selection of patients for subsequent coumarin treatment, but it does emphasize the desirability of treating every patient seen early after the onset of symptoms with intramuscular or intravenous heparin. The practitioner in charge of the case will then have to decide whether he is going to give a full course of coumarin anticoagulants for a period of several weeks, or a shortened course as suggested by Gilchrist and Tulloch,⁵ or whether he is justified in denying the patient the undoubted protection against thrombo-embolic complications which coumarin anticoagulants offer.

NOBEL PRIZE

Three pioneers in the development of cardiac catheterization have been chosen to receive the Nobel Prize in Physiology and Medicine this year. One of these, Dr. Werner Forssmann, of Bad Kreuznach, West Germany, is the first man known to have inserted a catheter into the living human heart through a blood vessel in a limb. The other two are Professors André F. Cournand and Dickinson W. Richards, of New York, prominent among those various workers who in the last 15 years have added greatly to our knowledge of cardiac function by means of this technique.

At the age of 25 Dr. Forssmann, who is now 52, described¹ how with the help of a colleague he inserted a cannula into his own right antecubital vein, and passed through it a well-lubricated ureteric catheter for 35 cm. At this point the colleague, considering the experiment to be dangerous, ended it. A week later Forssmann by himself undertook a second experiment, this time inserting a catheter for 65 cm. into the left antecubital vein. He walked from the operating-room where he carried out this manoeuvre to the x-ray apparatus, and a radiograph was taken. It is reproduced with his article and clearly shows the catheter lying in the right auricle. In conclusion Forssmann referred to the "many prospects of new possibilities for research into metabolism and heart function" that his experiments had opened up. A month later Forssmann reported² that Professor E. Unger had drawn his attention to a trio of earlier publications³⁻⁵ in which F. Bleichröder, Unger himself, and W. Löb described the introduction of catheters by the first two authors into the arteries of human subjects in 1912 for the administration of "collargol." They were encouraged to make this direct attack on septicaemia then "because of the progress in chemotherapy."³ But while their object was different from Forssmann's the occasion is of interest because a catheter may have entered the living human heart then for the first time; for Unger revealed that in a preliminary experiment carried out on Bleichröder, but not published, they were led to infer from the length of catheter that passed up an arm vein, and a piercing pain he felt, that it had reached his heart.

Professor Richards, aged 60, and Professor Cournand, 61, of Columbia University and the Bellevue Hospital, New York, were encouraged by Forssmann's experiments to try cardiac catheterization in their studies of cardio-respiratory physiology. Their work, begun on chimpanzees in the later 1930s, and soon continued in the human subject, confirmed the safety of the procedure and showed the wealth of new information to be gained by it. Their studies of gaseous exchange and blood pressure in the heart and pulmonary arteries from about 1940 onwards have greatly extended the benefit, especially by surgery, that it is now possible to offer patients with heart disease. Indeed, Professor J. McMichael, of London, another pioneer in this field, has described⁶ catheterization of the heart as "the most significant advance in cardiological method in the present generation." As a diagnostic procedure it is now performed as a routine in all the larger cardiac clinics.

SCIENTIFIC EXHIBITION, 1957

In the short period of five years the scientific exhibition has become one of the main attractions at the Annual Meetings of the B.M.A. For this the Association has to thank the exhibitors, whether from hospitals, medical schools, research departments, or general practice, who have gone to such trouble in preparing and demonstrating their exhibits. Often a visitor gains a more vivid impression of current research or of clinical and epidemiological investigations from studying a cleverly arranged display at the exhibition than from listening to a paper read at a meeting. For this reason there is much to be said for linking some of the scientific exhibits with the sectional discussions. Most exhibitors would agree that the visitors are not the only ones to benefit from the exhibition: a good display tends to evoke discussions in which medical men and women from many parts of the world may take part. These exchanges of ideas are stimulating to all concerned.

Next year the Annual Meeting of the B.M.A. is to be held at Newcastle-upon-Tyne from July 15 to 19, and arrangements are already being made for the allocation of stands at the scientific exhibition—not to be confused with the exhibition of pharmaceutical products and medical appliances. Space is limited, and the final date for the receipt of applications is December 31. Forms are obtainable from the Secretary of the Association.

The Lister Medal for 1957, which is awarded in recognition of distinguished contributions to surgical science, has been granted to Sir Stewart Duke-Elder for the services he has rendered to the advancement of knowledge through his researches and writings in ophthalmic medicine and surgery. Sir Stewart Duke-Elder will deliver the Lister Memorial Lecture in London on April 5, 1958, under the auspices of the Royal College of Surgeons of England.

¹ Forssmann W., *Klin. Wschr.*, 1929, 8, 2085.
² — *Ibid.*, 2287.

³ Bleichröder, F., *Berl. klin. Wschr.*, 1912, 49, 1503.

⁴ Unger, E., *Ibid.*, 1504.

⁵ Löb, W., *Ibid.*, 1504.

⁶ McMichael, J., *British Medical Journal*, 1948, 2, 927.

THE PHYSICALLY HANDICAPPED CHILD

FUNCTIONAL ASSESSMENT OF THE DISABILITY AS AN AID TO PLANNING

BY

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Founded in 1903 by Dame Grace Kimmins and Miss Alice Rennie, Chailey Heritage (Craft School and Hospital) has passed through several phases in its evolution from a derelict Industrial School building, which housed the original seven crippled boys from London. These boys came under the aegis of the "Guild of the Brave Poor Things," to be trained in crafts to enable them to earn a livelihood. Vocational training of the crippled was in its infancy then, and the demand grew quickly: expansions came as money was raised by public appeals. A similar project to include training for girls soon followed: next, under the pressing influence of Sir Robert Jones, the need for treating the disabilities was accepted; as a result the hospital side was developed and Surgeon Commander G. Murray Levick (of Polar fame) was appointed Medical Director.

Thus a craft school and an orthopaedic hospital grew up alongside each other in lovely rural Sussex surroundings.

Finally, the spate of post-war social legislation overtook the Heritage, bringing it under the Ministry of Health in July, 1948. The school section was designated an independent special hospital school, and a separate committee of management was appointed. All children admitted, whether ambulant or bed cases, are, however, patients under the National Health Service, and therefore the final responsibility rests with the hospital authority.

Children are accepted from widely over the British Isles and the Channel Islands, and this poses considerable social problems. With increased provision in local areas for physically handicapped children planned under the 1944 Education Act, the trend has been for the more severely crippled to be referred: this stimulated new thought about the approach and led to the functional method outlined here.

Nature of the Problem

This paper refers mainly to the severe and complicated handicaps, because, with the badly disabled child, very realistic thinking is called for in order to evaluate the important defects and to plan how to tackle them. Functions of daily life and self-protection are the hard core—feeding, dressing, washing and bathing, toilet management, ambulation. Equally vital is the time factor: if the time taken in the accomplishment is excessive, it remains a serious problem in living.

In the final issue the amount of assistance needed decides the type of placement for the child: for example, the developmentally paraplegic child, with a meningomyelocele, presents difficulties of management with which few homes can cope. The laundry involved, adequate educational provision, the increasing weight of the patient, the treatment and prevention of trophic lesions, manual bladder expression, the need for bowel training and possibly regular enemata—all these demand a range of knowledge and services beyond

the reach of the average home, even with the most devoted parents; and it is sometimes a revelation what the parents have achieved and the ingenuity they have displayed in caring for their child.

Certain other conditions present major problems. Bilateral upper-limb poliomyelitis can cause a gross degree of handicap in daily life; and severe arthrogryposis, extensive Still's disease, the bad athetoid form of cerebral palsy, the bilateral developmental defects of the arms, are further types.

Need for a Method

To tackle adequately the problem outlined demands a systematic approach to function: this form of evaluation highlights the important deficiencies, and upon it a coherent plan of treatment may be evolved.

Faced increasingly often with just such cases, I had felt that the anatomical analysis alone was inadequate, except in deciding the detail of operative treatment. There is even a risk that corrective surgery which at first sight appears to be anatomically sound may in fact reduce residual function still further. This was illustrated recently by a surgical colleague who had done a triceps-to-biceps transplant in a housewife to produce elbow flexion. Soon afterwards she returned highly indignant because she had lost the ability to cut a loaf of bread—evidently an important function in her life.

So much depends on what function is most valuable to the patient. This can be judged only by the test of the activities of daily life: can the hand, in fact, be used better in pronation or supination? The advantages of effective opposition of the thumb in ordinary life is rarely called into question, and tendon transplants to hold a foot in a functionally better position afford unquestioned gains.

It is mainly in the upper limb that what constitutes the most useful function is more problematical. The hand and arm have to perform so many and such varied tasks; adequate length of the arm and the ability to get it behind the trunk are necessary for cleansing after defaecation; and elevation of the limb is required for combing the hair, shaving, applying cosmetics, brushing the teeth, and endless daily jobs.

The practical test seems the only valid way for deciding the issue when advising the patient. This principle has been widely adopted in the field of industrial rehabilitation but perhaps applied too little to the problem of the disabled child; yet it leads to clearer thinking and improved planning, especially if the long-term aim of equipping the child for living and for a job is the purpose from the start.

This approach, too, can resolve such specific problems whether hand and arm function is too poor to warrant the expenditure of time and of training effort (Case 1); if so, attention can be directed to the feet. In the latter event careful thought must be given to the type of footwear, clothing, and methods of supporting clothing—elastic-sided shoes, elastic belts, zip-fasteners with big rings, coat type of shirts, and any dressing aids which are a practical help.

I believe, too, that adequate analysis of function can improve the planning of any operative surgical programme by better timing, and sometimes by even obviating doubtful and unrewarding surgery (Case 2).

In considering the badly handicapped child, one must remember that he lives (or ought to live) in a continuously expanding world, where experience and education need to keep pace with advancing years. All too often such children have lost vital years, but if operations can be timed (Case 3), so as to avoid important examination hurdles, for instance, a greater measure of progress may be preserved, provided it is without prejudice to the surgical criteria. Bone growth decides the optimal age for certain definitive surgery: even so, if the forward programme is well thought out the other needs can be woven into the pattern. Another material factor is that the aims are more precisely defined and continuity is given to the programme from all aspects.

Method

This has two stages: (a) the actual functional analysis and documentation of the findings in considerable detail, followed by (b) a full case conference of all the staff directly concerned, to evolve a planned programme for each child.

Functional Analysis and Documentation

It was decided to adopt a modification of the "proforma" used by the Bellevue Medical Center, in New York.¹ This breaks down daily life functions, under certain broad headings, into considerable detail: their presence or absence is indicated by "blocking in" squares. Each function is put to a practical test. A section can be added, where applicable, to make the proforma comprehensive enough to include speech defects in cerebral palsy.

This initial documentation is done by a special staff; feeding, toilet, washing, bathing, and dressing are analysed and recorded by the nursing staff; elevation and ambulation by the physical treatment staff; certain hand functions, and sometimes dressing techniques, by the occupational therapist; speech disabilities by the speech therapist. In addition, whenever possible, an intelligence test is carried out by the clinical psychologist: this is valuable as a guide to the degree of co-operation to be expected.

By this means we obtain a full and factual picture of the problem to be faced.

The Assessment Proforma.—This is lengthy; the main headings are given below, each of them being subdivided to give full details.

I. *Non-walking Activities.*—(a) Bed activities; (b) hygiene; (c) eating activities; (d) dressing and undressing activities; (e) hand activities; (f) wheel-chair activities; (g) elevation activities.

II. *Walking Activities.*—(h) Progressing activities; (i) gait; (j) climbing activities; (k) travelling activities.

III. Summary.

IV. *Recommendations.*—(1) Physical Treatment: (a) physiotherapy; (b) remedial gymnastics; (c) occupational therapy. (2) Operative Treatment. (3) Speech Therapy. (4) Aids. (5) Other. (6) Educational. (7) Social Adjustment.

Case Conference

When the proforma has been completed by the staff concerned it is returned to me a day or two before the conference; this enables me to study the extent and the salient points of the disability, and helps in leading the discussion.

At the conference, the report is considered by all the staff directly concerned—medical, nursing, physiotherapy, remedial gymnast, occupational therapist. The almoner attends, as direct social problems are so often involved. The psychiatrist, clinical psychologist, and speech therapist are invited to participate whenever their special help is needed. The teaching staff also participates, and their presence proves very valuable. The details of the proforma are discussed section by section, and the possibilities weighed up; opinions are freely invited and decisions made on both the way and the person to tackle the particular function in question.

At this stage the child attends so that his or her own opinion can be sounded and any particular problem studied—for example, whether writing is better done by mouth than by hand.

The above procedure gives the staff a clear picture of the extent of the disability and provides as wide a context as possible for considering the child's future programme; further, it helps to eliminate overlapping and waste of time. It may bring to light psychological factors adversely affecting the child's morale and co-operation (Case 4). Expert advice can then be sought from the psychiatrist.

My secretary sits in at the conference to keep notes of the proposals put forward and conclusions reached. These are typed and distributed to the staff involved in the

rehabilitation programme, which defines clearly what is delegated to each participant.

A system of periodical progress reviews is being planned: with larger experience this will yield much valuable knowledge of the results and the time taken to achieve them. Already certain features stand out as vital. Under the hygiene section, the question of toilet management requires very careful analysis; in employment it may be a deciding factor, and undoubtedly it drastically increases the person's self-respect. Even a quite young child resents being dependent on others for such help. The time factor in dressing and putting on appliances can be a serious hindrance; careful thought and practice given to the method of doing these can be rewarding. For example, it may be better for a child to put on his footwear and callipers before a spinal support, otherwise he may find it impossible. These are elementary points, but frequently they are overlooked and much time is wasted. A practical try-out can soon settle the doubt.

As our team's experience grows, the advice can become more precise and be given earlier. Simple modifications of clothing which really economize time and effort can be settled at the start: there is here real value in having a mixed team.

Value of the Method

Even in the limited period of its operation the value of the approach has seemed clear, and the staff have found it instructive, stimulating, and, on occasion, starkly revealing of how severe these handicaps can be in daily life. It has evoked really hard thinking with regard to ways and means of overcoming these handicaps. Sometimes the difficulties prove baffling. Equally, the conference allows a much greater pooling of ideas and suggestions: this has been especially so in matters of clothing adjustments, aids, and functional training. It avoids the predicament of discovering a serious social limitation at the last moment, when employment is looming up and no time is left to tackle it.

Where a psychological attitude impedes co-operation the psychiatrist can advise and the whole team then work in concert to overcome it. This can sometimes be the key to success; a severe attack of poliomyelitis coming in early teenage can have a devastating impact, and it needs very good team-work, in an atmosphere of guarded optimism and confidence, to tide over the worst phase. This we have seen more than once.

The team involved may appear large and the method extravagant of time. So far this has not been borne out—if anything, rather the reverse: by having the complete picture presented to all simultaneously it has reduced cross-reference of difficulties. The seriously disabled child calls on many services—medical, nursing, physical treatment, educational, social, psychological; therefore the closer the integration of the team-work the better the results.

As experience grows we find each case can be considered more expeditiously and quicker solutions reached. The question of medical responsibility may be raised against the method. I do not think this responsibility is affected: the surgeon decides what surgery should be done, and when; and the plan is worked out by agreement. Medically, I think we have moved into the era of team-work, and frank discussion can extend one's knowledge usefully: thus in the long run one may become a wiser and more considerate counsellor.

Finally, the courage and optimism of such disabled children give a spur—if such is wanted—to our ingenuity, and act as a reminder of our own good fortune in having whole limbs. "Over and over again this courage has enabled them to do the seemingly impossible."

Illustrative Cases

Case 1.—Girl aged 6 years 11 months; average intelligence, I.Q. 100+. Disability: poliomyelitis, upper limbs; left arm flail; right arm, limited hand function only. Socially very

handicapped: can perform a number of play activities—for example, dressing dolls—with her feet. Cannot adjust clothing for toilet; can feed herself a little, using a spoon or fingers; needs almost all dressing done; is afraid of stairs (had a fall at home and fractured her left humerus) as she cannot protect herself. The problem posed was whether hand function would be adequate to gain much independence, or whether she should be trained to use her feet. The case conference showed that training could achieve much regarding toilet; modifications to clothing could help with dressing; training, and the building of confidence, could overcome the fear of stairs. Operative treatment would improve thumb opposition, and hence hand function. It was agreed that the hand was sufficiently good for every effort to be made to improve its use and not to turn entirely to feet training.

Case 2.—Girl aged 15 years 9 months; I.Q. 87. Disability: arthrogryphosis multiplex congenita, all limbs; minimal power in both arms and both legs. Between May, 1942, and May, 1954, this girl had 13 orthopaedic operations—six on the arms and seven on the legs—also 10 manipulations under general anaesthesia, with plaster-of-Paris splints; at various hospitals. At the end of this formidable programme she remains grossly handicapped: virtually everything has to be done for her—feeding (mainly), dressing, toilet, washing, and bathing (completely). She can roll from side to side in bed; she can write with her mouth, and drink by holding a cup in her teeth or using a straw; she can walk with callipers and surgical boots (when they are put on for her) on the level and up a slight incline going sideways. She cannot protect herself if she falls. It seems possible that some of the surgery may have had an adverse effect; certainly much of it failed in its purpose. The case conference clearly exposed the serious degree of social handicap, and showed that residential placement was the only solution in view of family difficulties. It was decided that work, using her mouth, should be found to give her an interest and a sense of usefulness. Had the functional method of assessment been applied at an earlier stage the amount of operative and manipulative treatment might well have been reduced. As she cannot manipulate knee locks on the callipers, sitting is very awkward: she has to either stand or lie. She requires a special chair with foot-rests; this is being evolved.

Case 3.—Boy aged 11 years 4 months; I.Q. 165. Disability: poliomyelitis, upper limbs; right arm flail; left arm, very limited function. A highly intelligent boy who has taught himself many trick methods: limited over toilet, cutting up food, and parts of dressing and washing. Left-hand function could be improved by surgery. Should go for academic career; educational needs are therefore very pertinent. The case conference revealed that simple modifications of clothing would assist with toilet management; special toothbrush and long sponge needed; tests for feeding aids were required. Operation should be undertaken early to allow time for working for G.C.E.; date settled. These were the main immediate agreed points; each was allocated to the appropriate person—for example, occupational therapist to evaluate feeding aids, assistant matron to arrange clothing alterations with sewing-room staff.

Case 4.—Boy aged 14 years 4 months; I.Q. 111. Disability: poliomyelitis, upper limbs; right arm flail; left arm very poor. Late onset of poliomyelitis at age of 12. Always keen to take up farm work. Average intelligence, deeply resentful of his disability. Is heavily handicapped, requiring help with toilet, feeding, dressing, washing, bathing; has to use his mouth in writing. Social conditions difficult: mother deserted family; father lives in lodgings, but is concerned for boy's welfare, financial position difficult. The case conference emphasized the serious degree of handicap: the psychological attitude required expert advice by the psychiatrist. Surgery could improve the function of the left hand, and should be started at once, as time is short; even then he should be trained to get the maximum use of his feet. The home conditions need careful investigation and

stabilization, so that simple home aids can be used. Employment will require hard thought. Modified footwear is desirable.

Conclusions

Proper evaluation of this approach to functional disability needs prolonged and careful study by a team who can watch and review the children over the full period of training and treatment.

The method can anticipate forward problems, thus allowing time for better advance planning.

It provides a forum at which experience and advice can be pooled and the overall needs of the child considered.

The approach is factual and systematic; it presents a complete picture and provides a method of checking progress.

Social difficulties are more clearly foreseen; hence the almoner can start early investigations and discussion with the family and authorities.

When the scheme has been longer in operation it should yield a useful pool of experience with wider applications.

The method is designed to deal with the more complicated and severe handicaps in children.

It improves team-work, yet need not conflict with medical responsibility.

I would like to thank the many members of the Heritage staff who are co-operating so helpfully in the scheme.

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CHALLENGE OF MONGOLISM

A meeting on "Current Research in Mongolism" was held on October 3, with Dr. L. T. HILLIARD in the chair, at the Fountain Hospital. Professor L. S. PENROSE, F.R.S., of the Galton Laboratory, began by describing mongolism as a challenge. It was a specific disorder and a common one, yet little was known about its causation. Many theories had been put forward, but they had little value without new data. Attempts must be made to find new data even though the results would often be negative. For example, the anti-genetic relationships between mother and child had been studied, but any deviation from expectation was in the direction of resemblance, not dissimilarity.

Studies on twins were difficult to interpret. One or two examples of concordant pairs of dizygous twins were now known, but no proved example of a discordant monozygous pair. Family studies showed only a low incidence of mongolism in the sibs of mongols; there was perhaps a two- or three-fold increase in the risk to sibs. The effect of maternal age was well known, but there was little evidence that maternal ill-health predisposed to mongolism. A maternal cytoplasmic factor was a possibility. He had therefore been interested in a pair of monozygous twin mothers in Dr. Carter's survey, who had each had a mongol child within a few years of each other. But he had also heard of an instance where it was the fathers who were monozygous twins.

Heredity and Environment

Dr. C. O. CARTER described some results of a survey of over 550 mongols on which he had been engaged with Mrs. K. EVANS at the Hospital for Sick Children, Great Ormond

Street. They had paid particular attention to possible aetiological and social factors. The findings on aetiology illustrated many of Professor Penrose's points. Among the twin pairs in the series, the 4 unlike-sex and 5 like-sex but probably dizygous pairs were discordant. Of the 4 like-sex pairs of unknown type because one twin was dead, one pair had been concordant. The finding that dizygous pairs were usually discordant suggested a genetic element in causation, since a purely environmental cause would be likely to affect both twins. The incidence in the sibs was low, but perhaps higher than one would expect by chance when allowance was made for the mother's age. Of a little over a thousand sibs 4 were also mongols, the random expectation being 2.6. Øster, in his second publication, reported that 7 sibs were mongols, the expected figure being 3.5. In contrast there were single families reported with several sibs affected, in one instance no fewer than 5; perhaps in a small proportion of families there was a higher risk of mongolism.

In looking for environmental factors it was important to remember the probable time in embryonic development at which the retardation in mongolism occurred. It had been suggested that this was from the 6th to the 9th week. In this series the malformations occurring unduly often all represented an interference with development concentrated within the 6th week. However, the histories of the mothers' pregnancies showed no consistent pattern of abnormal happenings at this time. Even if the fallibility of mothers' memories was allowed for, it was difficult to believe that any memorable event was the major cause of mongolism; the environmental factor was more likely to be something subclinical.

It was interesting that 3 of the 119 mongols in the series had died of leukaemia, an association which had been reported also from America this year. This might have some bearing on the findings of the next speaker.

Dr. URSULA MITTWOCH described some unusual features of the polymorphonuclear leucocytes in mongolism. These cells tended to have fewer lobes in the nucleus in mongols than in normals. In addition she had found that female mongol children had fewer "drumsticks" in the nucleus than in control children. There was an association between the number of lobes and of drumsticks in both mongols and controls, but if the number of lobes was held constant the mongols still had relatively fewer drumsticks than the controls. It was improbable that infection was the cause of the low lobe count, since the total white cell count in these mongols was not increased.

Educable Mongols

In the discussion following, Mrs. K. EVANS described some of the social findings in the survey from the Hospital for Sick Children. Most mongols were best brought up in their own families and trained in occupation centres. A period at home was usually desirable even if the children later had to go to an institution. Some of the unhappiest parents were those who had been over-persuaded to send their children to an institution in infancy. A few mongols managed well in schools for the educationally subnormal, and it was wrong to assume, without test, that a mongol child was ineducable. It was important in helping parents to make a good adjustment that someone should spend some time explaining, preferably on more than one occasion, the implications of mongolism. They should also offer the moral support of their hospital or institution in the early years of adjustment. Dr. J. STERN, of the Fountain Hospital, described biochemical changes he had found in mongolism, especially that the gamma-globulin was raised and that this was not explained by infection. Dr. L. CROME showed the brain of a mongol, explaining that the frontal lobe was particularly undeveloped, together with the middle lobe of the cerebellum, which was linked to the frontal lobe.

WESTMINSTER MEDICAL SCHOOL

The inaugural meeting of the session of the Westminster Medical School was held on October 22, when the prizes were distributed and a brief address was given by the Rt. Hon. VISCOUNT CHANDOS. The chair was taken by Mr. H. M. CLOWES, and a report on the year's work of the School was given by the Dean, Mr. H. E. HARDING. Among others present were Lord Nathan, chairman of the Board of Governors of Westminster Hospital, Lord Kershaw, a member of the Board, the Directors-General of the Army and Royal Air Force Medical Services, and the very Rev. A. C. Don, Dean of Westminster.

Before presenting the prizes and certificates, Lord CHANDOS spoke on rewards in the professions. Although professional people were not primarily concerned with monetary rewards, he said, such rewards did have a stimulating value. Few people turned down completely the possibility of reward, though he thought that doctors, who worked longer hours than most others, had on the whole smaller rewards. But those who devoted themselves to the cure and prevention of disease had the reward which came from investment in health, which properly understood was one of the richest investments possible. "I am not one of those who decry the principles of the National Health Service," said Lord Chandos. "I remember that when the Government of the day brought in the National Health Service on its present lines the Conservative Party, of which I am a member, supported them, and I still think that if we can eliminate the area of waste and reduce frustration such an investment by the State is socially desirable and economically productive."

Of the doctor himself he said that a man with a second-class brain, but having sympathy and imagination, could generally be more successful than a brilliant man who lacked such qualities. The more remote, impersonal, standardized, and inflexible the organization, the more necessary were the human qualities which the doctor brought to his task. The vote of thanks to Lord Chandos was proposed by Dr. G. H. MACNAB and seconded by Dr. R. I. S. BAYLISS.

Future Development

Mr. H. E. HARDING, the Dean, said that during the year the School had been visited by the University Grants Committee, and they were able to discuss what faced the School in the next quinquennium and the projects which it was hoped the Committee would support. Ten years ago the School Council thought plans should be made for a pre-clinical school; a premedical school as well was out of the question, as there was not enough land. Five years ago, however, when making their policy for the quinquennium, the Academic Board stressed the urgent claims for extension of the clinical school. The Board and the School Council had recently reviewed very carefully the space available, and were agreed that it would be entirely needed for expansion of the clinical school, and that plans for premedical and preclinical departments should be dropped. Westminster Hospital now had access in its teaching group and affiliated hospitals to nearly 1,000 beds, and the present clinical school was strained to capacity.

The proceedings terminated with a vote of thanks to the Chairman, proposed by Dr. F. DUDLEY HART.

Speaking at the annual meeting of the Metropolitan District Nursing Association on October 17, Miss PAT HORNSBY-SMITH, Parliamentary Secretary to the Ministry of Health, said that 24 million visits were paid by home nurses to over 1,100,000 patients in 1955. Owing to the introduction of new antibiotics there had been a great increase in the demand for injections. The nursing of old people to-day played a greater part than formerly, and the advantages of keeping sick children at home wherever possible had led to the development of special schemes in which hospital and district staff co-operated to provide care in the home.

Correspondence

Because of heavy pressure on our space, correspondents are asked to keep their letters short.

Anaesthetic Deaths

SIR.—The leading article on anaesthetic deaths (*Journal*, October 13, p. 868) gives an unduly alarming picture owing to the omission of two vital facts: first, that the death rate for 1953 is the lowest recorded for nearly 30 years; and, secondly, that the number of anaesthetics given each year is continually increasing.

There has been a steady fall in the number of deaths reported to the coroner as occurring during operation or within 24 hours, and the figure of 562 for the year 1953 is the lowest recorded since 1925. This fall has coincided with the introduction of the muscle-relaxant drugs and the use of antibiotics to control post-operative complications. And it must be remembered that in 1925 operations were far less severe than they are now, and also that far fewer anaesthetics were given for diagnostic procedures.

The second point is the great increase in the number of anaesthetics given. Statistics from London teaching hospitals show that over the last ten years the number of anaesthetics given has more than doubled, and it is fair to assume that this increase is general throughout the country. Yet the mortality continues to fall.

Unfortunately the number of anaesthetics given in England and Wales each year is not known. The survey carried out by the Ministry of Health in 1954 gave a total of 2,775,000 for the hospitals of England alone. The figures for nursing-homes, general practitioners, and dentists are unknown, but it is fair to assume that they would bring the total up to at least 4,000,000. And for the sake of comparison with the coroners' reports, a further 250,000 would have to be added for Wales on a population basis, which would produce a figure of one death per 7,500 anaesthetics. But this figure in the absence of accurate details can only be a speculative one.

The report of the committee set up by the Association of Anaesthetists¹ to study anaesthetic deaths should be made compulsory reading for all anaesthetists and surgeons. And the most important statement in that report is, to quote the words of the committee, "If the anaesthetic or surgical misadventure had not occurred complete recovery would have been highly probable in 46.8% (of the anaesthetic deaths). When, by means of better training and more complete equipment, this figure can be reduced to zero, then anaesthetists will be able to feel with satisfaction that the death rate has been reduced to its unavoidable minimum. But much remains to be done before this ideal is attained.—I am, etc.,

MASSEY DAWKINS.

London, W.1.

REFERENCE

¹ Edwards, G., Morton, H. J. V., Pask, E. A., and Wylie, W. D. *Anaesthesia*, 1956, 11, 194.

SIR.—In your leading article on anaesthetic deaths (*Journal*, October 13, p. 868) you state: "Too often the acute observer can see unconscious patients left unattended or in the care of a junior probationer." I have had a death under such circumstances and I submit that this deplorable risk to the patient will continue to be accepted until it is understood that the over-long operating list is good for neither the patient nor the science of surgery.

There is a most dangerous tendency for our nationalized hospitals to become surgical sausage machines, with the result that an undue strain is placed on surgeons, anaesthetists, and nurses. A great many surgical misadventures are

certainly due to this cause, and overwork is the commonest single factor operating against the recruitment of hospital staff. In the public interest, now that we are a nationalized industry, let us work the same hours as other national services.—I am, etc.,

New Barnet.

JOHN E. ELAM.

True Hermaphrodites and the Prostate

SIR.—"A Case of True Hermaphroditism," by Dr. J. D. Arnaud and his colleagues (*Journal*, October 6, p. 792), is an interesting and well-illustrated article.

In this particular case the authors found that the right gonad was an ovary. The left gonad consisted of two portions, one an ovary and the other a testis. There was a complete uterus, cervix, and vagina, and the phallus more like a penis than a clitoris. There was no trace of a prostate, which is of particular interest to me, because I have always contended that it is the entire prostate which is the homologue in the male of the uterus and cervix in the female. From this it follows that the prostate is functionless. It follows, too, that the presence of a complete uterus, cervix, and vaginal cavity in any true hermaphrodite completely rules out the presence of a prostate. It is conceivable, of course, that a hermaphrodite with an incompletely formed uterus might also have an incompletely formed prostate.

The subject of genital homologues makes a fascinating study. Apart from the gonads all the active genital organs and structures in one sex are represented in a rudimentary and functionless state in the opposite sex—penis and clitoris, mammary glands and nipples, etc. These so-called homologues, rudimentary as they may be, are actually reproduced as perfect miniatures. The only outstanding exceptions are the homologues of the uterus and prostate, two organs which are structurally so alike that it is indeed strange that this circumstance has not been more freely commented upon.

Many years ago the late Sir Arthur Keith seemed to be faced with a dilemma when he had to find some explanation for the absence in the male of an adequate homologue of the uterus and cervix. He explained it away by stating that the Müllerian ducts, from which the uterus, cervix, and part of the vagina arise, proceed to atrophy in the third month of foetal life in the male. As the musculature and glands of the uterus and cervix in the female are not laid down until the fourth month of foetal life, this explanation would appear to be satisfactory enough, were it not for the fact that the vagina in the female is also not completed until the fourth month, and is quite adequately represented in the male as the sinus pudicus.

There is, however, a very much more powerful argument in favour of the prostate being regarded as the homologue of the uterus, and it is that the prostate has no known function. Let us face it—will a function ever be found for the prostate? There is little to be said for the prostatic glands. It is the inert and functionless condition of the prostatic musculature which should excite most wonder. If the prostate is a gland, then it is more richly supplied with unstriated muscle than any other gland in the body. The behaviour (or lack of it) of the unstriated muscle of the prostate is contrary to that in any other part of the body. Even thin strands of unstriated muscle give rise to the most excruciating pain at times, and a thick mass of it, as in the uterus, is capable of agonizing activity and of superlative *tours de force*. Only in the prostate does unstriated muscle, and no mean mass of it either, lie completely and for ever inert.

There is much more evidence in a similar strain concerning this subject,¹ but space does not permit of its pursuance here.—I am, etc.,

Beaconsfield.

J. A. L. MAGEE.

REFERENCE

¹ Magee, J. A. L., *Uterus Masculinus*, 1939. H. K. Lewis, London.

Cardiovascular Collapse During Apomorphine Treatment

SIR.—In the course of investigation of anti-emetic drugs I have administered apomorphine to more than 100 normal subjects. I gave 1 mg. of apomorphine hydrochloride by subcutaneous injection, a much smaller dose than that used in "aversion therapy." Syncope occurred in six subjects. The usual course of events in these cases was that 5 to 10 minutes after the injection the subjects suddenly became very pale with cyanosis of the lips. Respiration deepened and there was profuse sweating. The subjects usually complained of dizziness and tinnitus, then cried out: "I feel I am falling away." An ordinary faint then followed, in the course of which the pulse rate usually fell to 40 or 50 per minute. The subjects regained consciousness within a minute or two, then slept soundly for an hour. One subject vomited during the faint and one on regaining consciousness. In three subjects the faint was preceded by tonic contraction of the extensor muscles of the back and neck lasting about 15 seconds, followed in turn by brief jactitating movements of the limbs and face, then by a fall to the ground. Many of these experiments were conducted with the subject seated immobile with restriction of head movement. In experiments when head and body movement were allowed, syncope also occurred, but less frequently. Syncope never occurred when apomorphine was administered to recumbent subjects.—I am, etc.,

Glasgow, W.2

BERNARD ISAACS.

Treatment of Iron-deficiency Anaemia

SIR.—Having read the article by Drs. E. Cope and R. O. Gillhespy and Mr. R. W. Richardson on the treatment of iron-deficiency anaemia, comparison of methods (*Journal*, September 15, p. 638), I would like to make a few comments on their findings. It is probably not generally understood that in the iron-deficiency anaemia of pregnancy the response to treatment, as estimated by the haemoglobin rise, varies considerably, depending on the stage of pregnancy. Up to the 20th week the response is usually very good. Between the 20th and 36th weeks, when the blood volume increases by about 25%¹ and the foetal demands begin to be felt, the rise in haemoglobin is naturally considerably less. Only after the 36th week does a slight improvement occur, and this appears to be due to a reduction in blood volume just before term. This triple type of response is seen with all modes of therapy, but is more obvious when iron is given by the oral route. Hence, in comparing methods of treatment, it is essential to make sure that the duration of pregnancy is the same in each group, especially when, as in Drs. Cope and Gillhespy and Mr. Richardson's series, small numbers of patients are being included in some of the groups.

Another factor which alters the rate of haemoglobin regeneration in pregnancy is that of hospitalization. On a normal ward diet, without adjuvants, the rate of haemoglobin regeneration with oral iron therapy is almost doubled once the patient is put to bed. This is not so obvious with intramuscular iron therapy. Drs. Cope and Gillhespy and Mr. Richardson did not make it clear how many of their patients on oral iron were admitted to hospital, but it is significant that optimum results in this group can only be obtained by admitting all patients to hospital, and this, of course, is a practical impossibility.

Finally, the amounts of iron actually given in their series are worthy of consideration. Seventeen days of oral iron therapy, as prescribed, would make a total of 1,785 mg. of metallic iron available to the patient, of which, according to the authors, 35%, or 625 mg., would be absorbed. Since all groups received the same, presumably 625 mg. of intramuscular iron was administered to the other patients in the seventeen-day observation period. This amount of iron is well below the average required by our anaemic patients, and, neglecting foetal demands and blood volume changes, which of themselves may require 500 mg. of elemental iron,²

would only raise the haemoglobin of an anaemic patient by an average of 1.8 g. Thus it is possible that in Drs. Cope and Gillhespy and Mr. Richardson's series some of their more severely anaemic patients were actually undertreated and would have shown greater haemoglobin increments if more intramuscular iron had been made available to them in the seventeen-day observation period.—I am, etc.,

Glasgow, C.4.

JEAN M. SCOTT.

REFERENCES

- Dieckmann, W. J., and Wegner, C. R., *Arch. Intern. Med.*, 1934, 53, 71.
- Scott, J. M., *British Medical Journal*, 1956, 2, 635.

SIR.—The very interesting article, "Treatment of Iron-deficiency Anaemia," by Drs. E. Cope, R. O. Gillhespy, and Mr. R. W. Richardson (*Journal*, September 15, p. 638) does seem to demonstrate that ferrous succinate is as valuable a haematinic as parenteral iron preparations. Further thought, however, raises two serious doubts.

The first is whether such a conclusion is justified even by the criteria implicitly laid down by the authors. For instance, 11 of their "medical" cases failed to respond to ferrous succinate, though they did respond to intramuscular iron. It is not stated whether these patients were included among those 45 medical cases for which the authors give an average daily haemoglobin rise; their omission could well lead to a figure for this rise that would not reflect the true picture. Then, too, as there were among the antenatal patients 133 on ferrous succinate but only 21 on intramuscular iron, the results in two such disproportionate groups might well not be significant. Will the authors tell us if any statistical analysis was, in fact, attempted? The second and more important doubt is whether the authors' criteria were in fact valid criteria to use. Should one assess the value of a haematinic, as the authors do, on an average haemoglobin rise over a period of only seventeen days or on the average time taken to bring the haemoglobin level up to 100% and on the patients' subsequent progress?

It is in the latter respect that recent work seems to demonstrate the superiority of parenteral over oral iron preparations. Very briefly, a healthy adult man has a body store, a reserve, of iron of some 1-1.5 g., compared with 3-3.5 g. of iron in circulating haemoglobin. The first step in the development of, say, a chronic post-haemorrhagic anaemia is the using up of these stores for haemoglobin synthesis: the haemoglobin stays for a time at 100% and there are no symptoms. It is only when these stores have been depleted that the haemoglobin level starts to drop and the patient to complain.

Now a good oral iron preparation, such as ferrous succinate, will in a high proportion of patients restore a low haemoglobin to a normal level reasonably quickly and without much in the way of side-effects. However, as the haemoglobin level rises so does the intestinal mucosal block to iron absorption become more effective; and indeed, at a haemoglobin level of 100%, iron absorption from any oral iron preparation is very small—certainly too small to build up the lost iron stores in any reasonable time. One group of American workers¹ has demonstrated, for instance, that even six months' administration of oral iron has no effect on depleted iron stores.

Parenteral iron preparations have not got to pass the mucosal block: they are always absorbed in their entirety, so that, in a manner of speaking, once they have restored the haemoglobin level to normal in an anaemic patient they at once go on to build up the body's stores of iron. With these repleted, the patient has a fairly adequate "buffer" against an early recurrence of the anaemia. Indeed, it is probably the failure of oral iron preparations to do more than merely raise the haemoglobin level that is responsible for those many patients who return to their doctors time and time again with anaemic symptoms—each time to receive oral iron, to respond, and then to relapse again in a few weeks.

This new and fascinating subject of body iron stores is excellently summarized in an article by F. G. J. Hayhoe,² and I should like to recommend this article to your readers.

OCT. 27, 1956

CORRESPONDENCE

BRITISH
MEDICAL JOURNAL 997

Whatever the views of Drs. Cope, Gillhespy, and Richardson on the relative merits of the two types of preparation in raising haemoglobin levels, they will, I feel sure, agree that ferrous succinate, unlike intramuscular iron, will not restore the body's reserve of iron except over a very long period. And that surely in 1956 is the crucial point in any comparison.—I am, etc.,

S. BRADSHAW.

Benger Laboratories Ltd.
Holmes Chapel, Cheshire.

REFERENCES

- Haskins, D., Stevens, A. R., jun., Finch, S., and Finch, C. A., *J. clin. Invest.*, 1952, 31, 543.
- Hayhoe, F. G. J., in *British Encyclopaedia of Medical Practice: Medical Progress*, 1956, edited by Sir Henry Cohen, p. 47. Butterworth, London.

SIR.—The article entitled "Treatment of Iron-deficiency Anaemia" by Drs. E. Cope and R. O. Gillhespy and Mr. R. W. Richardson (*Journal*, September 15, p. 638) requires some qualifications with respect to its claim to fill a gap in scientific investigation.

No physician should be content to claim success in treatment until the disease he is treating is cured, and yet the authors compare the therapeutic value of oral and parenteral iron preparations by confining the observations to a 17-day period: the patients were therefore still anaemic at the time when conclusions concerning the therapeutic value of these iron preparations were drawn. A fair comparison can only be made by following patients until they are cured of their anaemia—and ideally this includes evidence of an adequate iron store, particularly in women and growing children.

In a severe iron-deficiency anaemia the initial response to treatment with most iron preparations, including ferrous sulphate B.P., is remarkably good. The limiting factor in haemoglobin regeneration is usually not the efficiency of intestinal absorption of iron but the bone marrow functional capacity. As the haemoglobin rises, the mucosal barrier becomes increasingly important and the poor absorption of oral iron now becomes a limiting factor in haemoglobin synthesis, and may considerably prolong or prevent full recovery and the replenishment of the depleted iron stores. The haemoglobin level at which oral iron absorption is severely impaired varies with each individual. It is, however, interesting to note that in their medical series the authors found that over 20% failed to respond at all to oral iron. These patients responded to intramuscular iron, but it is unfortunately not stated whether these oral iron failures were included in the figures given for the haemoglobin rise of the orally treated group. If the failures were in fact excluded from the oral iron group, the average haemoglobin rise for all patients treated by oral iron would of course be even lower.

In the antenatal and post-natal series the large differences in the number in each treatment group makes it difficult to draw significant conclusions from the available data, but it is highly improbable that even "ferromyn" (ferrous succinate) could alone account for such a satisfactory rise in the post-natal cases.

It appears that there still remains a gap in the scientific investigation of all the factors involved in the cure of iron deficiency anaemias.—I am, etc.,

BERTHA KLEMPMAN.

Wilmslow, Cheshire.

Penicillin V and Diabetes

SIR.—One of my patients, a severe diabetic aged 73, with arteriosclerosis, myocardial degeneration, and dyspepsia, recently developed pneumonia of the right lower lobe. He responded well to injections of procaine penicillin (600,000 units daily), so that his temperature settled and the clinical signs disappeared in 48 hours.

I continued the injections for two further days, during which his temperature remained normal, and he seemed well. Feeling then that injections were no longer required, but wishing to prolong the effect of the penicillin, I prescribed capsules of penicillin V (125 mg.), one four times a day. Within a few hours of taking the first capsule he developed heavy glycosuria and thirst, although he was being

maintained on his usual insulin (soluble insulin 120 units a.m. and 80 units p.m.), and was having less than his usual carbohydrate intake (because he "did not fancy it"). The worsened diabetic state continued for 36 hours, during which time the capsules were given, and then he started to vomit. The capsules were therefore stopped, and he returned to his normal stable condition within 12 hours.

The series of events suggests that the oral penicillin was the cause of the loss of control of the diabetes. Others who have occasion to treat severe diabetes with penicillin V should be on the look-out for a similar upset.—I am, etc.,

J. F. BURDON.

Paignton.

Treatment of Recurrent Urolithiasis with Aspirin

SIR.—I was interested to read your annotation on the treatment of recurrent urolithiasis with aspirin (*Journal*, September 15, p. 650). This treatment has been used very little, if at all, in this country and, as you say, is still in the experimental stage. I hope, therefore, that it will not be used indiscriminately until it has been properly worked out. At present we do not know if there are likely to be any untoward effects other than excitation of peptic ulcer.

I am at present, with the co-operation of some colleagues, trying out the effect of salicylamide on a series of recurrent stone formers, and we hope to have something to report in the future. The assessment of the prophylactic value of this treatment must not be made too soon, as it depends on a clinical comparison between treated and untreated cases. Moreover, the cases must have already had at least one recurrence, if not more. It will therefore be some years before one can really decide the true value.—I am, etc.,

S. HENRY C. CLARKE.

Hove, Sussex.

Abuse of Antibiotics

SIR.—May I correct the misconception which Dr. A. C. Mayer (*Journal*, October 13, p. 883) has placed upon my remarks about the abuse of antibiotics in this country (*Journal*, September 29, p. 767)? My aim was to condemn not a section of our profession but an attitude of mind which seems to me harmful—a motive similar, no doubt, to Dr. Mayer's own. I did not state, and I do not believe, that this light-hearted use of powerful drugs is confined to one section of the profession, although the example I quoted was from general practice.

It would obviously be rash to conclude that all men, or indeed all doctors, are fools on the strength of a single instance, but equally it seems unwise to allow overwork and underpay to creep in as justification for random prescribing, and the substitution of medication for diagnosis.—I am, etc.,

JOAN M. CURTIS.

London, N.11.

Early Management of Poliomyelitis

SIR.—I wish to point out to Dr. G. E. Breen (*Journal*, October 6, p. 828) that in my letter (*Journal*, September 15, p. 657) I did not retreat from my original attitude in the article of June 30 (p. 1539). I reiterated that the indications for admission were positive ones, and it still happens that patients are severely paralysed when first seen by their practitioners. Dr. Breen seems to be intent on misinterpreting what was written, or making unwarranted assumptions because he does not agree with the policy of home nursing under any circumstances. This policy is not a new one nor is it personal to me, and W. Ritchie Russell¹ considers that with adequate safeguards it has a place in the management of the pre-paralytic patient.

With regard to the statistics of admissions to the Blegdams Hospital, Copenhagen, during 1952-3, while these figures show a preponderance of paralytic patients (55%), Thomson² reports that in Denmark "in the epidemic year 1952, of 5,711 cases, 3,696 (65%) had no paralysis." Dr. Breen, by altering the context of my letter, makes it appear that I suggested that only a small proportion of meningitic cases

ever progress to paralysis. What I wrote was: "In advocating the domiciliary management of suspected and early cases in the meningitic phase—and after all only a small proportion ever pass beyond this stage . . ." My reason for stating that the suggested policy has not been a factor in the quoted fatality rate, and which he obviously disbelieves, is that it is only two years since the present policy was adopted and all the deaths, except four, occurred before this time, when all cases were accepted on request regardless of the stage of illness.

No one will disagree with Dr. Breen's rather obvious statement that all cases of life-threatening poliomyelitis should be brought under skilled observation and within reach of help at the earliest possible moment. But this does not mean that all cases of poliomyelitis are life-threatening, and it does not require "special divinatorial powers" (which I can assure Dr. Breen that my colleagues and I neither possess nor claim) to decide that a patient should go to hospital long before such an emergency arises—always supposing that the cases are seen early enough, and that does not always depend upon the doctor.

As long as the policy advocated is applied intelligently, the only figures likely to suffer are those of the hospital admissions.—I am, etc.,

E. G. BREWIS.

REFERENCES

- ¹ Russell, W. R., in *Poliomyelitis*, 1955, p. 139. World Health Organization, Geneva.
² Thomson, D., *Monthly Bull. Minist. Hlth (Lond.)*, 1954, 13, 83.

* This correspondence is now closed.—ED., *B.M.J.*

Pseudohaemophilia

SIR,—May I protest against the use of the word pseudohaemophilia? Provided the clinical condition under consideration is adequately defined, as in your annotation (*Journal*, August 11, p. 353), no great harm follows. But this word has been used to describe so many conditions that in itself it now has no meaning and should be dropped completely. Biggs and Macfarlane¹ use the term to denote a coagulation defect in the presence of an inhibitor. Whitby and Britton² apply the term to an abnormality of the clotting system, different from that described by Macfarlane, and also apply it to the familial syndrome with a long bleeding time, often called von Willebrand's disease. Even this latter appellation has been applied to cases dissimilar to those described by the author. At least one definite entity can be separated from this latter group which probably contains several syndromes. I called this syndrome diffuse capillary telangiectasia.³ This term, if cumbersome, is at least largely definitive.—I am, etc.,

Portsmouth.

J. R. O'BRIEN.

REFERENCES

- ¹ Biggs, R., and Macfarlane, R. G., *Human Blood Coagulation*, 1953. Blackwell, Oxford.
² Whitby, L. E., and Britton, C. J. C., *Disorders of the Blood*, 1953. Churchill, London.
³ O'Brien, J. R., *Proc. Int. Soc. Haematol.*, 1950, 546-8.

Shadow in the Lung

SIR,—The following interesting case history has just fallen into my hands.

A thin, active, nervous man, past middle age, submitted himself to "mass radiography," when unhappily a small shadow was seen in the lung field. Fuller investigation was pursued: repeat x-ray examinations confirmed the presence of the shadow, but its shape and size remained unaltered. Bronchoscopy on two occasions elicited nothing abnormal. Finally, some weeks after the first x-ray, thoracotomy was advised. A few days prior to the operation the patient's chest was examined clinically—it would appear that this was the first occasion. On the back of the chest an infected cyst was found: this was forthwith removed—the shadow was absent from a subsequent radiograph.

This patient was caused a great deal of preventable anxiety, for he was only too aware of the possible and

sinister implications of a shadow in the lung field in one past middle age. This cannot be glibly dismissed as a cancerphobia. Again, considerable expense was incurred by his stay in hospital, radiographs, other investigations, doctors' time, etc. As well as expense, there was some concern over the diagnosis. This case would seem to emphasize yet again that laboratory tests, x-ray investigations, etc., must and should only be considered against a background of careful history-taking and thorough clinical examination, which starts with "looking" at the patient.—I am, etc.,

London, E.11.

ERIC K. GARDNER.

Amnion Implantation in Peripheral Vascular Disease

SIR,—I should like to thank Mr. R. Rowden Foote for his excellent letter (*Journal*, September 1, p. 553) *re* amnion implantation. It is most interesting to see that other diseases, apart from the intermittent claudication of arteriosclerosis, are being treated in this way. I quite realize that amnion implantation will be tried for other forms of vascular disease, and it is gratifying to see an early pioneer in any field of surgery. I wish him all success in his further work.

May I also thank Dr. H. St. John Mansbridge (*Journal*, September 8, p. 606) for sending up the letter about a patient that I treated by amnion implantation for intermittent claudication? It was indeed pleasing to read of such good results. At the same time, may I thank Dr. B. S. C. Gaster for his interesting letter in the same issue *re* a patient suffering from intermittent claudication and treated by amnion implantation? The letter states that he could walk from the Athenaeum to Piccadilly. I am quite sure that for many readers it is unknown that walking from the Athenaeum to Piccadilly entails walking up a long and moderately steep gradient; in fact this is a most important clinical finding—namely, that the aforesaid patient could walk up an incline without any pain.—I am, etc.,

London, W.C.2.

E. TROENSEGAARD-HANSEN.

Tranquillizers

SIR,—I am writing because I am rather disturbed that some of my fellow practitioners may be taken in by a recent circular from the chairman of a certain firm of manufacturing chemists.

This circular lists the tranquillizer drugs (but not all of them) in order of cost, and by inference suggests that the product of this particular firm is the least costly to the N.H.S. and therefore is the most economical to prescribe. I wish to point out that in actual fact one of the most generally useful drugs in this group is not included in this circular and is appreciably cheaper—11½d. per 25—than any of the drugs so listed.—I am, etc.,

Bath.

C. D. PETERS.

Suicide

SIR,—I was interested to read the article by Dr. E. B. Strauss (*Journal*, October 6, p. 818), which I found informative and instructive. I should, however, like to comment on Dr. Strauss's treatment of ceremonial suicide, particularly amok. During my sojourn in Malaya I had the opportunity of studying a number of cases of so-called amok, which in Malay means an impulse to murder. A number of these cases were obviously not suffering from this syndrome and were diagnosed as cases of catatonic excitement and post-epileptoid states.

The European concept of this disease and that of latak, to which it may be related, has been described by the late Sir Hugh Clifford, former Governor of the Straits Settlements, in his book *Studies in Brown Humanity* (1893). He said that the Malay who has lost face suddenly went amok, knowing that, as suicide was against his religious beliefs, anyone was privileged to shoot or cut him down. I spoke to many Malays, who informed me that they would never consider this method of death involving cutting down friend

or foe, old men and women or children; they said that such a person was suffering from "*kapela pusing*" (confusional state).

The cases which I considered to be suffering from amok had an initial period of anxious preoccupation passing into a phase of homicidal excitement, subsequently falling into a deep sleep. On awakening they were in an unstable nervous condition for several months. A sea captain, knowing of my interest in this disease, asked me to examine one of his crew who had been amok. The sailor, who had been sitting apart for several days, suddenly became wildly excited. He was seized and put into irons before any damage was done; meanwhile the sailor was screaming and shouting that he was surrounded by devils. Later he became quiet and fell into a deep sleep; on awakening he had no recollection of his conduct.

Although latak occurs in men and women, I have observed amok only in men. It has been suggested that amok is restricted to districts where quartan malaria is an endemic disease. A number of my cases were addicted to hashish. My experience would suggest that amok is not a ceremonial suicide but a definite psychiatric syndrome.—I am, etc.,

Wakefield Yorks

D. FENTON-RUSSELL.

SIR,—Dr. E. B. Strauss writes (*Journal*, October 6, p. 818) that as a boy he remembers "being very impressed by the half-starved, often deformed, repulsive-looking beggars whom one used to see congregated outside churches in Latin countries" and "expressing surprise that they did not commit suicide." He thinks that the answer is given by Durkheim,¹ who found that the suicide rate among Catholics is a mere fraction of that among Protestants. Dr. Strauss explains this by the compactness and cohesiveness of Catholic culture.

Unfortunately, the explanation does not look as if it will prove so simple. A recent Swiss monograph² fails to show this wide discrepancy between the religions in suicidal attempts, and suggests that in Catholic countries suicide is concealed and a statistical illusion is created. In support of this it is shown that in Switzerland the number of deaths by violence is the same in all cantons. While the suicides are indeed fewer in the Catholic cantons, the number of deaths by "accidents" is much higher than in the non-Catholic cantons. Helweg-Larsen's³ review of concentration camps showed that apathy and diminished power of spontaneous reaction were early and constant changes related to malnutrition. "Suicidal attempts were quite exceptional" he notes. Possibly the explanation of the beggars' behaviour lay in their half-starved condition. This, I believe, was already reckoned to provide some assurance of better things to come. It has perhaps not been widely recognized to date as a more immediate blessing in disguise.—I am, etc.,

A. A. ROBIN.

Wickford, Essex.

REFERENCES

- ¹ Durkheim, E., *Le Suicide*, 1897. Paris.
² Schneider, P. B., and Blanc, C., *La Tentative de Suicide*, 1954. Delachaux and Niestlé, Neuchâtel.
³ Helweg-Larsen, P., Hoffmeyer, H., Kieler, J., Thaysen, E. H., Thaysen, J. H., Thygesen, P., and Wulff, M. H., *Famine Disease in German Concentration Camps*, 1952. Munksgaard, Copenhagen.

Liquorice-all-sorts as Anastomotic Aid

SIR,—It seems to be the general opinion, and it certainly has proved advisable in my experience, that anastomosis between a distended proximal and a narrow distal ileum in neonatal obstruction from ileal stenosis or atresia should be end-to-end. This is often technically difficult, chiefly because of the difference in size between the two ends, though the problem may be somewhat simplified by dividing the small segment very obliquely as suggested by Nixon.¹ It seemed, therefore, that some form of intraluminal splint over which the anastomosis could be performed would be an advantage so that the lumen at the site of anastomosis is properly maintained. Such a splint should be easily shaped at the operating table; it should be readily absorbable, but not too quickly so; and it should be of a consistency which

will not damage the intestine. We have found the solid, spiral cylindrical all-liquorice variety of liquorice-all-sorts to have these properties and to be very suitable for use for this purpose. For the last few years we have always had a collection of these sweets available when this operation is contemplated. It might also be that the very mild aperient action of liquorice is not a disadvantage in the distal collapsed segment of ileum.—I am, etc.,

London, W.1.

REFERENCE

- ¹ Nixon, H. H., *Arch. Dis. Childh.*, 1955, 30, 149.

PETER MARTIN.

Hibernation in Shocked Patients

SIR,—Congratulations to Dr. Sheila Kenny (*Journal*, July 28, p. 211) on her success with "hibernation" in her severely shocked patients. It occurred to a number of us doing our physiology for the second time after the war for the primary fellowship that the logical way to treat shocked patients was to cool them. The era of piling on blankets and hot-water bottles was passing and the exposure of a limb with doubtful blood supply was well established. However, we were unable to get any of our clinical colleagues sufficiently interested at that time. Of course we were not then thinking of the fully developed hibernation technique as used by Dr. Kenny.

Still, it would be interesting to hear how casualty surgeons are now treating their shocked patients, and to have their reactions to the possibilities of cooling, or at least not warming, them if they are not already doing so.—I am, etc.,

Nairobi.

ANDREW HICKS.

Troublesome Staphylococci

SIR,—The increasing incidence of staphylococcal disease has been causing anxiety to clinicians for some time. The papers by Professor Walsh McDermott (*Journal*, October 13, p. 837), and by Professor Ronald Hare and Dr. C. G. A. Thomas (p. 840), and your leading article on the troublesome staphylococci (p. 867) are well timed. In addition to the methods of transport of infection mentioned in these articles, the staphylococcus is spread by vulvo-vaginal secretions, as is shown by the development of signs in one child after another in the same household. Since such staphylococci have become resistant to penicillin and other drugs, the family doctor finds these children difficult to treat. The condition tends to become chronic and is responsible for many cases of long-standing vaginal discharge causing redness, vulval soreness, and irritation, but not necessarily any general ill-health.

In order to obtain a satisfactory culture of the organism so that its susceptibility to other antibiotics can be tested, specimens must be taken from the apex of the vagina and preferably from the cervix through a child's speculum. Investigation of even a mild case along these lines is likely to prevent the spread of infection in schools through the use of toilets, etc., and to reduce the incidence of vaginal discharges, for which advice is often only sought after puberty.—I am, etc.,

London, W.1.

G. M. SANDES.

SIR,—" . . . to-day we are seeing with greater frequency the actual development of staphylococcal disease in patients after they have come into our hospitals than was formerly the case" (Dr. Walsh McDermott, *Journal*, October 13, p. 837). This statement, made in New York, is equally true for England. Why has this change occurred? Part of the answer is provided by Professor R. Hare and Dr. C. G. A. Thomas (p. 840). In the leading article (p. 867) it is written: "There is at least a strong suspicion that antibiotic-resistant staphylococci have a greater capacity for epidemic spread than sensitive strains and perhaps a different capacity for producing lesions." This "epidemic spread"—apart from "food poisoning" outbreaks—is limited almost entirely to hospitals. Again, why? Briefly, because infective particles are principally disseminated in hospitals, and the density of these aggregations of infective particles is greater in the air

of hospitals than elsewhere (as Professor Hare has shown). There is some evidence that "wearing a sterile gown over ordinary clothing does not prevent dissemination of infected particles," but the sterile gown does appreciably reduce the density of infected particles in the circumambient air of the person under test. (By density I mean the degree of crowding of infected particles in the air.) In actual practice this aggregation of infected particles in air can be dispersed and neutralized by dilute "hibitane" used in a "microsol" sprayer. Infected dust clinging to hangings round ward beds can be sterilized by this means. Clothing can be disinfected regularly by exposing it to moist warm formalin gas in the hospital autoclave or in a "sparkhall." Clothing so treated is not damaged in any way. Important and very capacious reservoirs of infected particles in the shape of dust are the mattresses of hospital patients' beds, and their pillows (as Professor Hare mentions); both these reservoirs can be neutralized by regular treatment with hot moist formalin gas in an apparatus. Blankets should be washed regularly in "lissapol" and then soaked in "fixanol C" and dried without further rinsing. Sterile gowns soaked in dilute benzalkonium solution and dried without rinsing might be better protection than untreated sterile gowns. Efficient masks prevent the dispersion of infective crusts, etc., from the nose as well as "droplets," which are important for microbes other than staphylococci. Floor dust can be immobilized by a variety of methods.

Evidence for the measures here recommended can be found in the paper by Miss Helen Rodway and me.¹ I do not agree with Dr. McDermott when he writes: "Moreover, as staphylococci are so ubiquitous, an approach based on attempts to eliminate them from the environment would not seem hopeful." In my opinion, to eliminate staphylococci from the micro-environment represented by a hospital is not only feasible but would be rewarding in high degree.—I am, etc.,

Epping, Essex.

FRANK MARSH.

REFERENCE

¹ Rodway, H. E., and Marsh, F., *Lancet*, 1954, 1, 125.

Speech Therapy

SIR,—May I, on behalf of speech therapists, say how much we welcome Dr. R. Macdonald Ladell's expression in his letter (*Journal*, October 13, p. 884) of the view that "stammering cannot be treated as if it were merely a matter of correct enunciation" but rather that it is the "domestic atmosphere" which requires a change. This we strive to bring about through our interviews with the parents at the clinic or in the home. I do not here refer to such problems as stammering clutterers or others such as those with cleft-palate speech who also stammer, but only to "pure" stammerers.

Since speech is a psycho-physical process of incredible complexity it is not surprising that when environmental circumstances are highly unfavourable a breakdown of this chief means of expression of thought and feeling should occur. As would be expected, this speech breakdown occurs, in the vast majority of cases, in the early years of the child's development. Unfortunately a great many stammerers do not reach us until years after the onset of the disorder—often not until they are adults. So we have also to strive to facilitate adjustment on the part of the stammerer to the social situation. Then, too, visits to the school are necessary so that we may guide the teacher—faced with a stammerer in the class—as to how to assist in the rehabilitation, and how to avoid exacerbating the difficulty of that particular stammerer at that particular moment.

As a considerable proportion of early stammerers do not recover spontaneously, we question whether the still fairly prevalent advice to the parents on the part of general practitioners that "he will grow out of it" is always of the best. So often, when at last the patient is referred, or when at last the parents have been able to accept the advice to avail themselves of the specialist's help, we find that the condition has deteriorated rapidly and severely.

Dr. Macdonald Ladell has noticed that the dammed-up aggression, which often to a great extent contributes to the inhibition of speech, is usually against the father. Would, therefore, the male therapist, by rule, be the more suitable one to deal with the stammerer?—I am, etc.,

Chepstow, Mon.

RUTH BENNETT.

Medical Witnesses

SIR,—We beg to draw attention to a topic which doctors often discuss with concern but which is not aired, presumably because it is a somewhat delicate matter. There is discernible a marked tendency for some medical witnesses to give evidence in categorical and emphatic terms which would be hard to justify on any set of facts in the present state of medical knowledge. This leads to inexplicably wide differences of opinion between medical experts who have the same evidence at their disposal. It is very confusing to the public, who draw their own conclusions. A High Court judge has said, "Doctors always disagree in court but always agree in consultation." Laymen may be excused if they wrongly conclude that medical experts are not very proficient or that they are influenced by the doctrine, "Who pays the piper calls the tune." This loses prestige for the whole profession. It leads to undignified divisions of opinion and unfortunate slurs on colleagues and medical institutions. Sometimes the cause of justice is badly served.

The large majority of doctors testify with a high sense of duty, but are often reluctant to appear at all. A minority, often very frequent testifiers, risk bringing discredit to the profession. "Science begets knowledge; opinion ignorance" (Hippocrates). It is indeed difficult to speak "the truth, the whole truth, and nothing but the truth." To approach this ideal, witnesses must have enough humility to recognize their own fallibility and the limitations of the corpus of medical science. These limitations can hardly be fully appreciated by the other learned professions who take part in the administration of justice, and this increases the load of responsibility borne by the expert medical witness.—We are, etc.,

J. CLAPHAM COATES.
IAN D. INNES.

Hull, Yorks.

Doctors in Hungary

SIR,—Having been in Hungary this summer I read with great interest the letter from Mr. Ron Ledger, M.P. (*Journal*, October 13, p. 886). I am sure that doctors in England would be grateful if he could amplify some of his statements. For instance, how much in forints per month is the salary given to each doctor? Does he have to incur expenditure on surgery accommodation, etc., in State and/or private practice? I am surprised to hear that the State Health Service only covers 5 millions of the inhabitants. We were informed that it was universal. Who and what are the 4.5 millions uncovered?

I agree that no one appears to starve in Hungary, but the dreariness, drabness, and low standard of living displayed everywhere makes one speculate as to where there can be a lucrative source of private practice.—I am, etc.,

London, S.W.12.

W. P. M. DAVIDSON.

Biography of James Braid

SIR,—I am collecting information about the life and work of James Braid, the Manchester surgeon who originated the term "hypnosis," with a view to writing a biography of him. He was born in 1795 and died in 1860. I should be grateful for any help which any of your readers may be able to give me, either by putting me in touch with descendants of Braid or by drawing my attention to letters by and about him or similar data. Any material forwarded to me at this address will be returned with care after it is examined.—I am, etc.,

Maudsley Hospital,
Denmark Hill,

LAWRENCE GOLDIE.

Obituary

A. H. GALE, D.M., D.P.H.

Dr. A. H. Gale, director of medical postgraduate studies and lecturer in epidemiology at the University of Bristol, died on October 12, aged 55. Before moving to Bristol in 1950 Dr. Gale carried out numerous important epidemiological investigations while working as a medical officer at the Board of Education and at the Ministry of Health.

Arthur Harold Gale was born on August 31, 1901, the son of Dr. A. K. Gale, of York. From Dover College he went on to Trinity College, Oxford, continuing his medical education at University College Hospital. Qualifying in 1926, he graduated B.M., B.Ch. in 1927 and proceeded to the D.M. in 1933. After holding the posts of house-surgeon and house-physician at University College Hospital he took the D.P.H. in 1930 and became an assistant medical officer of health and assistant school medical officer in Surrey. One of the first papers he published, in 1933, was on the testing of children's hearing by the gramophone audiometer.

In 1933 he was appointed to the staff of the Board of Education as a medical officer, working under Sir George Newman and Dr. R. H. Crowley. One of his first duties was to investigate the effect of the economic depression on the nutrition of children. His clinical judgment was always sound, and he got on well with children, schoolmasters, medical officers, and educational committees. He was at his best dealing with the problems of the treatment and education of handicapped children, work which he carried out with skill and a very human tact and sympathy. An ideal colleague, he was modest, serene, kind, always ready to help, and as well liked by his opposite numbers of the administrative side as by his fellow medical officers. In the war he assisted the Ministry of Health in many ways, including the nightly inspections of air-raid shelters.

His work in the epidemiology of the infectious diseases of children brought him a larger audience. In 1944 he was Milroy Lecturer at the Royal College of Physicians, and his studies on the changes in the mortality and incidence of the principal infections of childhood were published in the *Proceedings of the Royal Society of Medicine*, the *Archives of Disease in Childhood*, and the *Monthly Bulletin of the Ministry of Health and Public Health Laboratory Service*. To the last-named he was also a frequent contributor on other subjects. In 1947 and again in 1949, with Dr. W. H. Bradley, he arranged two nation-wide hospital inquiries on poliomyelitis, and together they wrote the reports upon the facts they had ascertained, reports which are of outstanding importance in the history of poliomyelitis in this country. In 1949, with B. Benjamin, he wrote on the age-distribution changes shown in poliomyelitis in England and Wales. Other subjects which he ably illuminated included

children's deaths from violence and the causes of severe deafness in children. In a refresher course article published in this *Journal* he summed up the pros and cons of tonsillectomy.

In 1950 Dr. Gale accepted the newly designated office of director of postgraduate medical studies in the University of Bristol, together with the lectureship in epidemiology. He was also honorary consultant in epidemiology to the United Bristol Hospitals. He is survived by his wife and two children.—J. A. G.

We are indebted to Professor R. MILNES WALKER for the following appreciation:

The early death of Arthur Gale will leave a gap in the medical organization in the south-western region. Since 1950 he had held the Bristol University appointment of director of postgraduate studies, with which he combined a lectureship in epidemiology. This double appointment brought him into contact with the medical services from Gloucester to Land's End, but since the introduction of the pre-registration house appointments part of his time has been occupied in seeing that graduates of Bristol University found suitable resident posts. As a member of the joint Registrar Appointments Committee he was responsible for the interchange of registrars between the teaching hospital and the hospitals under the regional board. The thorough yet gentle way in which he set about his tasks and his solution of problems, often in the face of conflicting interests, led to a confidence in his guidance which was shared by all who worked with him; he would take endless trouble in seeing that all points of view were considered and that every claim received just treatment. In this way he formed an important link between the university, the board of governors, and the regional board, and he enhanced the happy relations which exist between them. During the last year he had had poor health, but he was always happiest when at work and was just getting into his stride again when the last illness burst suddenly upon him.

He was a man who sought nothing for himself and was always ready to help others; his colleagues in Bristol will miss him, as the work which he was doing so ably will have to continue; he has been responsible for making it an essential part of the medical services of the country.

D. K. L. LINDSAY, O.B.E., M.D., D.P.H., D.T.M.

Colonel D. K. L. Lindsay died at Bexhill on October 15, aged 52. Until recently he had been working for the World Health Organization in Ethiopia.

David Kenneth Llewelyn Lindsay was born of British parents on August 9, 1904, in Paraguay, where his father, the late Dr. J. W. Lindsay, was practising medicine. The Scottish accent of his father was mellowed by the Spanish that he learned as a child. Educated in Edinburgh, he graduated M.B., Ch.B. at the university there in 1929, proceeding to the M.D. in 1933. He took the Liverpool D.T.M. in 1930, and in the same year returned to Paraguay, where he was admitted M.D. at the University of Asunción. His stay there was short, but long enough for him to publish two valuable papers about medical practice on the Brazilian frontier and on American leishmaniasis. After returning to London he held postgraduate appointments before joining the Indian Medical Service in 1933. Much of his service was as a civil surgeon in Burma. Early in the Japanese advance into Burma in 1942 he set off from Lashio, after waiting longer than self-security dictated and no shorter than his duty allowed, to escape out of Burma. Within a few days he and the three medical sergeants with him were ambushed and their car lost. He dauntlessly led the party to Kunming, a walk of about 500 miles. He was next posted to New Delhi to plan and prepare the rehabilitation of medical services in Burma when that

country was freed. When he returned to Burma he showed the maturity of his character by his tremendous energy, sound judgment, and the highest standards of conduct, which were to remain with him the rest of his life. He was appointed O.B.E. in 1943, and was also mentioned in dispatches in 1946 for his gallant and distinguished services in Burma.

On leaving Burma soon after the country attained its independence, Lindsay completed his studies for the London D.P.H. in 1949, studies which had been interrupted by the war. His next appointment was to a hospital group at Prestwick, where he found his administrative experience in the I.M.S. of great value. When he felt he had done all that was required he resigned and soon after joined the field staff of the World Health Organization in 1952. He served with distinction in Libya for two years and was working in Ethiopia when the symptoms of his last illness first appeared in 1954.

J. H. B. writes: The death of Kenneth Lindsay, after an illness of nearly two years which, almost from its start, he knew must be fatal, brings to a premature close the career of one of the most outstanding officers of the late Indian Medical Service and a medical man of high attainments and great promise. In the I.M.S. he speedily made his mark and was selected for civil employ in Burma in December, 1935, after the minimum obligatory period of military duty of two years, during which, however, he had served as command consultant in dermatology.

In Burma Lindsay found ample scope, and his exceptional capabilities speedily became apparent. After holding various civil surgeoncies and a period of study leave spent mostly in Prague, in 1940 he was appointed civil surgeon, Northern Shan States, with his headquarters at Lashio. This district was notoriously unhealthy. Malaria was hyperendemic and the spleen rate, as Lindsay records it, 98%. Moreover, to the normal duties of a civil surgeon—responsibility for preventive measures in his district and the running of the district hospital and its satellite dispensaries on the curative side—was added responsibility for the preventive and curative care of the labour force of the western part of the Yunnan Highway, better known as the Burma Road. This involved preventive measures against all endemic and many imported diseases, for the latter of which the motley and cosmopolitan labour force and the inevitable crowds of clerks, overseers, traders, and adventurers which accompany such projects were responsible. Some idea of the magnitude of the task may be gathered from the fact that the main labour hospital organized by Lindsay received 40,000 acute cases in two years and was, in his words, "a clinician's paradise such as few have seen."

To quote him further: "Work here came to a sudden end in 1942 when the population fled before the Japanese armoured columns. Remaining behind to help refugees, I was attacked while assembling medical supplies, but, escaping with only a slight wound, reached a Chinese air-field [after a 500-mile walk] and joined the Army in India as a hospital commandant." This laconic report is typical of the man; what actually happened is equally so.

As the Japanese rapidly advanced northward up Burma permission was given to the district authorities to evacuate. Lindsay took no notice of this beyond the collection of medical supplies and their distribution to the various parties of refugees as they set off. Shortly afterwards he was ordered to evacuate ; but again took no notice as there were still many parties to supply. Then came a final categorical and personal order to evacuate which could no longer be ignored ; and Lindsay with three devoted followers, and all the supplies he could carry or get carried, started up the *via dolorosa* of the approaches to the Hawkong valley. At the end of every day's march, while others rested, Lindsay and his three assistants turned back over the way they had come to treat and help those who had fallen by the way. After five days of this progress of "two steps forward, one

step back," while returning along the route he ran into a Japanese patrol, was shot through the arm, but escaped into the jungle, where he met—or was discovered by—friendly tribesmen who took him in till his clean wound had healed. Then he and the survivors of his helpers, unarmed and without maps, trekked 500 miles through jungle and hills till they reached Kuming. Thence the Americans ferried him "over the hump" to India, and Lindsay proceeded to S.mia, where what remained of the Burma Government were accommodated, and laconically reported for duty. For this outstanding example of devotion to duty, courage, and initiative he received the not-over-generous award of the O.B.E.

After a period of work on the planning staff for the rehabilitation of Burma, he rejoined the Army for the re-occupation as A.D.M.S. Civil Affairs Staff (Burma) of the 14th Army or C.A.S.B. with the temporary rank of colonel and the responsibility for all aspects of civil health throughout the country—duties which he brilliantly discharged and for which he recruited *ad hoc* over 500 medical officers—British, Indian, Chinese, and Burmese. In this work he was employed except for a short period of leave till the grant of independence to Burma, after which internecine differences made further useful work impossible and he returned to Britain and proceeded to the D.P.H. (London).

After a period of service with the Scottish Western Regional Hospital Board he resigned and accepted appointment to the field staff of the Middle Eastern Bureau of the World Health Organization. His first assignment was to Libya, where, ably assisted by his wife, he rendered most distinguished pioneer service and gained the friendship and esteem of the Emir (now King) Sayed Idris. From Libya he was assigned to Ethiopia, where he repeated both his valuable health work and his capture of the esteem of the sovereign. It was in Ethiopia that the first symptoms of his fatal illness appeared and dictated an immediate return by air to England for operation. Characteristically, though well aware of the nature and course of his complaint, Lindsay insisted on returning to Geneva between periods of treatment to complete a survey and report which had been entrusted to him, and persevered in his work for W.H.O. until the point of no return was reached.

A man of wide culture—thinker, writer, and linguist—he was a loyal friend with a most delightful sense of humour and a dry wit, and I have never met a man with higher ideals or greater sense of vocation nor one more modest and unassuming. His career is the embodiment of those ideals below which he never permitted himself to fall. His love for and pride in the service he adorned were unflinching, and the pride and affection of its surviving members for a brother officer whose life was an embodiment of its traditions will last as long as they do.

He is survived by his mother, his second wife, and his son by his first marriage, to whom the warm and affectionate sympathy of all who knew him goes out.

C. J. H. writes: Lindsay was always critical of conduct lower than the high standard he had set himself. His love for his old service was wide and deep, and his respect and affection for those who had served in it with him never faltered. He was a good doctor and an above-average linguist. He died a relatively young man—certainly young in spirit—after a courageous struggle, in which he was loyally supported by his second wife, against an unrelenting foe. Although he was quite early fully aware of the close possibilities of his illness, he discussed them with his close friends in a detached manner and without complaint. So has passed a man always free of pettiness and of great integrity, high courage, and tireless endeavour.

J. R. GRIFFITH, M.B., F.R.C.S.

By the death of Mr. J. R. Griffith on October 14 the medical profession in Sussex has lost one of its most distinguished and popular members and the community a man who served it with skill for nearly forty years. He was 68 years of age.

Ост. 27. 1956

The grandson of a former headmaster of Brighton College, John Richard Griffith was born on November 18, 1887, the son of a well-known Brighton solicitor. He read classics at Christ's, his family college at Cambridge, and received his medical training at St. Bartholomew's Hospital, graduating B.Chir. in 1913. He took the M.B. in 1941. After graduation he became house-surgeon to Sir Anthony Bowlby at Bart's and then held a similar appointment at the Metropolitan Hospital. In 1916 he entered the R.A.M.C. and served as a surgical specialist with the 9th (Secunderabad) Division in India in 1917-18 and in Mesopotamia in 1918-19. He would always recount with pleasure the experiences he had while serving abroad. On his return to civilian life he obtained the F.R.C.S. in 1920, and became surgeon to Hove Hospital and assistant surgeon to the Royal Alexandra Hospital for Sick Children, Brighton. The children loved him and he was a master at gaining their confidence. His gentleness enabled him to be particularly successful with hare-lip and cleft-palate operations, and an oft-repeated injunction of his was, "Treat tissue as though you loved it." He also worked at the Southlands and Crawley Hospitals, but most of his life was devoted to the Royal Sussex County Hospital.

A colleague and friend writes: John Griffith was a true general surgeon, and his work was enterprising and original. He pioneered regional anaesthesia, using it for thyroidectomy, major abdominal surgery, and the setting of fractures. He introduced Waugh's technique of tonsil dissection to Sussex, and taught generations of his house-surgeons how to treat the septic hand according to sound anatomical principles. At all times he was glad to share his original ideas with others who later became specialists. His presidential address to the Brighton Medico-Chirurgical Society on the preparation of the patient before operation illustrated his surgical philosophy: it was delivered through the noise of an air raid, and the police sent in a message asking whether it was wise for all the doctors to be gathered in one room on such a dangerous night.

In the medical world of Sussex John Griffith will be greatly missed, but he will also be missed by a host of others. His delight in outdoor sports and his knowledge of nature were extensive. He was a keen fisherman, and during his retirement he developed an enthusiasm for his garden and delighted to entertain at his country home. In an organized shoot his prowess as a shot was always outstanding, but his greatest pleasure was rough shooting with his dog. Those who were privileged to have him as a companion on such an exploit will long remember his generous heart, his great knowledge of country ways and things, his splendid physique, his patience and endurance, his love of animals, and above all his love of his fellow men, peasant or peer alike. His last conscious hour was spent walking with his dogs in the woods he loved so well. In the midst of his happiness he was suddenly struck down by a cerebral haemorrhage and lay guarded by his faithful companions till their barking led searchers to their unconscious master. He was taken to hospital, but died next day without recovering consciousness.

John Griffith leaves behind him a family to carry on the medical tradition—one daughter, and two sons who followed their father at Christ's and later at Bart's. Through his wife, who is also a practising doctor, his sons are the fifth generation in a medical family. A memorial and thanksgiving service for his life and work was held at St. Andrew's Church, Hove, on October 18. In the crowded congregation were young and old from far and near throughout Sussex. All met to pay their last respects to an able doctor and a staunch and valued friend and loyal colleague.

Dr. DOROTHY WILLOUGHBY died at her home at Edmonton, Alberta, Canada, on July 16 at the age of 57. Dorothy Pease was born at Abington, Massachusetts, U.S.A., on April 8, 1899, and graduated B.A. in literature, with honours, at

OBITUARY

BRITISH MEDICAL JOURNAL. 1003

Tuft's College, Massachusetts, in 1919. In 1923 she entered the New York State Tuberculosis Service as a graduate nurse from Bellevue Hospital, New, York City. Later she came to live in England and studied medicine at Bristol University, qualifying M.R.C.S., L.R.C.P. in 1943. After qualification she held resident appointments at the Bristol General Hospital and at Bury, Lancashire, and Whitehaven, Cumberland, before entering general practice at Broadway, Worcestershire, in 1946. For a time she was also a member of the honorary staff of Evesham Hospital. She left Broadway in 1953 for Menai Bridge, Anglesey, but in the following year went back to North America with her husband, Dr. Lawrence Willoughby, setting up in general practice at Edmonton, Alberta. She died suddenly and unexpectedly, having seen patients up to within a few hours of her death. She is survived by her husband and one son.

The sudden death of Dr. S. S. YAVAGAL on September 9 at the early age of 30 was a great shock to his many friends in this country and in India. Shivalingappa Shivappa Yavagal was born on November 8, 1925, and graduated M.B., B.S. at Bombay University in 1951. After three years spent in house appointments in Bombay he came to England in 1953 for postgraduate study. The first two years he spent in Edinburgh and the north of England, and in the autumn of 1955 came to London to take up the appointment of house-physician to the tuberculosis wards at St. Margaret's Hospital, Epping. He had a special interest in diseases of the chest, and a good knowledge of this branch of medicine in particular. During the 12 months he was at St. Margaret's he showed himself to be not only a promising young physician but a person to whom nothing was too much trouble. He endeared himself to his colleagues, the nursing staff, and above all to his patients by his innate kindness, sympathetic understanding, and willingness to help all those with whom he came in contact. The opinion held of him by the staff of the hospital is perhaps best expressed by a remark made by a ward sister shortly after his arrival: "He is quite one of the nicest things which have ever blown into St. Margaret's." His early death, due to a coronary thrombosis, is a grievous loss to India, to which country he was planning shortly to return. Our deepest sympathy goes to his wife and other members of his family.—V. U. L.

Mr. D. A. LANGHORNE, surgeon to the Royal West Sussex Hospital, Chichester, died on September 20 after an illness of a few months. He was 51 years of age. Douglas Alfred Langhorne was born at Bennington, Hertfordshire, on March 4, 1905. He qualified M.R.C.S., L.R.C.P. from St. Bartholomew's Hospital in 1927, and then held appointments there as house-surgeon to Mr. Harold Wilson and Mr. (now Sir) Geoffrey Keynes, and as house-physician in the department of dermatology. He became interested in plastic surgery and was assistant to Sir Harold Gillies. However, after taking the F.R.C.S.Ed. in 1930, he returned to general surgery, which he pursued as surgical partner in general practice with Dr. A. H. Bostock, of Chichester. He was soon appointed assistant orthopaedic surgeon to the Royal West Sussex Hospital, and in due course surgeon to that hospital and to the Royal West Sussex County Mental Hospital. He was active in support of the British Medical Association and was honorary assistant secretary of the West Sussex Division for several years before the second world war. His high sense of duty led him to join the Territorial Army, and in the early stages of the war he served in Iceland. During the period of relative military inaction there he indulged his taste for natural history and wrote a delightful short book about the character and beauty of that island. Later he served for three and a half years on the Burma front. His gay courage and self-sacrifice among the casualties during the six months of siege in the Imphal pocket were an example to all about him. His appointment as M.B.E. in 1945 was well deserved. When the war was over, he returned to Chichester, but withdrew from general practice to devote himself exclusively to surgery. He was an able, kindly, and sympathetic surgeon, and at

his memorial service the little church at Bosham was filled to overflowing with patients, colleagues, and friends. Langhorne loved the sea and sailing. He knew every inlet of Chichester Harbour and spent hours studying the habits of sea birds and waders there. He painted a little and read archaeology. He devoted a great deal of his leisure to voluntary organizations in Chichester, where his interest was always to secure fair play for the individual and to preserve kindness in human affairs. He was a gay, handsome, friendly man, with a steady philosophy and an innate modesty. He was loved by all who knew him. He leaves a widow and three sons.—H. T.

Dr. DOUGLAS GRAY, of Henlow, Bedfordshire, died in hospital on September 24, after a car accident. He was in his 79th year. Douglas Gray was born in Aberdeenshire in 1878, and from Bedford Modern School went to Charing Cross Hospital Medical School. He graduated M.B., with honours in forensic medicine, in 1904, having qualified by taking the London Conjoint diploma two years earlier. After gaining experience at Charing Cross Hospital as house-surgeon, house-physician, and medical registrar, he started practice at Bolton, Lancashire, in partnership with Dr. Charles Macfie, continuing on his own after his partner's death in 1915. He became assistant surgeon at Bolton Infirmary in 1904 and was appointed honorary surgeon two years later, a position he held until 1939, after which he was appointed consultant surgeon. Altogether he served on the honorary staff of the infirmary for 43 years, and was chairman of the board of management for nine years. During the first world war he served in Salonika as a captain in the R.A.M.C. In politics he was a strong Liberal, and served on the town council for 14 years. A man of great integrity and unbounded energy, he was beloved by all who knew him. He leaves a widow and a son, Dr. G. Gray.—J. L.

Dr. W. M. WILSON died suddenly on September 28, at the age of 58, while on holiday at Blairgowrie, Scotland. William Muirhead Wilson was born at Edinburgh on February 21, 1898, and was educated at George Watson's College, where, in addition to playing Rugby for the first fifteen and cricket for the first eleven, he was dux of the school in 1915. On leaving school he enlisted in the Army as a combatant before his 18th birthday by giving a false age. He was badly wounded in 1916 and spent eighteen months in hospital. After the war he enrolled as a medical student at Edinburgh, graduated M.B., Ch.B. in 1923, and was captain of the university golf club. Following house appointments at Edinburgh Royal Infirmary and Durham County Hospital, Dr. Wilson settled in practice at Gateshead-on-Tyne in 1924, where he remained until the time of his death. In 1931 he proceeded to the M.D. with a thesis on pink disease. At Gateshead he held numerous appointments, including that of surgeon to the Children's Hospital from 1925 until his death—a voluntary appointment until 1948. He loved this work and gave to it his unsparing time, skill, and devotion. He was a staunch member of the British Medical Association, and during his long membership of the Gateshead Division held various offices, being chairman twice. During the second world war he did much useful work on various medical committees and was subsequently chairman of the Local Medical Committee from 1948 to 1954, and of the Medical and Pharmaceutical Committee from its inception until his death. For several years he represented Durham County on the committee of the North of England Medical Society. Dr. Wilson was made a magistrate in 1951 and by his wonderful knowledge of human nature and his own exemplary conduct was perfectly suited to carry out the duties of this office. He lived a very full and active life, as, in addition to his medical work, he had many outside interests and was very keen on all sports. He represented the North of England at bridge, and in spite of his severe war wounds played an excellent game of golf. His death is a great loss to his

wide circle of friends and to his adopted town of Gateshead, where he was greatly respected and loved by all classes. He was a very clear thinker with a deep sense of humour and with a great sense of duty. He inspired his patients and others with confidence, and throughout his full and useful life set a fine example for young doctors to follow. He is survived by his wife and twin daughters, both of whom are physiotherapists.—J. C. A.

Dr. J. R. McDONALD writes: The announcement of Bill Wilson's death has come as a severe blow to his many friends, especially in the Tyneside and Edinburgh areas. Their first instinct was one of profound sympathy for his wife, Jenny, and their two girls, Joan and Kathleen. After a strenuous thirty years in the centre of Gateshead, they had just comfortably settled in their new home on the outskirts. The profession has also suffered a severe loss in his passing. Fearless and independent, he never suffered fools gladly, but gave of his best to all. Nowhere will the loss be felt so much as among his old patients, who always looked to him for fatherly as well as medical advice. Slow in speech and heavy in manner, his appearance often belied the acuteness of his perception. Aloof from all petty bickerings, within the profession or otherwise, he was always a wise counsellor to colleagues and others. His record as dux of George Watson's College in 1915 was no fluke. His lameness, the result of a wound received in the first world war, prevented him from pursuing his favourite game on the Rugby field and limited his recreations to golf and bridge, at both of which he was an expert. As a magistrate and the mainspring of many local activities, he will be much missed in Gateshead. His friends will always remember him for his uprightness of character, his quiet urbanity, and his delightful sense of humour.

Dr. W. C. HARRIS died at his home at Kenton, Middlesex, on October 2 after a long and painful illness. He was 55 years of age. William Cecil Harris was born at Uddingston, near Glasgow, on April 12, 1901, and graduated M.B., Ch.B. at Glasgow University in 1926. He settled at Kenton in the following year to take up general practice, and in this he had the satisfaction of being well loved by his patients. He was also on the staff of Harrow Hospital. Appointed honorary secretary of the Harrow Division of the British Medical Association in May, 1934, he served in this capacity until he joined the R.A.M.C. soon after the outbreak of the second world war. He was wounded and captured at St. Valéry-en-Caux in 1940, and three years later was repatriated while still recovering from his wound. He resumed practice at Kenton a year or so later, retiring in 1953 owing to ill health. He is survived by a widow and a daughter.

The obituary of Dr. DORIS GORDON was published in the *Journal* of August 11 (p. 364). Dr. JOHN RICH, president of the Taranaki Division of the B.M.A., writes: Dr. Doris Gordon was one of the first women graduates in New Zealand and overcame great educational difficulties to enter Otago University. She then had a brilliant undergraduate career which was a promise of her great achievements in later years. For some time after the second world war she was director of Maternal and Infant Welfare in the Health Department of New Zealand. Her long struggle over the years did much to improve the standards for the treatment of maternity patients in New Zealand and they owe a debt of gratitude to her. She practised in Stratford for almost the whole of her medical life and was in partnership with her husband. She was loved and respected throughout the whole district. Recently Dr. Gordon added another success to her very full life when she published her entertaining biography *Backblocks Baby Doctor*. Dr. Doris Gordon was a woman with a most commanding personality and a vigorous proponent of what she considered right. The sympathy of the Division goes out to her husband, Dr. W. P. P. Gordon, and to her family.

INFECTIOUS DISEASES AND VITAL STATISTICS

Summary for British Isles for week ending October 6 (No. 40) and corresponding week 1955.

Figures of cases are for the countries shown and London administrative county. Figures of deaths and births are for the 160 great towns in England and Wales (London included), London administrative county, the 17 principal towns in Scotland, the 10 principal towns in Northern Ireland, and the 14 principal towns in Eire.

A blank space denotes disease not notifiable or no return available. The table is based on information supplied by the Registrars-General of England and Wales, Scotland, N. Ireland, and Eire, the Ministry of Health and Local Government of N. Ireland, and the Department of Health of Eire.

CASES in Countries and London	1956					1955				
	Eng. & Wales	Land.	Scot.	N. Ire.	Eire	Eng. & Wales	Land.	Scot.	N. Ire.	Eire
Diphtheria	2	2	6	0	3	6	0	2	0	2
Dysentery	421	66	201	2	4	475	51	227	13	
Encephalitis, acute	10	1		0		3	0		0	
Enteric fever: Typhoid	3	1	0	0	1	5	0	0	3	
Paratyphoid	9	1	0	0		41	2	1(B)	3	
Food-poisoning	308	30	34	3		294	27		3	
Infective enteritis or diarrhoea under 2 years		0		14	14		0		27	67
Measles*	1,968	140	185	72	40	1,397	29	28	35	160
Meningococcal infection	20	4	8	1		23	2	15	0	
Ophthalmia neonatorum	22	1	10	0		36	2	4	0	
Pneumonia†	239	13	126	2		237	16	100	8	
Poliomyelitis, acute: Paralytic	64	12	20	0	23	186	30	40	0	3
Non-paralytic	91	6				164	31			
Puerperal fever‡	226	37	8	2		229	39	6	1	1
Scarlet fever	458	44	67	31	24	666	45	100	23	26
Tuberculosis: Respiratory	560	55	85	14		641	76	104	24	
Non-respiratory	74	6	10	4		99	9	12	3	
Whooping-cough	1,487	101	224	15	30	802	43	53	69	61

DEATHS in Great Towns	1956					1955				
	Eng. & Wales	Land.	Scot.	N. Ire.	Eire	Eng. & Wales	Land.	Scot.	N. Ire.	Eire
Diphtheria	1	1	0	0	0	0	0	0	0	1
Dysentery	0	0	0	0		0	0	0	0	
Encephalitis, acute		0			0		0			0
Enteric fever	0	0	0	0		0	0	0	0	
Infective enteritis or diarrhoea under 2 years	0	0	0	0	6	7	0	0	0	3
Influenza	2	1	0	0	0	8	0	1	1	0
Measles		0	0	0	0		0	0	0	0
Meningococcal infection		0	0				0	0		
Pneumonia	156	22	15	6	4	151	14	7	4	1
Poliomyelitis, acute	1	0			0	7	0			0
Scarlet fever		0	0	0	0		0	0	0	0
Tuberculosis: Respiratory	37	6	15	1	4	54	13	7	1	4
Non-respiratory		0	0	0	0		0	0	0	1
Whooping-cough	1	1	0	0	0	1	0	0	0	0
Deaths 0-1 year	188	20	29	4	18	193	28	18	1	8
Deaths (excluding stillbirths)	4,574	663	499	95	132	4,603	657	488	80	144
LIVE BIRTHS	7,761	1,157	959	228	377	7,447	1,117	928	224	308
STILLBIRTHS	193	29	21			170	24	24		

* Measles not notifiable in Scotland, whence returns are approximate.

† Includes primary and influenza pneumonia.

‡ Includes puerperal pyrexia.

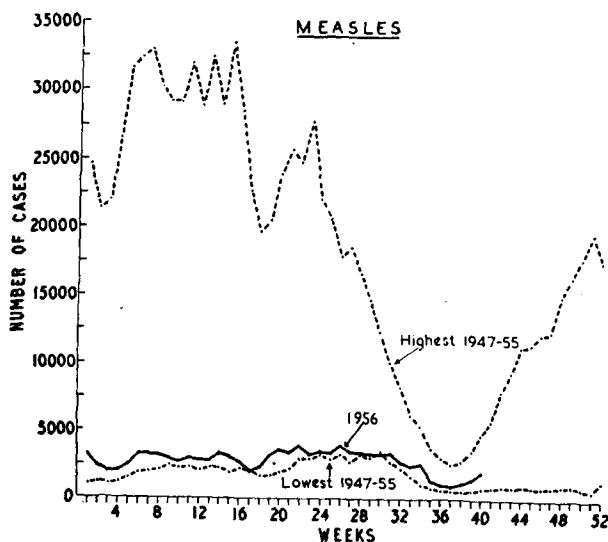
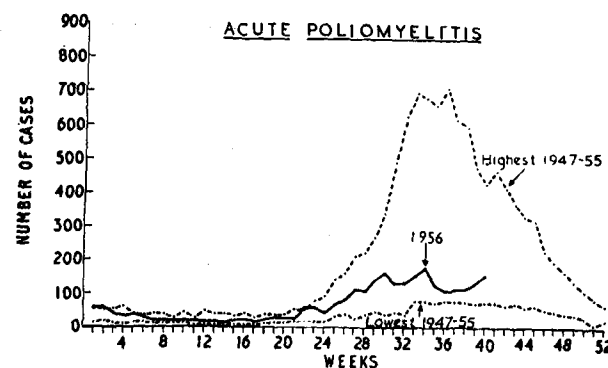
Vital Statistics

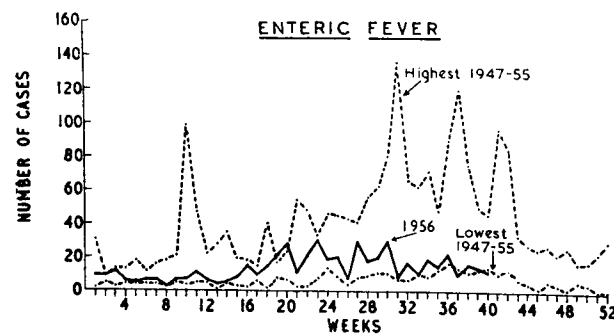
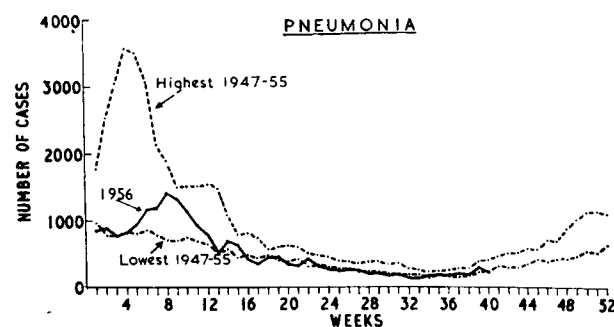
Spotting Epidemics

The quick detection of winter epidemics is the subject of a note in the latest *Monthly Bulletin of the Ministry of Health* (October, 1956, page 226). Medical officers of health are asked to select general practitioners in their district who are willing to act as spotters, though keeping in touch with all general practitioners, so as to have early information about the start of any epidemic. The note stresses that at crucial times the general practitioners are often overloaded with work, and consequently the minimum effort should be required of them to provide epidemiological information. The medical officers of health are also asked to invite the help of doctors in hospitals, industrial firms, schools, and other institutions. Other suggested sources of information include pharmacists, whose sales of "cough and cold cures" may go up at the beginning of an influenza epidemic; the local registrars of deaths, who can quickly make information available of deaths from influenza, bronchitis, and pneumonia; and the ambulance services, which can provide figures of cases removed to hospital.

Graphs of Infectious Diseases

The graphs below show the uncorrected numbers of cases of certain diseases notified weekly in England and Wales. Highest and lowest figures reported in each week during the nine years 1947-55 are shown thus -----, the figures for 1956 thus ———. Except for the curves showing notifications in 1956, the graphs were prepared at the Department of Medical Statistics and Epidemiology, London School of Hygiene and Tropical Medicine.





Infectious Diseases

The only large increase in the numbers of notifications of infectious diseases in England and Wales during the week ending October 6 was 572 for measles, from 1,396 to 1,968; the largest decreases were 278 for whooping-cough, from 1,765 to 1,487, and 36 for dysentery, from 457 to 421.

The largest rises in the incidence of measles were 130 in Lancashire, from 325 to 455, 58 in Cornwall, from 21 to 79, 52 in Montgomeryshire, from 6 to 58, and 50 in Monmouthshire, from 15 to 65. The outbreak in Montgomeryshire was localized, 55 of the notifications being recorded in Newtown and Llanllwchaearn U.D. 458 cases of scarlet fever, 11 more than in the preceding week, were notified; the largest rise was 27 in Yorkshire West Riding, from 40 to 67. The largest falls in the number of notifications of whooping-cough were 45 in Northumberland, from 76 to 31, 37 in Warwickshire, from 109 to 72, and 30 in Essex, from 118 to 88. 2 cases of diphtheria were notified, being 6 fewer than in the preceding week; both cases were notified in the metropolitan borough of Wandsworth.

155 cases of acute poliomyelitis were notified, and these were 4 more for paralytic and 20 more for non-paralytic cases than in the preceding week. The largest returns were Lancashire 33 (Manchester C.B. 19, Blackpool C.B. 3, Warrington C.B. 2), Cheshire 23 (Stockport C.B. 12, Altrincham M.B. 3, Bebington M.B. 2), London 18 (Kensington 9, Hackney 2, Wandsworth 2), Surrey 11 (Carshalton U.D. 3, Woking U.D. 3, Richmond M.B. 2), Durham 10 (Bishop Auckland U.D. 3, Darlington C.B. 2, Sunderland R.D. 2).

The chief centres of dysentery were Yorkshire West Riding 94 (Leeds C.B. 24, Sheffield C.B. 17, Colne Valley U.D. 14, Barnsley C.B. 10), Lancashire 79 (Liverpool C.B. 19, Bolton C.B. 9), London 66 (Islington 13, Southwark 12), Warwickshire 22 (Coventry C.B. 19), and Northumberland 20.

Scotland in Second Quarter

The birth rate in Scotland for the second quarter of 1956 was 19.5, being 0.8 above the rate for the corresponding quarter of 1955 and the highest rate for any quarter since the second quarter of 1948. The infant mortality was 26 per 1,000 registered live births; this was 3 below the rate for the corresponding quarter of 1955 and 5 below the average of the 5 preceding years. The death rate was 11.4 per 1,000 of the population, being 0.3 below the rate for the corresponding quarter of 1955 and 0.2 below the 5 years' average. The death rate from malignant neoplasms was

209 per 100,000, being 9 above the rate for the preceding second quarter and 15 above the average of the 5 preceding years. Only 31 deaths were attributed to the principal infectious diseases. These were 21 from influenza, 5 from meningococcal infections, 2 from whooping-cough, 2 from measles, and 1 from scarlet fever. Deaths from all forms of tuberculosis numbered 162; of these, 144 were due to tuberculosis of the respiratory system and 18 to other forms; the death rates were 11 and 2 per 100,000, respectively. Deaths from violence numbered 658, being 67 fewer than in the preceding second quarter. Road transport accidents accounted for 146 of these deaths and were 1 fewer than in the second quarter of 1955.

Week Ending October 13

The notifications of infectious diseases in England and Wales during the week included: scarlet fever 532, whooping-cough 1,393, diphtheria 10, measles 2,146, acute pneumonia 261, acute poliomyelitis 150, dysentery 524, paratyphoid fever 4, and typhoid fever 8.

Medical News

Bisset Hawkins Medal.—Immediately after the Harveian Oration at the Royal College of Physicians on October 18, the Bisset Hawkins medal was presented to Dr. G. S. WILSON, director of the Public Health Laboratory Service, by the president of the College, Sir RUSSELL BRAIN. The medal is for the recognition of outstanding work in the field of public health. In the citation it is said of Dr. Wilson, "The indisputable fact that this country now possesses the finest national epidemiological laboratory service in the world is due largely to his wise guidance and constant stimulus." Dr. Wilson has directed the P.H.L.S. (originally the Emergency P.H.L.S.) since 1940.

Society of Medical Officers of Health.—The annual dinner of the society was held on October 18 with the President, Dr. J. D. KERSHAW, in the chair. In proposing the society's health, Miss PAT HORNSBY-SMITH, M.P., said that in the early days of the N.H.S. the stress had been on hospitals, but during the past two years greater emphasis had been laid on prevention and domiciliary services. The Guillebaud Committee had supported the idea of a domiciliary team of local-authority workers under the clinical leadership of the general practitioner. The success of this team depended on the success of the M.O.H. in securing co-operation. Miss Hornsby-Smith was sure the Ministry could count on the support of the society in the inquiry into toxæmia of pregnancy arising from the report of the Standing Advisory Committee on Maternity and Midwifery. She was delighted to know the society had formed a mental health group. The M.O.H. had reached a point in the development of preventive health work where further progress depended largely on the ability to work with and through his clinical colleagues. The field had shifted from sewage and pure water to problems inside the house. The M.O.H. was ideally placed to keep before the clinician those socio-medical factors which contributed to the prolongation as well as the inception of disability. In reply Dr. KERSHAW, referring to the current need for partnership between the M.O.H. and the clinician, said the gap had been bridged with general practitioners, who knew the social environment of their patients, but this was not the case with the hospital. He thought hospitals should have departments of clinical social medicine in which the M.O.H. would be on an equal footing with his clinical colleagues. The toast "The Guests" was proposed by Dr. C. FRASER BROCKINGTON and Dr. P. A. TYSER, and responded to by Lord WAVERLEY and Dr. ALEXANDER HALL.

Poliomyelitis Vaccines.—In an address to the New York Academy of Medicine on October 25 Dr. ALBERT B. SABIN put into perspective recent press reports that his attenuated

poliomyelitis vaccine is ready for mass trial. "We now have strains derived from single particles of virus that are sufficiently highly attenuated and stable under appropriate conditions of cultivation to justify their use for the next stepwise studies on immunization of human beings," he said. "Experience has taught me the importance of accentuating the negative," he continued, "and I therefore wish to stress that we are not ready for so-called mass trials of an oral vaccine but only for those tests on increasingly larger groups which must precede any consideration of tests on a large scale. I also want to accentuate the positive by saying that the Salk vaccine is the only polio vaccine available for public use at this time and that advantage should be taken of its protective effects to the maximum extent of its availability. I may add that some reservations that I had before disappeared with the demonstration that the antibodies and immunity produced by the Salk vaccine do not interfere with the alimentary infection produced by an oral attenuated vaccine or naturally acquired virus."

Future of the R.S.M.—The council of the Royal Society of Medicine is gravely concerned about the society's finances. If the society is to survive in its present form, says the council in its report for 1955-6, the annual income must be raised considerably. The council has a four-pointed policy to meet the situation: The creation of the Library (Scientific Research) Section (see *Journal*, September 15, p. 665) is hoped to tap new sources of subscription income; a request for an annual Government grant has been made to the Lord President of the Council; negotiations with London University are proceeding with a view to widening the readership of the library; and lastly, to stop the use of the society's facilities by those who are not entitled to them, entrance to the R.S.M. building is to be by ticket only. According to the last audited accounts (1954-5), the society's total income was £83,338 and the expenditure £81,316.

"Sigmamycin."—Pfizer Ltd. announced last week a new antibiotic preparation named "sigmamycin," consisting of a mixture of two parts (by weight) of tetracycline with one of oleandomycin ("matromycin"). The two antibiotics are claimed to act synergistically, so that lower doses can be given to achieve a desired clinical effect. The results of American trials of sigmamycin were presented at the fourth Washington Symposium on Antibiotics which opened on October 17. Clinical trials in Britain are now being arranged by the makers, but as yet the drug is not generally available here.

Glasgow Mass Radiography Campaign.—Dr. W. A. HORNE, M.O.H. of Glasgow, announced on October 17 that the City's mass radiography campaign to detect cases of pulmonary tuberculosis would take place between March 11 and April 12 next year. It was hoped to radiograph 25,000 people, he said, which, if achieved, would be a world record.

Royal College of Surgeons of Edinburgh.—At the annual meeting on October 17 Sir WALTER MERCER was re-elected president, and Professor R. C. ALEXANDER and Professor JOHN BRUCE vice-presidents.

Royal College of Physicians of Ireland.—Dr. F. J. O'DONNELL was re-elected president at the annual meeting on St. Luke's Day (October 18). This will be his second year of office. Dr. R. B. PRINGLE, physician to Dr. Steevens' Hospital, Dublin, and chief medical officer of A. Guinness, Son and Co., was elected vice-president.

Chair of Surgery at Khartum University.—Mr. JULIAN TAYLOR, vice-president of the Royal College of Surgeons of England and consulting surgeon to University College Hospital, London, has arrived in Khartum to fill the Chair of Surgery there. It is understood that his appointment is initially for a period of two years. Khartum University was constituted an independent university by an Act of the Sudan Government on July 24 this year, and in December the University is celebrating its new status.

Sydney Body Trust Medal and Lecture.—Mr. ALECK BOURNE, consulting gynaecologist to St. Mary's Hospital, was presented with a Sydney Body gold medal "for merit

in the field of obstetrics and gynaecology" when he delivered the third Sydney Body lecture at Southend-on-Sea Hospital on October 19. The presentation was made by Mr. S. F. BODY, M.P.S., who endowed the Trust named after him. The lecture is given annually, and has as its object the promotion of sympathetic understanding between members of the medical profession and the public.

Medical Film Appraisals.—The Scientific Film Association would welcome members of the medical profession at their appraisals of medical films. Appraisal meetings are being held on November 1, 15, and 29 and January 3 and 17 at the Shell Film Unit Theatre, Room 103, Shell-Mex House, Strand, London, W.C.2, at 5.45 p.m. Further details may be obtained from the hon. secretary of the medical committee, Scientific Film Association, 164, Shaftesbury Avenue, London, W.C.2. (Telephone: Temple Bar 4694.)

Birmingham University.—The following lecturers in the faculty of medicine have been appointed: Dr. D. M. MATTHEWS, in physiology; and Dr. D. S. ROWE and Dr. D. R. STANWORTH, in experimental pathology. Mr. S. S. SHULMAN, F.R.C.S.E., and Dr. L. KORNEL have been appointed temporary lecturers in anatomy and medicine respectively.

COMING EVENTS

Order of St. John.—Annual surgeons' conference will be held on November 3 and 4 at B.M.A. House.

Glasgow University Club, London.—Annual dinner on November 8 at 7.30 p.m. at the Trocadero Restaurant, Piccadilly. Graduates are invited to write to Dr. J. F. HEOGIE, North Middlesex Hospital, Edmonton, London, N.18, not later than October 31.

Bradshaw Lecture.—Dr. WILLIAM PHILLIPS will deliver the Bradshaw Lecture on November 8 at 5 p.m. at the Royal College of Physicians of London. His subject will be "The Disintegrative Action of the Nervous System."

Contraceptive Technique.—Lecture and demonstration by MARIE STOPES, D.Sc., at the Mothers' Clinic, 108, Whitfield Street, London, W.1, on November 1 at 5.30 p.m. No fee is charged, but tickets must be obtained in advance.

Lloyd-Roberts Lecture.—Sir MAURICE BOWRA will deliver the Lloyd-Roberts lecture on November 20 at 5 p.m. at the Royal College of Physicians of London. His subject will be "Greek Science; its Greatness and its Failure."

John Shields Fairbairn Memorial Lecture.—Dr. HANS F. BETTINGER, of the Royal Women's Hospital, Melbourne, will lecture on December 13 at 5 p.m. at the Royal College of Obstetricians and Gynaecologists. His subject will be "Unexpected Maternal Deaths Without Obvious Gross Organic Lesions." Tickets from the College.

NEW ISSUES

British Journal of Ophthalmology.—The new issue (Vol. 40, No. 8) is now available. The contents include:

SPONTANEOUS REGRESSION OF RETINOBLASTOMA. J. K. Steward, J. L. S. Smith, and E. L. Arnold.
COMBINED FORMS OF CONGENITAL COLOUR DEFECTS. A PEDIGREE WITH ATYPICAL TOTAL COLOUR BLINDNESS. R. A. Crook.
HISTOPATHOLOGICAL STUDIES OF EYES ENUCLEATED AFTER FAILURE OF INTRA-OCULAR ACRYLIC LENS OPERATIONS. Redmond Smith.
ANGIOD STREAKS AND PSEUDOXANTHOMA ELASTICUM. C. G. Keith.
CARBONIC ANHYDRASE IN THE VITREOUS BODY. J. Gloster.
ECTOPIA OF THE MACULA. Ian W. Payne and R. Pitts Crick.
CAROTID-OPHTHALMIC ANASTOMOSES. FREQUENCY OF EXTERNAL CAROTID AND OPHTHALMIC ARTERY ANASTOMOSES. Michael Shea.
PROTEIN DEFICIENCY IN KERATOMALACIA. Yap-Kie-Tiong.
CASE NOTES:
SCLERAL GUMMA. B. N. Bhaduri and S. K. Basu.
CONGENITAL FISTULA OF THE LACRIMAL GLAND. F. J. Damato.
EPIDEMIC KERATO-CONJUNCTIVITIS IN THE CLYDESDALE AREA. James Winning.

APPLIANCE:
AN ACCESSORY FOR THE OPERATING TABLE. H. Campbell Orr.
BOOK REVIEW.

Issued monthly; annual subscription £4 4s.; single copy 8s. 6d.; obtainable from the Publishing Manager, B.M.A. House, Tavistock Square, London, W.C.1.

Annals of the Rheumatic Diseases.—The new issue (Vol. 15, No. 3) is now available. The contents include:

RHEUMATOID ARTHRITIS AND THE POSITIVE L.E.-CELL PHENOMENON. J. H. Kiebits, J. Gossings, H. R. E. Schuit, and W. Hijmans.
NATURE OF ANAEMIA IN RHEUMATOID ARTHRITIS—III. J. Richmond, D. L. Gardner, L. M. H. Roy, and J. I. R. Duthie.
USE OF THE HYPOSPRAY JET INJECTOR FOR THE INTRA-ARTICULAR AND LOCAL ADMINISTRATION OF HYDROCORTISONE ACETATE. Morris Ziff, Vincent Contreras, and Frank R. Schmid.
THERAPEUTIC TRIALS IN ACUTE GOUTY ARTHRITIS. Melvin H. Levin, Stanley Marcus, David Strang, and Robert L. Swezey.
CLINICAL AND METABOLIC EFFECTS OF Δ^1 -DEHYDRO-9-ALPHA-FLUORO HYDROCORTISONE ACETATE. L. Villa, G. Sala, and C. B. Ballabio.
CHANGES IN THE INTRA-ARTICULAR TEMPERATURE OF THE KNEE WITH CUTANEOUS VASOCONSTRICTION AND VASODILATION OF THE TOES IN NORMAL SUBJECTS. Raymond Penneys and Nathan M. Smukler.
MODIFIED WAALKER-ROSE REACTION EMPLOYING SENSITIZED HUMAN CELLS. H. J. Gibson and N. R. Ling.
CHLOROQUINE AND RHEUMATOID ARTHRITIS. A. Freedman.
HYDROCORTISONE TERTIARY-BUTYLACETATE FOR INTRA-ARTICULAR THERAPY IN RHEUMATIC DISEASES. Jack Zuckner, Otakar Machek, and Arch M. Abert.
BOOK REVIEWS.
HEBERDEN SOCIETY.
AMERICAN RHEUMATISM ASSOCIATION.
LIGUE INTERNATIONALE CONTRE LE RHUMATISME.
CANADIAN RHEUMATISM ASSOCIATION.
ABSTRACTS.

Issued quarterly; annual subscription £2 2s.; single copy 12s. 6d.; obtainable from the Publishing Manager, B.M.A. House, Tavistock Square, London, W.C.1.

SOCIETIES AND LECTURES

A fee is charged or a ticket is required for attending lectures marked ●. Application should be made first to the institution concerned.

Saturday, October 27

KENT PAEDIATRIC AND CHILD HEALTH SOCIETY.—At Children's Department, Farnborough Hospital, 3 p.m., Miss Josephine Barnes: Working Mothers.
MEDICAL SOCIETY FOR THE STUDY OF VENEREAL DISEASES.—At Liverpool Royal Infirmary, 2.30 p.m., general meeting. Dr. E. E. Prebble: Treatment of Non-specific Urethritis; Dr. C. D. Alergant: Lymphogranuloma Inguinale.

Monday, October 29

POSTGRADUATE MEDICAL SCHOOL OF LONDON.—4 p.m., Dr. H. S. Banks: Recent Advances in Infectious Fevers.

Tuesday, October 30

BRITISH POSTGRADUATE MEDICAL FEDERATION.—At London School of Hygiene and Tropical Medicine, 5.30 p.m., Professor E. C. Amoroso: Endocrinology of Pregnancy.
INSTITUTE OF DERMATOLOGY.—5.30 p.m., Dr. J. O. Oliver: Bacterial Flora of Healthy Skin.
LIVERPOOL UNIVERSITY.—At Liverpool Medical Institution, 5.15 p.m., Professor W. Schlapp: Galvani and Animal Electricity.
ROYAL STATISTICAL SOCIETY.—At Westminster Medical School, 5.30 p.m., Dr. C. R. Lowe: An Association Between Smoking and Respiratory Tuberculosis.
ST. MARY'S HOSPITAL MEDICAL SCHOOL.—At Wright-Fleming Institute Theatre, 5 p.m., Professor Ian Aird: Post-operative Complications.
UNIVERSITY COLLEGE LONDON.—At Anatomy Theatre, 1.15 p.m., Dr. H. Kalmus: Behaviour and Heredity.
WEST END HOSPITAL FOR NEUROLOGY AND NEUROSURGERY.—5.30 p.m., Mr. J. Minton: Ocular Manifestations in Clinical Neurology (Part I).
WEST LONDON HOSPITAL MEDICAL SCHOOL.—5.15 p.m., 9th Alex Simpson Smith Memorial Lecture by Dr. T. Cecil Gray: Reflections on Circulatory Control.

Wednesday, October 31

INSTITUTE OF DERMATOLOGY.—5.30 p.m., Dr. B. Russell: Role of Pyogenic Cocci in Skin Disease.
INSTITUTE OF DISEASES OF THE CHEST.—5 p.m., Mr. W. P. Cleland: Surgical Treatment of Bronchial Carcinoma.
●INSTITUTE OF OBSTETRICS AND GYNAECOLOGY.—4.30 p.m., Mr. D. H. MacLeod: Problem of Endometriosis.
INSTITUTE OF UROLOGY.—4.30 to 5 p.m., Dr. A. H. Harkness: Non-gonococcal Urethritis.
LONDON UNIVERSITY.—At St. Thomas's Hospital Medical School, 5 p.m., special university lecture by Professor P. Dell (Paris): Aspects of the Physiology and Pharmacology of the Brain Stem Reticular Formation.
POSTGRADUATE MEDICAL SCHOOL OF LONDON.—2 p.m., Dr. F. W. G. Wolff: Biochemistry of Diabetes (II).
RENAL ASSOCIATION.—At 41, Portland Place, W., 4 p.m., Dr. V. Hall (U.S.A.) and Dr. J. Rhodin (Stockholm): Electron Microscopy of the Kidney.
ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE.—3.30 p.m., Air Marshal Sir James Kilpatrick: Aspects of Health in the Royal Air Force (illustrated).
SOCIETY OF APOTHECARIES OF LONDON.—5 p.m., Dr. L. B. Cole: Interpretation of Symptoms in Hypertension; 6.15 p.m., Dr. J. H. Hunt: Management of Hypertension in General Practice.

Thursday, November 1

●BRISTOL UNIVERSITY.—8.15 p.m., Carey Coombs Memorial Lecture by Mr. T. Holmes Sellors: Surgery of the Thoracic Aorta.
BRITISH POSTGRADUATE MEDICAL FEDERATION.—At London School of Hygiene and Tropical Medicine, 5.30 p.m., Professor W. J. Hamilton: Multiple Pregnancy.
FACULTY OF ANAESTHETISTS: ROYAL COLLEGE OF SURGEONS OF ENGLAND.—4 p.m., Frederick Hewitt Lecture by Dr. R. F. Woolmer: Artistry and Science in Anaesthesia.
FACULTY OF HOMOEOPATHY.—5 p.m., Dr. N. J. Pratt: Reliable Indications for Arsenicum Album, Lachesis, Lycopodium, and Silica.
FARNBOROUGH HOSPITAL.—At Children's Department, 2.30 p.m., symposium on Poliomyelitis, dealing with epidemiology, virology, and clinical aspects. Speakers, A. D. Macrae, Dr. J. Marshall and Dr. Annie M. Peach. Visitors welcome.

ILFORD MEDICAL SOCIETY.—At Park Lane Hotel, 7 for 7.30 p.m., annual dinner and dance.
LIVERPOOL MEDICAL INSTITUTION.—At Adelphi Hotel, 7.30 p.m., annual dinner.
LONDON UNIVERSITY.—At Royal Society of Medicine, 5 p.m., Semon Lecture by Professor G. Portmann (Bordeaux): Physiology of Phonation.
MIDLAND THORACIC SOCIETY.—At Queen Elizabeth Hospital, Birmingham, 7.30 p.m., Dr. P. Forgacs: Management and Treatment of Tuberculous Pleural Effusion, both Primary and Secondary to Lung Disease.
ROYAL EYE HOSPITAL.—5.15 p.m., Dr. T. H. Whittington: Aspects of Refraction Work—(4) Prisms, and Their Use in Refraction Work.
ROYAL SOCIETY OF HEALTH.—At St. William's College, York, 10.15 a.m., Dr. Catherine B. Crane: Cancer Education; Mr. N. Hancock: Hygiene of Sports Arenas.
ST. ANDREWS UNIVERSITY.—At Physiology Department, Queen's College, Dundee, 5 p.m., Dr. J. A. Fraser Roberts: Genetics of Essential Hypertension.
ST. GEORGE'S HOSPITAL MEDICAL SCHOOL.—5 p.m., Dr. D. J. Williams: neurology demonstration.

Friday, November 2

●INSTITUTE OF DERMATOLOGY.—5.30 p.m., Dr. I. Muende: clinical demonstration.
INSTITUTE OF DISEASES OF THE CHEST.—5 p.m., Dr. K. F. W. Hinson: pathological demonstration.
POSTGRADUATE MEDICAL SCHOOL OF LONDON.—10 a.m., Mr. D. Trevor: Management of the Displaced Hip-joint in Older Children; 4 p.m., Dr. J. F. Goodwin: Coarctation of the Aorta.
ROYAL MEDICO-CHIRURGICAL SOCIETY OF GLASGOW.—At Royal Faculty of Physicians and Surgeons of Glasgow, 8.30 p.m., Dr. J. A. W. McCluskie: Hyperparathyroidism—A Not So Rare Disease.

Saturday, November 3

INSTITUTE OF LARYNGOLOGY AND OTOTOLOGY.—11.30 a.m., special lecture by Professor G. Portmann (Bordeaux): Surgery of Cancer of the Base of the Tongue (with cinematograph film).

Sunday, November 4

UNIVERSITY COLLEGE HOSPITAL MEDICAL SCHOOL.—10.15 a.m., clinical demonstration for general practitioners. Dr. H. A. Burt: The Rheumatic Diseases.

APPOINTMENTS

BORG, CHARLES, M.D., F.R.F.P.S.Glas., D.P.M., Part-time Consultant Psychiatrist, Parkside Hospital, Macclesfield, and Mid-Cheshire and South Cheshire Hospital Centres.
LAURIE, ALEXANDER, M.B., Ch.B., D.P.H., Medical Officer, Department of Health for Scotland.
MANCHESTER REGIONAL HOSPITAL BOARD.—T. G. Barlow, M.B., Ch.B., F.R.C.S., Consultant Orthopaedic and Traumatic Surgeon, Ashton, Hyde and Glossop Group of Hospitals; O. H. Simms, M.B., Ch.B., F.F.A.R.C.S., Consultant Anaesthetist, Lancaster and Kendal Group of Hospitals; I. W. Davidson, M.B., Ch.B., D.A., Whole-time Assistant Anaesthetist Salford Group of Hospitals; J. Cherkawsky, Med.Dip. Poznan, Whole-time Assistant Physician in Geriatrics, Burnley and District Group of Hospitals; A. R. Evans, M.B., B.Ch., Whole-time Assistant Pathologist, Wigan and Leigh Group of Hospitals; A. F. Robinson, M.B., Ch.B., F.R.C.S., Consultant Surgeon to Burnley and District Group of Hospitals; E. T. Downham, M.D., D.P.M., Consultant Psychiatrist to Burnley and District Group of Hospitals and to Whittingham Hospital, Preston; Madeleine B. Morris, M.D., M.R.C.P., D.C.H., Consultant Paediatrician, Barrow and Furness Group of Hospitals; E. A. Beetles, M.B., B.S., D.M.R.D., Whole-time Consultant Radiologist to Blackburn and District Group of Hospitals.
SMITH, S. B. S., L.M.S.S.A., D.T.M.&H., Assistant Medical Officer of Health and School Medical Officer, Swindon Borough Council.

BIRTHS, MARRIAGES, AND DEATHS

BIRTHS

England.—On October 5, 1956, to May (formerly Kingston), wife of Eric G. England, M.B., D.P.H., D.C.H., D.P.A., Dip. Soc. St., of 1 May Park, Malahide Road, Dublin, a daughter—Janet Karen.
Evans.—On October 8, 1956, at 387, Queen's Road, London, S.E., to Alexa Evans (formerly Mitchell), M.R.C.S., L.R.C.P., wife of C. J. Evans, M.R.C.S., L.R.C.P., D.O.M.S., a daughter—Annabelle Louise.
Levis.—On September 23, 1956, at the Central Middlesex Hospital, London, N.W., to Renée, wife of R. D. Lewis, M.B., F.F.A.R.C.S., a son—Peter Desmond Arthur John.
Parry-Jones.—On September 25, 1956, to Mary (formerly Brooks), wife of Dr. J. Parry-Jones, a brother for Elizabeth.
Sartory.—On October 18, 1956, to Pamela (formerly Johnson), wife of F. B. Sartory, M.R.C.S., L.R.C.P., L.D.S., a brother for Geoffrey, Ghislaine, and Rosemary—Jonathan Mark.

MARRIAGES

Harland—Burke.—On October 6, 1956, at St. Mark's, Surbiton, David Henry Cave Harland, of Lewes, to Norah Burke, of Surbiton.

DEATHS

Catto.—On October 2, 1956, at Bouenmouth, Hants, Patrick Thomas Catto, M.B., Ch.B., of 7, Eaton Road, Coventry, Warwick, aged 65.
Craig.—On October 1, 1956, at Hill End Hospital, St. Albans, Herts, Robert Hunter Craig, M.B., Ch.B., of 28, Station Road, Orpington Kent, aged 57.
Evans.—On September 28, 1956, John Morton Evans, M.R.C.S., L.R.C.P., D.P.H., of 117, Ashley Road, Bristol, aged 85.
Fagan.—On October 2, 1956, at 5, Aurion Mansions, London, W., Charles Horace John Fagan, O.B.E., M.R.C.S., L.R.C.P.
MacRae.—On September 30, 1956, at Millbank Kessock, Duncan MacRae, M.B., Ch.B., of Gairloch, Ross-shire.
Piggott.—On October 2, 1956, Frederick Stanley Lawrence Piggott, M.R.C.S., L.R.C.P., of Teign Royd, Teignmouth.
Titcombe.—On October 3, 1956, Roland Hereward Titcombe, M.D., D.P.H., of Disley, near Stockport.
Trewby.—On October 2, 1956, at St. Bartholomew's Hospital, Joseph Frederick Trewby, M.R.C.S., L.R.C.P.

Any Questions?

We publish below a selection of those questions and answers which seem of general interest. It is regretted that it is not possible to supply answers to all questions submitted.

Frozen Shoulder

Q.—What is the underlying pathology of the condition known as frozen shoulder? What is its cause?

A.—Frozen shoulder—also known as periarthritis or capsulitis of the shoulder—is an obscure condition of unknown aetiology. Pathological changes as revealed by ordinary histological methods consist in some infiltration of the fibrous capsule of the shoulder-joint with lymphocytes and plasma cells; at a later stage, adhesions are found between the joint capsule and the humeral head. No biochemical or biophysical studies of the fibres or ground substance of the capsule have been reported and the cause of the sudden stiffening is still obscure. Frozen shoulder is not associated with any constitutional disturbance and the E.S.R. is not elevated. There is no association between this type of shoulder lesion and any form of polyarthritis.

Frozen shoulder is a self-limiting condition with a duration of six months to three years. It occurs in both sexes, mainly between the ages of 45 and 65 years, and many of the affected individuals are said to have a special anxious, worrying "periartritic" personality. In some cases the shoulder lesion follows coronary occlusion, cerebral vascular accidents, or herpes zoster. In such cases it has been suggested that the shoulder lesion is due to a "reflex dystrophy," and cases in which the hand also stiffens have been described under the title of "shoulder-hand syndrome." Alternatively, it has been suggested that pain in the shoulder region in patients with a periartritic personality leads to voluntary immobilization of the shoulder, which in middle-aged subjects leads to rapid stiffening and atrophy from disuse; this causes more pain, and so on. Neither of these mechanisms provides a satisfactory explanation of all the features of the frozen shoulder, and its essential pathology still remains to be discovered.

Phosphaturia

Q.—How should a case of phosphaturia be managed? Is prolonged treatment with sodium acid phosphate a safe and satisfactory method?

A.—One difficulty in answering this question is semantic, for the word phosphaturia is variously used to mean a symptom or to name a rather ill-defined disorder. But no matter how the term is used the essential feature is the passage of urine containing deposits of calcium and magnesium phosphates. These salts are not very soluble, particularly in alkaline solutions, and phosphaturia occurs only when the urine is alkaline.

Anything which leads to an alkaline urine, such as urinary infection with urea-splitting organisms, may cause phosphaturia, but although the reaction of the urine is of prime importance it is not the only factor. A high urinary calcium concentration resulting either from an increased calcium excretion, as may occur, for example, in hyperparathyroidism, or just because the patient does not drink very much, will favour the formation of calcium phosphate deposits: furthermore, it is believed that various unidentified urinary colloids may hold these salts in supersaturated solution. Possibly a breakdown in this mechanism may lead to phosphaturia.

As a symptom phosphaturia may occur in widely differing conditions, provided the urine is alkaline, but it may appear in patients who have no infection of the urine or obvious metabolic disorder, and such cases are said to be suffering from "phosphaturia." The condition is said to be common in neurotic individuals, and, although there is

no proof that psychological factors are causative, much anxiety can result from the disorder; reassurance is therefore essential.

The urine may be alkaline for quite simple reasons, such as the ingestion of absorbable alkalis in patent medicines or powders, and this, especially if combined with a lacto-vegetarian diet, can cause phosphaturia. The patient should be encouraged to drink plenty of fluids except milk. Drugs which acidify the urine will usually clear the deposits. Sodium acid phosphate can be used in doses of gr. 15 (1 g.) to as much as gr. 60 (4 g.) three times a day. It is said to have the advantage over other acidifying agents that it does not increase the urinary excretion of calcium.¹ However, it is often not so effective as ammonium chloride, which can be given in doses of gr. 15 (1 g.) three times a day. It is important when using these agents to determine whether they do alter the reaction of the urine; this can be done with indicator papers. If, in full doses, they fail to acidify this may mean that the renal mechanisms for excreting an acid urine are at fault. In these circumstances the continued use of the drugs will only increase the loss of fixed bases, sodium, potassium, and calcium, from the body. This is a danger of acidifying agents.

REFERENCE

¹ Cordonnier, J. J., and Talbot, B. S., *J. Urol.*, 1948, 60, 316.

Hormone Therapy in Mongolism

Q.—Have hormones any place in the treatment of mongolism? Favourable results have been reported from the combined use of thyroid and pituitary hormones.

A.—There is at present no good evidence that hormone therapy has any place as a specific treatment for mongolism. Bourneville¹ used thyroid and Lewald² pituitary preparations, but neither obtained convincing results. Tredgold³ in 1929 recommended a mixture of thyroid, suprarenal, pituitary, thymus, and pineal, but later,⁴ in 1947, he said: "As a result of careful observation over a number of years on mongols who have and who have not been treated, I have come to the conclusion that gland extracts, whether administered orally or by injection, really have no effect upon the condition." Engler⁵ was favourably impressed by the effect of thyroid and recommended "substitution therapy" in general. Neither these nor many other similar views are based on carefully controlled trials, nor is there any clear evidence of any constant endocrine deficiency in mongolism, though there is a tendency to high values for blood cholesterol⁶ and to low steroid excretion. A recent study was made by Benda,⁷ who regards mongolism as hypopituitary dystrophy; he claimed increase in size and mental powers as a result of oral doses of pituitary hormones.

This is a subject for further investigation, but strict clinical and laboratory control is essential. An account of current research on mongolism will be found on p. 993 of this issue of the *Journal*. Meantime, as Jervis⁸ points out, there is no specific treatment for the condition.

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- ¹ Bourneville, D. M., *Congr. Méd. Allentistes Neurol.*, 1903, Paris.
- ² Lewald, J., *Amer. J. Psychiat.*, 1936, 93, 537.
- ³ Tredgold, A. F., *A Textbook of Mental Deficiency*, 1929 and 1947, pp. 226 and 207. Baillière, Tindall and Cox, London.
- ⁴ Engler, M., *Mongolism*, 1949, p. 116. John Wright and Sons Ltd., Bristol.
- ⁵ Simon, A., Ludwig, C., Gofman, J. W., and Crook, G. H., *Amer. J. Psychiat.*, 1954, 111, 139.
- ⁶ Benda, C. E., *Quart. Rev. Pediat.*, 1953, 8, 79.
- ⁷ Jervis, G. A., *Amer. J. ment. Defic.*, 1952, 57, 175.

Salmonella Bacteraemia

Q.—In salmonella infections is there always an initial blood-stream infection? If not, what determines this—the species of organism involved or the severity of the infection?

A.—Salmonella infections include the enteric diseases due to *S. typhi*, and *S. paratyphi* A, B, and C, as well as food-poisoning and other diseases due to any of the remaining

400 or more members of this genus. Although it has infrequently been demonstrated, it is probable that most cases of enteric fever have a light and transient initial bacteraemia before the proliferation of the organism in the spleen and liver finally lead to the more lasting and severe secondary bacteraemia and secondary intestinal infection, with the frank clinical manifestation of the disease. Following on this blood invasion there is usually a rise in the patient's serum agglutinins to the invading organism. It is possible that salmonella infections, other than those that develop into enteric fever, may have a light transient initial bacteraemia, but this is quickly dealt with by the normal body defences, and invasion proceeds no further, but knowledge on this point is not very precise. The sera from patients who have suffered from this type of infection show great differences. Some produce agglutinin titres, some show little or no reaction, which suggests that, even if invasion takes place, it is rare.

What determines the general invasiveness of an infecting organism may be an inherent and regular property of the species, as with typhoid and most of the paratyphoid bacilli, or it may be due to an unstable irregular property, a tendency-variation, by which invasion is likely to occur only under certain conditions of host-parasite relationship. *S. cholerae suis* and *S. enteritidis* var. *chaco* are organisms that are not infrequently found to be the cause of enteric fever, whereas other species usually cause gastro-enteritis. Experimental evidence has shown that different species, as well as different strains of a single species, may vary in their effect on human volunteers. The size of the infecting dose may play a part, but, while it is true that the great majority of salmonella strains never seem to show any tendency to invade, others in addition to those mentioned have been isolated, on rare occasions, from the blood stream.

Placentophagia

Q.—Why do most animals in their natural state, including the herbivores, eat their placenta? Is it because it contains valuable hormonal substances, or is it merely as part of the tidying up process to make the birthplace less conspicuous to enemies?

A.—Placentophagia is not confined to animals. It occurs also in man. The placenta is also widely used in various ritualistic, magical, or superstitious practices. In parts of Indonesia it is considered to be an animated body possessing a spirit or soul. In a few tribes the umbilical cord or placenta is eaten. Thus in Kamchatka it is reported that a post-parturient woman who hopes to become pregnant again will devour the umbilical cord. In parts of Brazil Indian women are said to eat the placenta, although the purpose of this practice is not disclosed. Placentophagia has also been reported in Java, where the placenta is cooked and eaten in the belief that the woman eating it will be the next to become pregnant. The use of dried and powdered umbilical cord as a medicament for a sickly infant is also recommended. However, although these practices are interesting, none of them would seem to shed any light on the widespread habit among animals; they all seem to be culturally rather than biologically determined.¹

Many animals, including primates, rodents, carnivores, and ungulates, eat the placenta. Since its consumption can occur only after parturition, the placenta may be eaten not so much for its caloric value as to balance some nutritional deficiency; or it may be eaten to supply some special substances—for example, vitamins or hormones—needed for lactation; or, as the questioner suggests, simply to cover up the traces of the birth from predators. It has been stated that only in circumstances where there is some nutritional deficit do rats, for example, eat the placenta, and the same may also be true of sheep and cattle. However, other animals, regardless of their nutritional state, eat the placenta and foetal membranes, and may even consume the amniotic fluids as well.² The placenta of many animals is known to be rich in oestrogens, progesterone, and pituitary-

like hormones. There is a theory that the ingested placental substance has an oxytocic principle which serves to bring about involution of the uterus and to reduce haemorrhage.³ However, Hartman⁴ reports the case of a monkey which gave birth to three babies and did not eat the placenta; yet, as determined by palpation, the uterus involuted normally just as in the other monkeys which had eaten the placenta. Claims for a galactogogic effect of placental extracts have also been reported.⁵

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- 1 Ploss, H. H., and Bartels, M., *Das Weib in der Natur- und Völkerkunde*, 1913. T. Grieben, Leipzig.
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- 3 VanDemark, N. L., and Hays, R. L., *J. Anim. Sci.*, 1951, 10, 1083 (abstracts).
- 4 Hartman, C. G., *Contr. Embryol. Carnegie Instn.* 1932, 23, 1.
- 5 Soyková-Pachnerová, E., Bruta, V., Golova, B., and Zuolska, E., *Gynaecologia (Basel)*, 1954, 138, 616.

Congenital Hydrocephalus and Spina Bifida

Q.—A young couple have recently lost their first child as a result of severe congenital hydrocephalus and spina bifida. There is no family history of similar trouble. (1) To what extent do hereditary factors influence the appearance of this condition, and what is the prognosis with regard to future children in the family described? (2) The mother was inoculated with B.C.G. when two weeks pregnant. Could this, or other factors affecting the mother during her pregnancy, such as a virus infection or vitamin deficiency, have predisposed to these abnormalities?

A.—According to Record and McKeown¹ the risk of recurrence of these congenital abnormalities in any further offspring of this couple is about nine times as great as the average risk. They also find that the risk of such a malformed infant is greater at the first parity, and after the sixth, with a corresponding reduction in the intervening ones.

There is no good reason why B.C.G. inoculation during early pregnancy should be blamed. On the other hand, virus infections, especially mumps, have been incriminated, and the embryo is most vulnerable in the early months. Experimentally, x rays and various vitamin deficiencies have been shown to produce severe malformations in the C.N.S. of the offspring of treated pregnant animals. But so far there is no evidence that such vitamin deficiencies have any similar aetiological role in man. In any event the deficiency required to induce these malformations experimentally is of a high order, and hardly likely to occur in Britain in normal circumstances. On the other hand, maternal inability to utilize ingested vitamins is a possibility worth remembering.

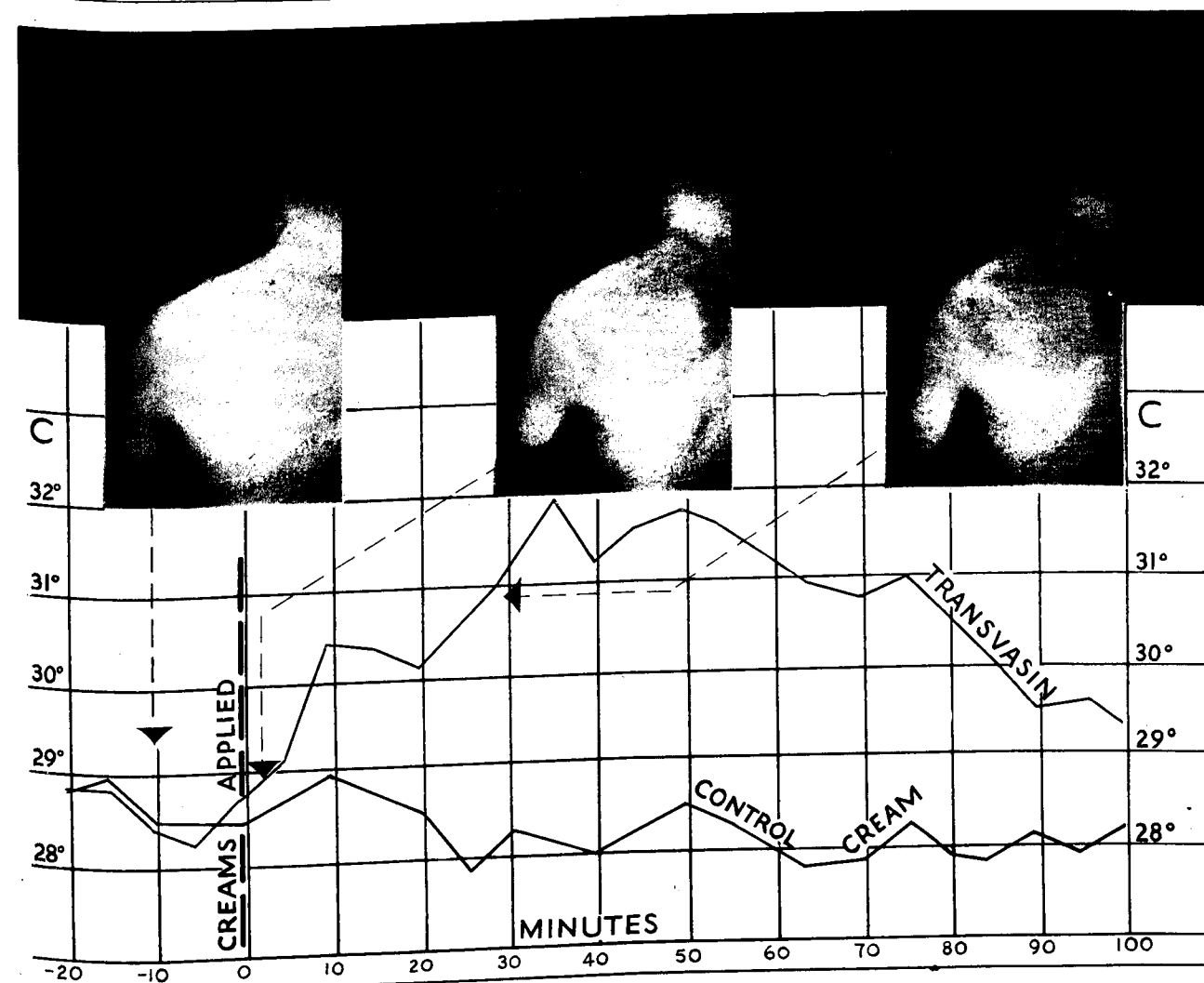
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- 1 Record, R. G., and McKeown, T., *Brit. J. soc. Med.*, 1949, 3, 183; 1950, 4, 26.

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The following books are still available through booksellers or from the Publishing Manager, B.M.A. House. Prices include postage. *Any Questions?*, Volumes 2 and 3 (8s. each); *Refresher Course for General Practitioners*, Volume 2 (26s. 6d. inland, 26s. overseas); *Clinical Pathology in General Practice* (22s. 3d. inland, 21s. 9d. overseas).

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TREATMENT OF HYPERTENSION*

BY

A. RAE GILCHRIST, M.D., F.R.C.P., F.R.C.P.Ed.
Physician-in-Charge, Royal Infirmary, Edinburgh

In the treatment of hypertensive vascular disease, a great variety of effective remedies are now available—so many, indeed, that considerable discrimination is required in the selection of the therapeutic procedures best adapted to a particular patient. Some are powerful remedies, not easy to administer or regulate, and call for the fullest co-operation between doctor and patient. Others, simple in themselves, demand skill in application to get the best results. Occasionally the justification for recommending a surgical procedure, remedial or palliative, will require careful consideration. With a multiplicity of aetiological factors, and with great variations in the pattern, course, and intensity of the disease, it is natural that treatment must vary widely from patient to patient and be adapted to the requirements of the particular individual. No single remedy is uniformly successful.

I. General Measures

Management

Of the general measures widely applicable, consideration must be given to the judicious and tactful management of the hypertensive patient. By their manner, attitude, and personality, some doctors are able to accomplish more than others for hypertensive patients. They owe their skill to the confidence they inspire. The first step in successful treatment is therefore the employment of conscious or unconscious psychotherapy. By this means the doctor establishes a relationship of mutual trust of particular advantage to the patient, who is thereby steadied in his outlook, reassured, and encouraged. The relief of emotional tension promotes a sense of tranquillity, which in itself can set a blood pressure at lower levels.

As a general rule, the fears of high blood pressure should be countered at the earliest opportunity, with the explanation that such a condition may persist for years without disagreeable happenings. It may even subside spontaneously, without serious embarrassment or permanent crippling. Doubts and fears can usually be set aside by explaining that the condition is comparatively benign, that suitable treatment is available when it is required, and that frequently no particular specific remedies are necessary. Such an attitude can do much for the patient, simplify his care and supervision, and permit the judicious use of appropriate remedies as and when these appear necessary.

Most people, and hypertensive patients in particular, feel better, make more headway, and have a lower pressure when under the protective and understanding care of a sympathetic and encouraging adviser. Relief from emotional stresses with the resolution of conscious or subconscious conflicts is of importance, particularly in

the earlier stages of the hypertensive process—that is, before irremediable damage has been done to vital organs. Conversely, it is bad practice to inform a patient bluntly that his blood pressure is worse and his drug treatment proving valueless. Such an attitude is never justified. It betrays a lack of appreciation by the doctor of the part he ought to play in the management of the hypertensive patient, whose confidence is readily undermined by injudicious comments and whose progress may thereby be affected adversely.

Neither doctor nor patient should be misled by blood-pressure readings. There is nothing to be gained by commenting on isolated readings, whether real or fictitious. The level of the mercury seldom correlates with well-being. Simple facts such as these can profitably be explained to the intelligent patient at the outset of treatment.

Advice on the better adjustment of the individual to real-life problems comes most appropriately from the patient's own practitioner. Expert psychiatric treatment aimed at the correction of personality and other defects is sometimes helpful and even occasionally curative in the earliest stages, but in the presence of established vascular disease, advancing at an increasing tempo, time should not be wasted on this particular aspect of treatment. For the great majority, simple measures, combining firm reassurance and steady encouragement, form the background of successful therapy.

Way of Life

The personal habits and way of life deserve consideration. It is often true that a routine which includes long hours of sleep, a short rest at midday, the quiet week-end, and a peaceful annual holiday, along with the cultivation of a placid and philosophical temperament, can counteract much of the nervous tension, irritation, and fatigue associated with long hours of exacting work, with all its present-day distractions and frustrations. Most hypertensive patients require advice on adapting their way of life to their blood pressure. Even in the severest grades of hypertension, blood pressure commonly falls temporarily to normal limits in deep sleep, whether physiological or induced by barbiturates or other sedatives. Hence the importance of adequate rest and sound sleep in relieving, even for a few hours at a time, the burden thrown on the vascular system. Amylobarbitone sodium, 3 gr. (195 mg.) at bedtime, repeated in an hour if necessary, is a valuable remedy in all stages of hypertensive disease.

Diet

Many hypertensive patients tend to overeat, and, if this be associated with corpulence, then a clear indication for dietetic treatment exists. The prescription of an exact diet of 1,500, 1,200, or 1,000 calories, with the cultivation of the habit of restricted indulgence, will do much to ease symptoms and increase a sense of well-being. Weight should be recorded at weekly intervals, and the figures are usually worthy of more attention on the part of the patient and

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dose: 1-2 100 mg. Ovets three times a day and 2-4 Ovets at bedtime.

*A paper read in the Section of Cardiology at the Annual Meeting of the British Medical Association, Brighton, in July.

the doctor than casual blood-pressure readings. Begin by correcting obesity is a good rule widely applicable.

In the severer forms of hypertension, as exemplified by Grade 3 or Grade 4 retinæ, a reduction in sodium intake is known to be of definite value. For instance, in malignant hypertension (Grade 4) nearly half the patients will show a regression in papilloedema with restoration of vision when the sodium content of the diet is reduced to 200 mg. a day. Unfortunately, few patients will tolerate such restrictions for long, and indeed experience indicates that equally good results can be obtained in hypertensive heart failure, and in hypertension of Grade 3 or 4 severity, with a diet in which the sodium content is maintained at 500 mg. a day. This diet involves much less hardship. All food, including bread, should be cooked without salt and no salt be served with meals.

Patients vary in their tolerance to salt restriction. Many become habituated and make little complaint. Others react badly after a few days. Anorexia is a danger signal. It should at once suggest the salt-depletion syndrome characterized by weakness, nausea, vomiting, and collapse. For this reason it is seldom wise to continue the strictest diets (with a sodium content of 500 mg. or less) for more than two or three consecutive weeks. The dangers of uræmia are so real that the addition of small quantities of salt to the diet for a few days at a time are therefore justified every two or three weeks. Strict salt restriction is necessary only in the severest grades of hypertension. A reduction in sodium intake is not only of value in itself but it appears to potentiate the ganglion-blocking drugs.

LOW-SODIUM DIET

Approx. 0.5 g. Na; 1,400 calories; NaCl 1.6 g.

Breakfast: 1 egg—poached, boiled, or scrambled—or small helping of white fish. 1 slice of salt-free bread. Salt-free margarine or butter. Jelly marmalade if desired.

Mid-morning: Glass of fruit juice.

Dinner: Small helping of lean meat, fish, tripe, chicken, or rabbit. Avoid ketchups and sauces. Small helping of sieved vegetables. Small helping of mashed potato. Stewed fruit, fresh fruit jelly, fruit whip or snow with sugar *ad lib.*

Tea: 1 slice of salt-free bread. Very small helping of meat or chicken or fish, or an egg. Salt-free margarine. Jelly if desired.

Supper: 1 slice of salt-free bread. Jelly if desired. Salt-free margarine.

Bedtime: Glass of fruit juice.

Allowance for Day: $\frac{1}{2}$ pint (568 ml.) of milk. $\frac{1}{2}$ oz. (21 g.) of salt-free margarine or butter.

Provided the patient is not obese, as much sugar or glucose as desired may be added to the diet.

All food should be cooked without salt, and no salt served with meals.

Meat, Fish.—Avoid all tinned and preserved meat, including ham, bacon, sausages; kippers, finnan haddock; meat extracts as oxo and bovril, also marmite, because of their high salt content.

Fruit.—All fresh fruit is suitable, but dried fruit often contains too much salt.

To be successful the low-sodium diet requires detailed care, and note should be taken of the following considerations.

Special Instructions

(1) In the preparation of the food no salt to be added during cooking or served with the meal at table.

(2) All tinned foods which have salt already added, such as tinned meats and vegetables, tinned soups and tomato juice, are to be avoided.

(3) Smoked, brine-cured, and salty foods such as bacon, ham, sausages, smoked fish, kippers, and pickles are not permitted. This applies also to meat extracts and sauces such as bovril, oxo, marmite, ketchup, and relishes.

(4) Shellfish such as oysters and lobsters are not permitted.

(5) Only breads prepared with yeast and made without salt are allowed. Cheese is not permitted.

(6) Foods to which baking powder or baking soda has been added in their preparation are not permitted. This includes biscuits, wafers, scones, "cookies," and cakes.

(7) Only unsalted or "washed" butter is allowed.

(8) Dried fruits such as figs, dates, raisins, apricots, and prunes are to be avoided.

(9) It is particularly important that no sodium-containing medicines be taken while the diet is in use. This includes sodium bromide, sodium bicarbonate, soda-mints and most of the so-called "indigestion" tablets and powders. Similarly, "soda-water" must not be added to drinks. Salt gargles and toothpastes containing sodium are likewise forbidden.

Recipe for Salt-free Bread.—If salt-free bread cannot readily be obtained, it can be made according to the following recipe:

6 $\frac{1}{2}$ lb. (2.95 kg.) bread flour 10 oz. (284 g.) sugar
8 oz. (227 g.) shortening 4 oz. (113 g.) yeast
2 quarts (2.27 l.) of water

This makes six loaves. This bread takes a little longer to rise than ordinary bread.

Foods Permitted:

- (1) Meat, boiled fish, or poultry, prepared and served without added salt.
- (2) Eggs—not more than one daily.
- (3) Milk—limited to two glasses (one pint (568 ml.) as a maximum).

(4) Vegetables—any fresh or green vegetables prepared and served without salt.

(5) Fruits—all fresh and tinned or stewed fruits.

(6) Bread—only yeast bread prepared without salt.

(7) Cereals—the only dry prepared cereals permitted are puffed wheat, shredded wheat, and puffed rice.

(8) Potatoes and rice prepared without salt.

(9) Butter—only unsalted or "washed."

(10) Puddings and sweets—custards, junket and plain puddings made with the milk allowance and with no added salt. Pies with no salt added to the pastry and limited to a filling prepared with fresh or tinned fruit. Jellies, jams, marmalade, white or brown sugar, and honey.

(11) Drinks—tea, coffee, fruit juices, and carbonated drinks.

(12) Flavoursings—chocolate, cocoa, caramel, peppermint, lemon, orange, vanilla, cherries, cloves, cinnamon, nutmeg, ginger, and coffee.

(13) Seasonings—pepper, curry, mustard, mint, vinegar, sage and onion.

II. Aetiological Considerations

The next step is to clarify the diagnosis. A remedial cause must be sought, as an elevation of the diastolic pressure is a sign common to a number of different disorders. In the absence of a demonstrable cause, the hypertension is spoken of as essential or primary hypertension. Known aetiological entities associated with the production of hypertension may be arranged in four main groups: (a) *Renal diseases*: acute and chronic glomerular nephritis, chronic pyelonephritis, polycystic kidneys, hydronephrosis; (b) *Endocrine disorders*: Cushing's syndrome, pregnancy toxæmias, phaeochromocytoma; (c) *vascular disorders* (affecting renal blood flow): congestive heart failure, periarteritis nodosa, coarctation of the aorta; (d) *Neurological diseases*: certain brain tumours, bulbar poliomyelitis.

This classification is not intended to be exhaustive, nor does it account for more than 30% of all cases of hypertension. It is put forward to illustrate how the discovery of an aetiological factor may influence therapy. For instance, unilateral pyelonephritis may justify nephrectomy before hypertension has led to damage of the vascular supply of the opposite kidney. Similarly, effective treatment for the hypertension of Cushing's syndrome, if not due to a localized and removable tumour, consists of total or subtotal adrenalectomy. In younger people excision of a coarctation with reconstitution of the aorta can promptly cure this particular variety of hypertension. A less common example of a remediable cause is a phaeochromocytoma arising from the chromaffin cells of the adrenal medulla or extrarenal chromaffin tissue. The symptoms, which depend upon excessive production of adrenaline or noradrenaline, and the hypertension which occurs in either a paroxysmal or sustained form, can be completely relieved by the early operative removal of these tumours.

III. Selection of Patients for Treatment

A further principle in the medical care of these hypertensive people is to assess as accurately as possible the severity of the disability and adapt treatment accordingly. It is as important not to over-treat, when symptoms are absent or trivial, as it is to employ an intensive routine when serious dangers threaten. The patient's safety depends upon the integrity of his arteriolar walls. To gauge his vascular state as a whole and thereby arrange treatment appropriate to the individual, information of the greatest importance is obtained by direct inspection of the retinæ. Simple studies of renal concentrating power, heart size, and lability of the blood pressure are valuable aids in the assessment of the extent and severity of the arterial disease, but are subsidiary to ophthalmoscopic examination.

Retinal Grading

On the basis of the retinal appearances one of four grades of hypertensive vascular damage can be determined for each patient. The Table given below, constructed from the prognostic studies of Wagener and Keith (1939) on the course of essential hypertension, provides a basis for the adaptation of treatment to the severity of the vascular disease. This is a more satisfactory approach to therapy than the two alternatives customarily offered by dividing essential hypertension into its benign and malignant forms—both terms being misleading. Grades 1, 2, and 3 are often included in the term benign, Grade 4, being known as malignant hypertension.

TABLE

	Grade 1	Grade 2	Grade 3	Grade 4
Symptoms	None to slight	Slight Morning headache Vertigo	Moderate Frequent headaches Fatigue Dyspnoea Nocturia	Severe Intense headaches Weakness Loss of weight Dyspnoea Confusion
Blood pressure	150/100–200/120	180/100–270/130	180/110–280/140	240/130–300/180
Retinæ	Minimal arterial narrowing	Definite sclerosis	As in Grade 2 with either exudates, star figures, cotton-wool patches, or haemorrhages. Definite retinitis	Papilloedema, with or without Grade 3 changes. Advanced retinitis usual
Renal function	Normal	Satisfactory: faint trace of albumin occasionally present	Impaired: albumin with casts and R.B.C.	Impaired, as in Grade 3, but progressively deteriorating
3-year mortality rates	20%	35%	75%	95%

To show the four grades of hypertension, increasing in severity from 1 to 4. Grades 1, 2, and 3 are commonly included in the term benign essential hypertension, and Grade 4 is also known as malignant hypertension. Broadly speaking, Grades 1 and 2 may be classified as mild, Grade 3 as moderately severe, Grade 4 as very severe.

Broadly speaking, Grades 1 and 2 may be regarded as comparatively mild, Grade 3 as moderately severe, and Grade 4 as very severe or malignant.

The retinal appearances provide a measure of the intensity of the hypertensive process as a whole, but in addition consideration must be given to the efficiency of the heart and kidneys, either of which, after taking the brunt of the elevated pressure for many years, may begin gradually to show signs of failure, or even suddenly fail, without an advance in retinal appearances beyond Grade 2. Left ventricular failure, particularly in an acute form, is an urgent indication for relief of hypertension. Occasionally, uræmia, beginning insidiously, continues remorselessly to a fatal issue, without the development of retinitis. The efficiency of the heart and kidneys, as well as the retinal grade, are therefore the basic factors in determining suitable treatment. Account must also be taken of the age of the patient, more vigorous methods being justified in younger people than in the elderly, whose arteries are less resilient.

Degenerative changes in vital organs may be so advanced as to debar any hope of successful therapy. This applies particularly to the state of the kidneys. If renal function is impaired there is little or no hope of reversing the process. Hypotensive drugs aggravate uræmia. Furthermore, a prompt reduction of the blood pressure in elderly people may prove harmful, if not occasionally fatal.

These considerations lead to the conclusion that patients are best selected for treatment on the basis of their vascular state as it affects certain organs and on the intensity of the hypertensive process rather than on casual or even basal blood-pressure readings. The experienced motorist setting out on a long run is less concerned about the tyre pressures, which must vary with every bump on the road, than about the wear and tear of the tyre covers. So also to the hypertensive patient—the state of the walls of his arteries and their arterioles is more important than his blood pressure at any given instant in the course of a protracted disease. In general, treatment should be determined more by vascular state than by blood-pressure readings.

It will be generally conceded that the following groups of patients should be selected for energetic treatment: (a) all showing hypertensive retinopathy—that is, Grades 3 and 4; (b) those without retinopathy but who have or have had transient cerebrovascular episodes, attacks of left ventricular failure, or angina; (c) those disabled by severe hypertensive symptoms—for example, headaches associated with a persistently high diastolic pressure—120 mm. or more.

There remains a large group of hypertensive patients who may have no symptoms, or only minor ones, and who have no serious retinal, cerebral, or cardiac changes. These patients should be kept under observation at intervals of a few months and are better under-treated than over-treated; certainly the more powerful hypotensive drugs (ganglion-blocking agents and hydralazine) should not be used in view of their attendant discomforts and dangers. Mild hypotensive agents may be employed, but whether they prevent the development of serious vascular damage is not yet known. It is unlikely that they do any harm even when used continuously for many years.

In summary—treatment with the more powerful drugs should be reserved for patients presenting with symptoms or signs of retinal, cerebral, or cardiac impairment of hypertensive origin. Milder hypotensive agents and sedatives can be employed on a prophylactic basis when symptoms and signs are less severe.

IV. Drug Therapy

Rauwolfia serpentina

This drug has proved useful by itself in the treatment of the milder varieties of hypertension (for example, retinal grades 1 and 2) and in combination with other drugs when the response to it alone is incomplete or unsatisfactory. It has many advantages, as toxic symptoms are relatively uncommon and postural hypotension seldom occurs. It has a central action, producing a feeling of tranquillity without somnolence, which may result in a fall of 10 or 20 mm. in diastolic pressure. The object is to pacify without depressing.

Many preparations are available. The refined whole root (for example, "rauwiloid," 2–4 mg. thrice daily), the mixed alkaloids (for example, "raudixin" in 50-mg. tablets, 3 to 8 daily), or the single alkaloid (for example, reserpine, 0.25 mg. thrice daily) may apparently be employed with advantage for long periods and without ill effects. Full benefit is not obtained from this drug until it has been in use for two or three weeks. A fall of 10 to 20 mm. in diastolic pressure is then commonly observed.

Few disagreeable "side-effects" have been recorded from its use. If daytime sedation is excessive on the usual therapeutic routine, the entire daily quantity may be taken as a single dose at night. Mental depression is seldom observed when raudixin is in use, but the drug should be used with caution in the emotionally unstable and in those who have passed through phases of mental depression, lest exacerbations recur. A minor sense of stiffness of the nose and a tendency to diarrhoea are occasionally encountered. Vague pains in the back and thighs are sometimes noted, and in younger women lactation may occur. Administration of two 50-mg. tablets of raudixin three or four times a day, the first dose on rising in the morning and the last 12 hours later, makes a useful routine and may be supplemented by a phenobarbitone tablet, 30–60 mg. at bedtime, if necessary.

Veratrum

If after a fair trial rauwolfia fails to maintain the diastolic pressure below 100 or 110 mm., extracts of veratrum viride, or hellebore, may be added to the patient's treatment. "Veriloid" is a useful proprietary preparation of the active principles. It is available in 1- and 2-mg. tablets. Treatment may be started with 2 mg. four times a day, the dose being taken along with the quantity of raudixin already prescribed. With this drug a maximum hypotensive effect is usually obtained with a daily quantity 2 to 4 mg. less than that required to induce toxic symptoms. The margin between optimum benefit and early toxicity is narrow, and may amount to no more than 2 mg. in a 24-hour period. Accordingly, the dose of veriloid should be increased cautiously by adding a 2-mg. tablet to the daily dose every third or fourth day until the earliest symptoms of intolerance develop. Heartburn, increased salivation, nausea, and vomiting are the usual indications that the optimum daily dose has been exceeded. Veriloid intoxication subsides rapidly when the daily quantity is reduced by 2 to 4 mg. It is not

necessary to discontinue completely the use of this drug when toxic symptoms are induced.

Significant hypotensive effects can be induced in about half the patients taking this drug, more particularly if the maximum dose tolerated is taken steadily and in conjunction with raudixin. Most patients feel better, are less tired, and are free from headaches when full doses of veriloid are in use. Tolerance varies from patient to patient, and the daily quantity ranges from 18 to 24 mg. as a general rule. Minor toxic symptoms such as a peppermint-like flavour in the mouth or slight salivation are common. They tend to come and go, and conscientious patients ultimately learn to disregard them in the knowledge that thereby the drug is exerting a full effect. If no corresponding reduction is observed in the diastolic readings when full doses are in use, there is no justification for urging the patient to continue with this drug.

Ganglion-blocking Compounds

When signs of retinitis are present, or when the heart or kidneys are showing early signs of impairment, more energetic measures are required, firstly for the relief of symptoms, which tend to be more severe in this group, and secondly in an attempt to arrest or reverse the obliterative vascular disease. In recent years new ganglionic blocking-agents, consisting of the halogen salts of hexamethonium and pentamethonium, have proved increasingly useful. They act on both sympathetic and parasympathetic ganglia, and therefore produce a wide range of effects such as pupillary paralysis, gastric hyposecretion, and intestinal ileus as well as hypotension. At the present time, pentolinium tartrate ("ansolysen") is the methonium compound of choice. It closely resembles hexamethonium in its action, except that its effects last longer and it is about five times as strong. Its great advantage is that it can be given successfully by mouth in the majority of patients.

The ideal method of regulating pentolinium tartrate to the patient's particular requirements is by measurement of the blood pressure, taken lying and standing, at frequent intervals through the day. This can best be done in hospital by trained technicians or nurses. Where such facilities are not available a single timed reading of blood pressure each day in the erect posture between two and three hours after the morning dose of pentolinium tartrate may prove a useful guide, but fairly accurate control of dosage can be regulated by the production of hypotensive symptoms, the quantity of the drug being gradually increased by small increments, say 20 mg., until such symptoms occur. At, or a little above, the optimum dose the patient, on standing quietly at the time of maximum action of the drug, will notice slight dizziness, promptly relieved by sitting or lying down. If faintness occurs the dose should be reduced, while if no dizziness is noted the dose should be increased. The intelligent and co-operative patient can soon learn to regulate his pentolinium tartrate dosage. The dose requirements vary from patient to patient. The correct dose has to be determined by the individual's response.

The initial dose is 20 mg. twice daily, the first dose of the day being taken at 7 a.m. and the last at 10 or 10.30 p.m. The tablets should be taken crushed in a constant amount of water, preferably at least an hour before meals to ensure reasonable constancy of absorption. Doses at 12 noon and 5 p.m. suit most people. Blood-pressure readings can be recorded with advantage about 10 a.m., two hours after breakfast, and records kept of the response, with the patient lying and standing, from day to day until the dose is finally stabilized. The aim should be to obtain a systolic pressure of 120-140 in the erect posture when the drug action is maximum two to three hours after its oral administration.

If no symptoms are induced in the erect posture by 20 mg., then the following day 40 mg. is taken at 7 a.m. and 10 p.m. Assuming negative reactions, additional doses of 20 mg. each may be taken at noon and at 5 p.m. next day. The aim should be to obtain an adequate hypotensive effect throughout the 24 hours. Of the four doses, the evening one can with advantage be the largest in the hope of prolonging the effect overnight, the midday dose the smallest, and the

morning dose intermediate. When adjustments have been made and some tolerance has been developed, a day's routine after two or three weeks of cautiously increasing the dose might work out at 140 mg. at 7 a.m., 80 mg. at noon, 100 mg. at 5 p.m., 240 mg. at 10 p.m. The hypotensive effect of the evening dose can be augmented by having the patient sleep with the head of the bed raised on blocks 12 to 18 in. (30-45 cm.). If difficulties arise in adjusting the dose on the basis of hypotensive symptoms, it is usually necessary to have the patient in hospital in order to observe the blood-pressure response to a test dose over several hours.

There are two difficulties in pentolinium tartrate treatment worthy of particular consideration. Tolerance to the drug develops rapidly at first, and may in fact continue to develop to a slight extent for some months. The daily dose must therefore be raised day after day for two to three weeks, and later less frequently, if the desired postural effects are to be maintained, for without them the patient is not obtaining full benefit.

On effective methonium therapy most patients have some "side-effects." Constipation is a source of danger, as, following its relief, excessive absorption of methonium may occur with profound falls in pressure. Pentolinium tartrate is less likely to cause constipation than other hexamethonium compounds, but nevertheless the patient should be warned of its dangers and have a suitable remedy. A cascara pill or mixture may be necessary in generous doses. The bowel must be made to act at least once daily. Parasympathetic-stimulating drugs can also be used to combat constipation and also the dryness of the mouth. For this purpose oral neostigmine, 15 mg., carbachol, 0.25 mg., or pilocarpine, 1 mg. in water perhaps, thrice daily, may be used. If complaint is made of blurring of vision, physostigmine drops in a strength of 1/32% to 1/16% may help, but sometimes it may be necessary to provide an extra pair of glasses, refraction being adjusted to the change in the eye brought about by the action of the methonium compound.

Raudixin has proved very effective in counteracting the "side-effects" of the methonium compounds. When it is added to the methonium routine the response to pentolinium tartrate is enhanced, so that smaller doses prove equally effective. "Side-effects" of methonium are consequently diminished.

Mecamylamine

On account of its complete absorption and more protracted action, the powerful ganglion-blocking agent, mecamylamine, appears to be more predictable and constant in its hypotensive effects than the oral methonium compounds (Moyer *et al.*, 1956). Its "side-effects" are similar and tolerance is readily established, so that dosage must be adjusted to the individual's requirements. It is usually wise to begin with a small dose, say 2.5 mg. at 7 a.m. and 5 p.m. After two or three days these quantities may be doubled and, later, additional doses added at 12 noon and 10 p.m. As with pentolinium, the aim is to produce mild hypotensive symptoms in the erect posture two to three hours after taking the drug. A few weeks of careful study, during which the dose of the drug is titrated against the postural response, are usually required before a steady routine can be advised. The dose of all ganglion-blocking drugs can only be determined by trial and error. Preliminary experience with mecamylamine is so encouraging that it may yet prove to be the drug of choice in the severest grades of hypertension.

Malignant Hypertension

Patients in this category are gravely ill and commonly die within a few months in a confusional state, with or without evidence of left ventricular failure, and with varying degrees of renal inadequacy. Any success in treatment of this, the most serious form of hypertension, depends upon the early recognition of papilloedema, when symptoms may be comparatively slight, and on the employment of energetic measures to restore normal pressure levels. As a complication of malignant hypertension, left ventricular failure is more readily corrected than nitrogen retention. Uraemic

signs are of ill omen and usually betoken an unfavourable response to treatment.

If renal function is reasonably good, the blood non-protein nitrogen less than 50 mg. per 100 ml., and congestive failure absent or controlled, the prospects of lowering pressure and of arresting the progress of the vascular disease are reasonably good. Smirk (1953) considers that in these ill people the urgency of the situation demands that pentolinium should be used first as the "retard" preparation by subcutaneous injection in an initial dose of 3 mg. twice or thrice daily, increasing by 1 mg. per dose until suitable hypotensive levels are obtained. As much as 140 mg. daily may be required, but in our experience oral doses are equally effective, particularly when raudixin is also in use. The justification for the parenteral route is the necessity for rapid control of the blood pressure, as when hypertensive heart failure complicates the situation. Similarly, recurrent bouts of vomiting may preclude the effective use of the oral preparations. Parenteral administration is then the only alternative. With twice-daily subcutaneous injections at 12-hour intervals, a small supplementary oral dose may be given about midday, and, later, oral doses can sometimes be substituted for the two injections. As improvement is made, four oral doses of pentolinium tartrate may conveniently replace the subcutaneous injections.

Contraindications to Ganglion-blocking Compounds

A word of caution is necessary regarding the indiscriminate use of ganglion-blocking compounds. Unless the doctor is prepared personally to supervise their use, and succeeds in enlisting the intelligent co-operation of his patient, methonium or mecamylamine may do more harm than good. The patient must be taught to adjust and regulate his own treatment, and for this purpose he may be handed a leaflet giving him precise instructions. If he is uncooperative the attempt at home treatment should be abandoned.

Experience indicates that these compounds aggravate established uraemia. They should not be used in the presence of advanced cerebral arteriosclerosis, and only be commenced two to three months after either a cerebral or a coronary thrombosis. Prostatic symptoms call for considerable caution in the employment of these remedies.

Hydrallazine ("apresoline")

When renal function is moderately impaired, with a blood non-protein nitrogen in excess of 40-50 mg. per 100 ml., the response to treatment becomes less and less satisfactory. With a reduction in arterial pressure, renal function may in fact decline further. In these circumstances some success has been obtained by the oral use of hydrallazine in doses of 25 to 100 mg. It is a synthetic preparation which has the peculiar quality of considerably increasing renal blood flow while decreasing diastolic pressure. Cardiac rate and output are said to be increased. An improvement in renal function may warrant the cautious addition of pentolinium tartrate to the hydrallazine routine. When uraemia is in progress no drugs are of any avail.

Hydrallazine has distinct limitations, as "side-effects" and toxic reactions are frequent. Headache, flushings, and palpitations are common. Oedema of the skin observed about the hands and feet and drowsiness and dryness of the mouth also occur, but fortunately tend to disappear of their own accord after a few days when tolerance is gained. More serious signs of intoxication are the development of conditions resembling rheumatoid arthritis on the one hand and disseminated lupus on the other. Anaemia, hepatomegaly, and splenomegaly also occur. Intolerance for the drug usually subsides satisfactorily on its withdrawal.

V. Surgical Procedures

Lumbo-dorsal Sympathectomy

On the hypothesis that high blood pressure is the result of overactivity of the sympathetic system, bilateral excision of the paravertebral ganglia has been employed extensively during the past 20 years. Smithwick's procedure, which includes resection of the splanchnic nerves, together with excision of the sympathetic trunks from the level of the ninth

thoracic root to at least as low as the first lumbar, has yielded in expert hands striking benefit in the severest grades of hypertension. In younger people, provided renal function is reasonably good and congestive failure has not occurred, sympathectomy may produce a regression of the papilloedema, a fall in pressure, a restoration of a sense of well-being, and a prolongation of life which compares favourably with any other method of treatment at present available. It is, however, a major operation, commonly followed by a protracted convalescence and occasionally complicated by intractable root pains of a girdle type. Accidental wounding of the pleura can cause much respiratory embarrassment in the immediate post-operative period.

Sympathectomy has a limited use in the treatment of hypertension, as experience shows that a satisfactory result is most unlikely in the presence of impaired renal function, and, contrary to the use of the methonium compounds, patients who have suffered or are suffering from left ventricular failure never tolerate this surgical procedure. A poor response to methonium in combination with rauwolfia or hydrallazine, provided renal and cardiac functions are reasonably good, is a strong indication for sympathectomy, particularly in the severest grades of hypertension. For unintelligent and uncooperative patients, incapable of regulating their pentolinium or mecamylamine routine, sympathectomy is a justifiable alternative.

Bilateral Adrenalectomy

From the observation that the low blood pressure of Addison's disease could be corrected, and, indeed, overcorrected by the subcutaneous insertion of pellets of D.C.A. arose the suggestion that bilateral adrenalectomy might be justified in the severest forms of hypertension. Even with the help which cortisone and other substitution products provide, the post-operative findings indicate that subtotal or total adrenalectomy is a major undertaking, yielding uncertain results and imposing formidable risks among those surviving even a few months (Pickering, 1955). The immediate benefits resulting from the employment of the potent medical remedies now available, coupled with the substantial reduction in the mortality rate even in malignant hypertension, emphasize as nothing else can that there is no future for the employment of such a drastic upheaval as adrenalectomy in the treatment of hypertension other than in those instances where the suprarenal gland is primarily involved.

VI. Multiple Therapy

As already described, reassurance combined with light sedation in the form of small doses of barbiturates or rauwolfia are all that are required in the milder non-progressive cases of hypertension, with no more than Grade 1 or at most Grade 2 retinæ. The more powerful drugs—methonium and hydrallazine—are dangerous, but in combination have proved very effective when used cautiously in the severer forms of the disease.

Rauwolfia has the great advantage that it apparently potentiates other hypotensive agents, and when in use reduces the effective quantity of pentolinium, thus lessening the disagreeable "side-effects" of the latter preparation. In the opinion of Wilkins rauwolfia is the first hypotensive drug to try and the last to omit. Its stimulating action on the bowel may overcome to some extent the constipating action of the methonium compounds, its enhancement of vagal tone may restrain the cardiac acceleration of hydrallazine, and its central soothing action may augment the effects of veriloid by reducing that drug's tendency to gastric upset.

In the presence of hypertensive cerebral vascular disease, the combination of a low-sodium diet with rauwolfia, and later if necessary with veriloid in addition, is probably safer than intensive methonium therapy, at least in the first instance, whereas hypertensive heart failure calls for pentolinium or mecamylamine and a greater or less degree of salt restriction. Sodium retention is common when rauwolfia is in use, but seldom gives rise to difficulty if the diet is suitably adjusted and mercurial diuretics used from time to time.

For uncomplicated hypertension of Grade 3 or 4 severity, the combination of rauwolfia with a ganglion-blocking agent is the treatment of choice. This may be supplemented by salt restriction, and, if the response is incomplete or delayed, lumbo-dorsal sympathectomy may then be considered. It is said that a previous sympathectomy enhances the effects of hypotensive drugs.

VII. Conclusions

Hypertensive vascular disease presents in such a great variety of patterns, and runs such an unpredictable course, that the effects of treatment are difficult to assess.

Nevertheless, the remedies at present available, if selected judiciously, applied conscientiously, and adjusted carefully to the particular needs of the individual, offer more for hypertensive patients than ever before.

The maintenance of the blood pressure within the normal range permits a reversion of the vascular damage in the retinae, heart, and brain, provided renal function is not grossly impaired and massive tissue destruction has not occurred. Early treatment, even in the severe forms of hypertensive disease, should reduce the risk of serious complications and be the means of prolonging life.

In general, appropriate therapy, which is most often a combination of different remedies, should be determined more by the patient's vascular state than by blood-pressure readings. For the most part the retinal picture, taken with the state of the heart and kidneys, determines treatment.

Summary

A great variety of remedies are available for treatment of hypertensive vascular disease. General measures include: (a) simple psychotherapy; (b) advice regarding a physiological way of life; and (c) instructions regarding weight reduction and restricted Na intake.

The detection of a precise aetiological cause, and its prompt surgical removal, can lead to permanent cure.

In most cases treatment must be determined by the degree of vascular impairment rather than by blood-pressure readings.

All patients showing hypertensive retinopathy should have intensive therapy, also those without serious retinal changes but who have had transient cerebrovascular episodes, attacks of left ventricular failure, or angina. Most patients disabled by severe hypertensive symptoms will also require the more potent hypotensive remedies.

Patients who have no symptoms, or only minor ones, and who present no evidence of serious retinal, cerebral, or cardiac damage require advice about their mode of life, and only mild hypotensive agents such as rauwolfia.

Rauwolfia potentiates other hypotensive agents. Rauwolfia, with or without "veriloid," and a low-salt diet may keep hypertensive heart failure in check, but more commonly pentolinium and Na restriction will be required. Rauwolfia alone or with veriloid often helps the anginal patient with hypertensive coronary disease.

Low-sodium diet combined with veriloid is probably safer than intensive methonium therapy for cerebrovascular lesions. For uncomplicated Grade 3 or 4 hypertension rauwolfia with pentolinium is the treatment of choice.

Preliminary experience suggests that the effective dose of mecamlamine is more readily determined and more constant than that of the methonium compounds. It may therefore ultimately replace pentolinium, but the long-term results are not yet known.

In the presence of uraemia all hypotensive drugs are valueless, though in the milder grades of renal impairment hydrallazine ("apresoline") may prove helpful.

For patients incapable of regulating their pentolinium routine, or if the response to the drug is poor, lumbo-dorsal sympathectomy is indicated, provided renal and cardiac functions are reasonably good.

The accompanying Table and Diet Instructions are reproduced from a *Textbook of Medical Treatment* by permission of the publishers, Messrs. E. and S. Livingstone, Edinburgh.

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DURATION OF ANTICOAGULANT EFFECT IN RELATION TO URINARY EXCRETION OF DEXTRAN SULPHATE

BY

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It has already been reported that when the effect of single equipotent intravenous doses of heparin and dextran sulphate are compared the latter compound shows a slightly greater duration of effect. Comparison of repeated equipotent doses makes this disparity in duration of effect more pronounced (Ricketts *et al.*, 1953). This observation was confirmed by Donzelot *et al.* (1955), who reported that after three to five days' treatment with dextran sulphate the increase in duration of effect of successive doses was such that adequate control of the coagulation time and satisfactory clinical responses in cases of thrombo-embolic disease could be obtained by intravenous dosage at daily intervals or even on alternate days.

One factor which it was thought might be responsible for a cumulative effect of this kind, as compared with the absence of a similar effect with heparin, was a difference between the patterns of urinary excretion of the two drugs. Estimates of the urinary excretion of dextran sulphate in patients treated with dextran sulphate for periods varying from 10 to 23 days, and similar estimates in experimental animals given repeated injections for 10-day periods, were carried out and were related to measurements of the clotting-time of blood and the one-stage "prothrombin" time, in order to investigate this hypothesis. Certain further observations on the clinical effects of dextran sulphate were made incidentally in the course of this investigation.

Materials and Methods

Dextran sulphate ("dexulate," Batch No. 52DS041) was available as a 9% sterile solution, including 0.2% sodium bicarbonate and 0.7% sodium chloride. The dextran sulphate

contained 18.1% sulphur and the solution assayed at 1,200 units per ml. The unit of dextran sulphate is defined as the activity of 0.04 mg. of the standard preparation of dextran sulphate held by the Expert Committee on Biological Standardization of the World Health Organization. The *in vitro* effect of this unit is of approximately the same order of magnitude as the International Heparin Unit.

Estimation of Dextran Sulphate in Urine.—The method of MacIntosh (1941), which depends on the formation of an insoluble purple salt of the dye, toluidine blue, with sulphated polysaccharides, was modified as previously described (Ricketts *et al.*, 1954). Calibration against a dextran sulphate of known sulphur content enabled the results to be expressed as milli-equivalents of ester sulphate per litre of urine (1 mEq of ester sulphate is equivalent to 32 mg. of sulphur).

The blood coagulation time of patients was measured by the method of Lee and White (1913). With rabbits the method of Dale and Laidlaw (1911-12) was employed, using standardized capillary tubes containing steel shot of uniform size. All estimations were performed at 37° C. The "prothrombin" time was estimated by Quick's one-stage method (Quick, 1937) and the results were expressed as a percentage of normal by comparison with a normal serum dilution curve.

Method of Recovery of Dextran Sulphate from Urine.—4.26 g. of cetyltrimethylammonium bromide in 50 ml. of water was added to 2.14 l. of urine estimated to contain 2.13 g. of dextran sulphate. After standing to complete precipitation the insoluble dextran sulphate salt was separated by filtration and centrifugation, and dissolved in an alcohol-chloroform mixture (1:1 by volume). By adding approximately 2 M sodium chloride drop by drop to the clear solution in the organic solvent, sodium dextran sulphate was precipitated as a syrup. This salt was purified by treatment with charcoal, and repeated reprecipitation from alcohol-water solution finally yielded 275 mg. of dextran sulphate containing 18.95% sulphur. The anti-coagulant activity of the material recovered was compared with that of the material originally administered to the patient, using the method of Adams (1950) and an assay method previously described (Ricketts and Walton, 1953).

Design of Experiments

Clinical.—Observations were made on five patients who had been admitted to hospital for anticoagulant therapy but who were otherwise unselected. Two were cases of recent myocardial infarction and the other three were cases of venous thrombosis associated with pulmonary embolism. Therapy was initiated by twice- or thrice-daily intravenous injections of dextran sulphate after initial (baseline) values for the coagulation time and prothrombin time had been obtained. The coagulation time was measured before injection ("minimal" coagulation time) and, where necessary, one hour after injection ("maximal" coagulation time). Previous experience had shown that the coagulation-time response to this schedule of intermittent intravenous dosage took the form of a "picket-fence" curve. With thrice-daily injections the peaks (maximal clotting-time) and troughs (minimal clotting-time) of this curve became progressively elevated (Ricketts *et al.*, 1953). In the present investigation, once it was established in a given patient that a cumulative effect of this kind was occurring, the size of the dose and/or the number of injections was reduced in order to produce comparable responses on consecutive days. The general aim was to maintain a minimal coagulation time of at least twice the baseline value to ensure a continuous anticoagulant effect. Observations on the pro-

thrombin-time response were also made but were not used as a guide for the control of dosage. Twenty-four-hour specimens of urine were collected to allow estimation of the excretion of the drug.

Animal Experiments.—The duration of response to single intravenous injections of 750 units per kg. body weight was investigated in two rabbits. A week later the same animals were started on a course of thrice-daily intravenous injections of dextran sulphate, employing a dosage scheme similar to that initially used in the human subjects. The coagulation time was measured each morning before the first injection and again one hour later. Throughout the 10-day period of the experiment the animals were kept in metabolism cages and their urine was collected for each 24-hour period. The animals were maintained on a standard diet and allowed water *ad lib*.

Results

The clinical course of the thrombo-embolic disease in each of the five cases was satisfactory, and in no case was there any evidence of further embolism or thrombosis during therapy.

Coagulation-time Response.—The nature of the response to intermittent intravenous dosage was investigated by the use of different schedules of dosage. Progressive increase of the coagulation time on successive days in response to unaltered dosage, or a similar or increased coagulation time on successive days in response to a diminishing dosage, was taken as evidence of cumulation of dextran sulphate. The minimal coagulation time was regarded as the more sensitive index for this purpose and has been plotted together with the prothrombin percentage and total daily dose in Figs. 1-5. Judged by the nature of the minimal coagulation-time response, an effect ascribable to cumulation of the anticoagulant was observed in Cases 1, 3, 4, and 5. Case 2 presented special circumstances which are discussed separately.

Case 1.—A man aged 51 suffering from myocardial infarction was treated with dextran sulphate for 23 days. It can be seen from Fig. 1 that a daily dosage increasing from 8,400 units on the first day to 25,200 units on the third day raised the minimal coagulation time to the desired level. Evidence of cumulation was then obtained in that, in spite of reduction of dosage to 19,200 units on the fourth and fifth days, the minimal coagulation time continued to rise. Stabilization at the elective level of minimal coagulation

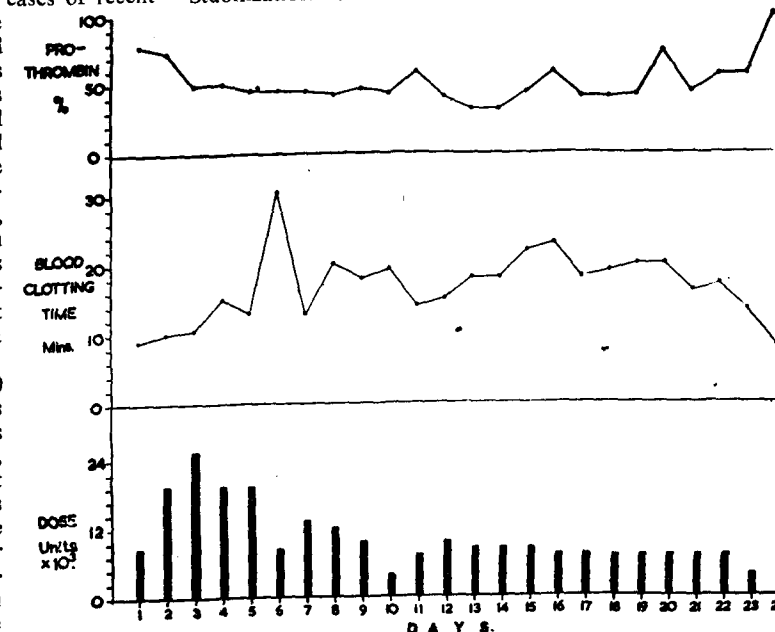


FIG. 1.—Case 1. Response of minimal blood coagulation time and of prothrombin percentage to variation of daily dosage of dextran sulphate.

time (15–20 minutes) was sought by variation of the dose between 13,200 and 3,600 units daily (given as two injections instead of three) during the 6th to the 12th day and by a

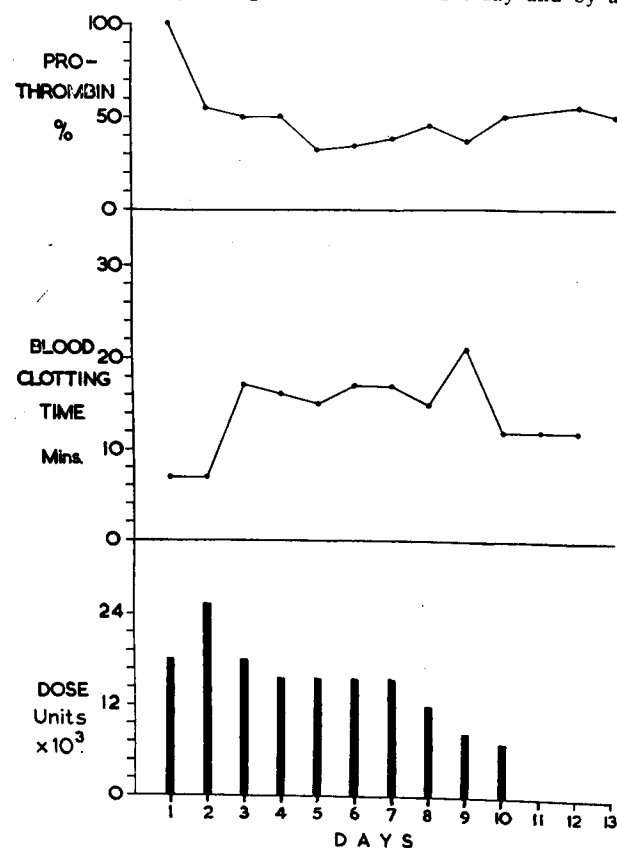


FIG. 2.—Case 3. Response of minimal blood coagulation time and of prothrombin percentage to variation of daily dosage of dextran sulphate.

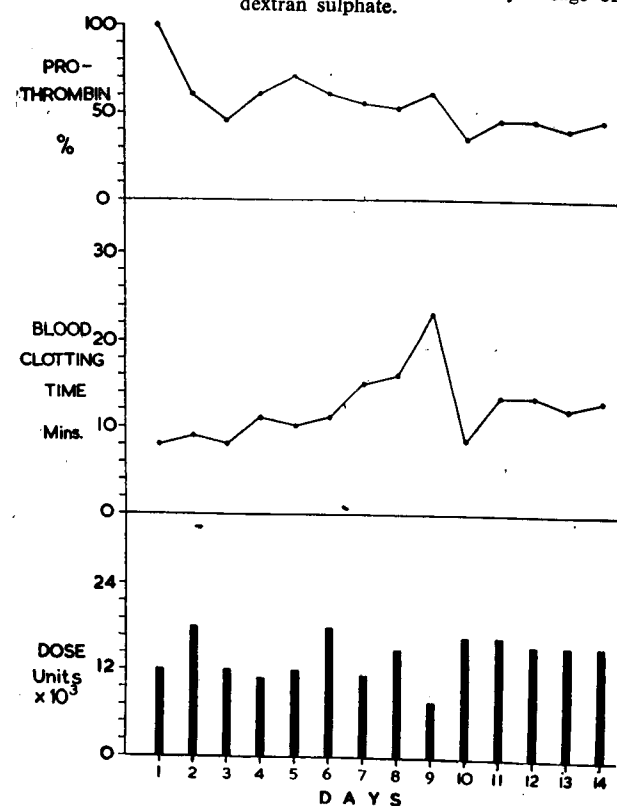


FIG. 3.—Case 4. The minimal blood coagulation time response shows a marked cumulative effect.

three-day period (13th to 15th days) on a steady dosage of 8,400 units. Even this latter dosage resulted in a progressive increase of the minimal coagulation time, and final stabilization was secured on a daily dosage of 7,200 units. During the 23 days of therapy this patient received a total of 235,200 units (17.64 g.) of dextran sulphate.

Case 3.—A woman aged 54 showed clinical and radiological evidence of pulmonary embolism evidently originating from deep vein thrombosis of the right leg associated with a severe superficial phlebitis in the varices of the same leg. An initial dosage of 42,000 units over the first two days raised the minimal coagulation time to the desired level. Reduction of dosage to 13,200 units daily on the fourth to the seventh day produced little variation in the minimal coagulation time until the ninth day, when it showed a rise in level in spite of further reduction of the dose to 12,000 units daily (Fig. 2), suggesting a slower cumulative effect than that seen in the previous case. Dextran sulphate was discontinued on the 10th day, and two days later the patient was transferred to treatment with an oral anticoagulant. The subsequent course of this case is discussed in further detail below.

Case 4.—A man of 50 suffering from a recent myocardial infarction was also found to have chronic bronchitis with purulent sputum. On a daily dosage of 12,000–18,000 units a marked cumulative effect was observed (Fig. 3). The increase in slope of the minimal coagulation time was first noted on the third day and became most pronounced by the ninth day. In this instance, after reduction of the dose on the ninth day, with corresponding reduction in the minimal coagulation time, stabilization was achieved at 15,600 units daily.

Case 5.—A man aged 40 with left femoral vein thrombosis and clinical and radiological evidence of pulmonary embolization was treated with dextran sulphate for 14 days. An

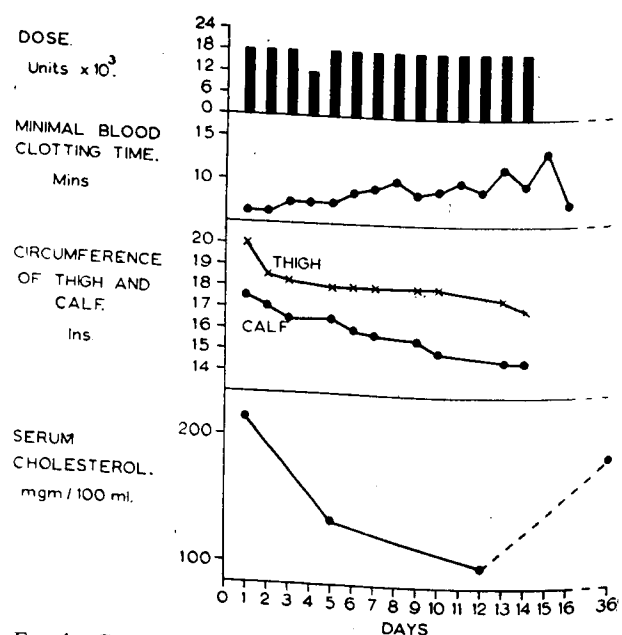


FIG. 4.—Case 5. In this case unvarying daily dosage produced a slow cumulative effect on the minimal blood coagulation time. The reduction in the swelling of the leg affected by venous thrombosis and the fall in the serum cholesterol during therapy are also shown.

unvarying dosage of 18,000 units daily was given for the first three days. Reduction of dosage to 12,000 units on the fourth day (when previous experience had suggested the first evidence of cumulative effect might be anticipated) was not accompanied by a fall in the minimal coagulation time, and more definite evidence of cumulation was obtained when the daily dosage of 18,000 units was resumed (Fig. 4) for the remaining 10 days of this course of therapy.

Effects on Prothrombin Percentage

In all cases the prothrombin percentage was reduced rapidly after injection, and within one hour of the first injection might be as low as 40% of normal. In contrast with the coagulation time the prothrombin percentage did not revert to the baseline level before subsequent injections. The nearest approach was in Case 4, the prothrombin percentage after an initial fall to 45% rising again to 74% 15 hours after the first injection. In every case the prothrombin percentage for most of the therapeutic period lay between 30% and 50%. Fluctuations were less conspicuous than those of the coagulation time, but on the whole the changes in prothrombin percentage and coagulation time mirrored one another. Although, as stated earlier, the prothrombin percentage was not used in the present investigation as a guide to therapy, these observations confirm the contention of Hirschboeck *et al.* (1951) that the prothrombin time can serve as an index of the anticoagulant effect of heparinoids, and it is possible that where both an oral and this intravenous anticoagulant are to be used in sequence it may serve for the control of each drug and for the transition from one to the other. In this latter connexion it was observed that following cessation of therapy with dextran sulphate in Cases 1 and 3 (treated for 23 and 10 days respectively) the coagulation time and the prothrombin percentage did not fall to the baseline values until 48 hours after the last injection.

Urinary Excretion of Dextran Sulphate

Cases 1, 2, and 4 were studied. Some day-to-day variation occurred in the amount of dextran sulphate excreted in the urine in each case, but over the whole therapeutic period the percentage of the total dose accounted for in the urine was close to 40% in all three patients (Table I). No close relation could be seen between the total daily dose and the percentage daily excretion, nor was the latter related to mean daily urinary volume. After the cessation of injections, dextran sulphate continued to be excreted for two to three days, as shown in Table II.

Case No.	Duration of Therapy (Days)	Percentage of Dose Excreted	No. of Days with 30–60% Excretion
1	23	42.6	15
2	16	42.2	12
4	14	39.3	9

TABLE II.—Decline of Excretion at End of Therapy (Figures are Milli-equivalents of Ester Sulphate)

Case No.	Days	Dose	Excreted
4	13	7.28	2.55
	14	7.20	3.82
	15	0	3.73
	16	0	0.66
	17	0	0.23
2	13	5.60	3.50
	14	5.03	1.70
	15	5.60	3.24
	16	1.68	1.11
	17	0	0.06
1	21	3.84	2.10
	22	3.84	0.95
	23	1.92	0.16
	24	0	0.11
	25	0	0.09

Observations in Rabbits

Anticoagulant Effect.—The two animals placed on a dosage regime similar in frequency and spacing of injections to that used in patients showed no evidence of any cumulative effect of the drug. The peaks and troughs of the maximal and minimal coagulation times were comparable in amplitude for a given dose day after day throughout the

course. Even when the size of the dose was increased from the initial 3,600 units daily to 4,800 units daily from the sixth day onwards in rabbit No. 2 (Fig. 5) no evidence of progressive increase in response was found. It should be noted that this absence of cumulation was observed although the animals were given an average dose in excess of 2,000 units per kg. of body weight per day as compared with the cumulative effect observed in man with doses of the order of 200 units per kg. body weight per day.

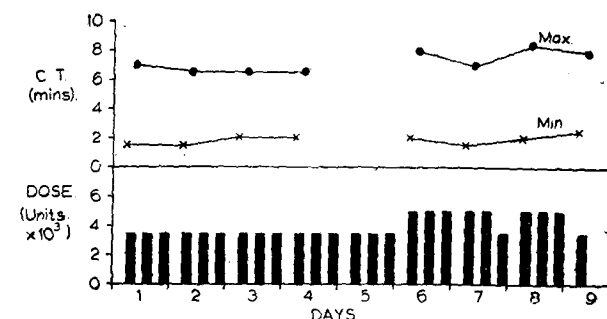


FIG. 5.—Maximal and minimal coagulation-time responses to dextran sulphate in the rabbit. Note absence of cumulative effect.

Urinary Excretion.—Analysis of the urine showed that the rabbits excreted 66.2% and 58.1% of the total dose administered. Small amounts of dextran sulphate were detected in the urine two to three days after the cessation of injections (Table III), although no anticoagulant effect was observed seven hours after the last injection.

TABLE III.—Decline of Renal Excretion of Dextran Sulphate in Rabbits After Cessation of Injections (Figures are Milli-equivalents of Ester Sulphate)

Rabbit 1			Rabbit 2		
Days	Dose	Excreted	Days	Dose	Excreted
8	2.44	1.290	8	3.05	2.480
9	0.61	0.650	9	0.71	
10	0	0.084	10	0	2.200
11	0	0.032	11	0	0.046
12	0	0.012			
13	0	0.002			

Examination of Material Excreted

It has been claimed that when heparin is injected the material recovered from the urine, "uroheparin" (Best and Jaques, 1948), differs in physico-chemical characteristics and in biological activity (Marbet and Winterstein, 1951) from the material administered. In a previous study carried out with dextran (³⁵S) sulphate (Ricketts *et al.*, 1954) it was found that during the first hour after intravenous injection of dextran sulphate in the rabbit the material appearing in the urine showed a slightly different R_f value by paper chromatography from that of the material administered. This was assumed tentatively to be explained by the excretion of a low molecular-weight fraction of the injected material.

The present investigation allowed recovery of a larger amount (275 mg., representing 12.9%) of the material appearing in the urine and further examination of its characteristics. On this occasion the material recovered from the urine of Case 1 showed no chromatographic difference from the original material. Its anticoagulant potency *in vitro* and *in vivo* appeared identical with that of the injected drug. This may possibly be accounted for by the fact that the product used in the present work was of more uniform and slightly lower average molecular weight than that used previously.

Other Clinical Effects of Dextran Sulphate

In the three cases with thrombosis of leg veins (Cases 2, 3, and 5), all presenting with painful oedematous limbs, dextran sulphate produced a lessening of pain and a

reduction of the swelling of the affected leg within 48 hours. In Case 5 the circumference of the initially swollen left leg, measured 4 in. (10 cm.) above and below the patella, gradually decreased to equal the corresponding measurements of the unaffected right leg during the 14 days of therapy (Fig. 4). During the first six days, accompanying the reduction of the oedema of the leg, the patient lost 8.5 kg. in weight, suggesting a reabsorption and excretion of about 8.5 litres of oedema fluid during this period.

It had previously been observed that dextran sulphate, like heparin, produces "clearing" of the turbidity of the plasma *in vivo* during alimentary lipaemia (Brown, 1952). The available evidence suggests that this phenomenon is due to the activation of a lipase acting principally on β -lipoprotein, the main carrier of lipids and cholesterol in human plasma. Alteration in the electrophoretic mobility of the lipoproteins following the injection of dextran sulphate has been shown to accompany the clearing phenomenon (Jeavons and Ricketts, 1956). In the present investigation the injection of repeated doses of dextran sulphate was observed to lower the level of plasma cholesterol even where the initial level was not greatly elevated, as in Case 5. The plasma cholesterol was lowered throughout the period of therapy but had reverted to its pre-treatment level 14 days after the last injection (see Fig. 4). Similar observations on the effect of dextran sulphate on plasma cholesterol have been made by Cohen and Tudhope (1956).

Complications and Side-effects of Dextran Sulphate Therapy

The response to dextran sulphate in Case 2 merits more detailed discussion.

Case 2

The patient, a woman aged 45, had previously undergone total hysterectomy and oophorectomy for bilateral ovarian carcinoma. At operation deposits were seen in the pouch of Douglas and pelvic tissues, so a post-operative course of deep x-ray therapy to the lower abdomen to full tolerance was planned one month later. Treatment was given by

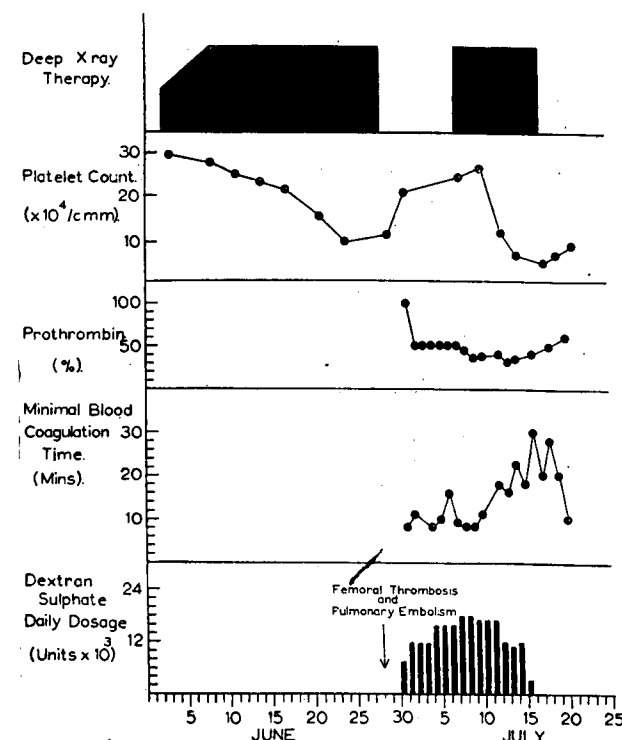


FIG. 6.—Case 2. Effect of radiotherapy on platelet count prior to and during dextran sulphate therapy. Note increased sensitivity of minimal blood coagulation time to dextran sulphate therapy during second episode of thrombocytopenia.

wide-field irradiation to a field area 40 by 40 cm. at 230 kV; H.V.L., 2.5 mm. Cu; F.S.D., 100 cm. An incident dose of 3,220 r to each of two fields over a period of 38 days gave a total of 3,500 r.t.d. (roentgen tumour dose). Blood counts were carried out at three-day intervals during treatment, and as the course progressed the blood platelets showed a steady decrease from an initial level of 295,000 per c.mm. to 119,000 per c.mm. by the end of the fourth week (Fig. 6).

On the 28th day of treatment the patient complained of a sudden sharp pain in the chest, and on the following day of pain and swelling in the left leg and thigh, suggesting pulmonary infarction associated with femoral vein thrombosis. Radiotherapy was suspended and treatment with dextran sulphate instituted. Twice-daily doses of dextran sulphate in amounts increasing to 19,200 units daily by the eighth day failed to produce a sustained rise in the minimal coagulation time to the desired level, although an anticoagulant effect was secured for the major portion of each day during this period. The pain in the chest disappeared on the third day of treatment and the pain and swelling in the left leg abated on the fourth day. During the first eight days of dextran sulphate therapy the platelet count rose till it had reached 243,000 per c.mm. The dosage was maintained at 18,000 units. Radiotherapy was resumed from the ninth day. An increasing response of the minimal coagulation time now became apparent and this continued in spite of reduction of dosage to 12,000 units daily (Fig. 6) on the 13th day.

A haematoma appeared at the site of venepuncture on the 15th day and the platelet count was found to have fallen once more to 121,000 per c.mm. Dextran sulphate was discontinued on the 16th day. The coagulation time continued to be elevated for three days. There were no further haematomata and no evidence of bleeding elsewhere was found. Radiotherapy was suspended on the 18th day and the platelets subsequently rose again, but the normal level was not regained for three weeks.

The patient's clinical condition progressed satisfactorily and she was alive and well with no evidence of recurrence of tumour and no further history of thrombo-embolic episodes when seen 18 months later.

Comment

The second fall in the platelet count in this patient was more precipitous than the first (Fig. 6). Whether this was due to an increased sensitivity of the marrow to a second dose of radiation before full recovery had occurred from the effects of the first, or whether the simultaneous administration of dextran sulphate with the second dose of radiation contributed to the thrombocytopenia on the second occasion, are questions it is not possible to decide unequivocally. Thrombocytopenia occurring during intensive therapy with a depot-heparin preparation in 13 out of 30 patients has been reported by Plancherel (1952), and platelet agglutination and thrombocytopenia have been recorded in experimental animals given a variety of sulphate polysaccharides (see Astrup, 1953, for references).

However, Soulier (1955) and Astrup, Flyger, and Gormsen (1955) have confirmed the absence of any direct effect upon platelets of dextran sulphate of the kind used in the present study, as originally reported by Walton (1953). Periodic platelet counts in the other four cases in the present series disclosed no significant changes (Table IV). On balance, therefore, it appeared to us more likely that the thrombocytopenia observed in Case 2 was occasioned by the heavy dosage of radiotherapy.

It was perhaps significant that while the platelet count was rising in this case (during the first eight days) the patient appeared to be relatively resistant to the anticoagulant effect of dextran sulphate, but showed a marked increase in sensitivity to the drug when radiotherapy was resumed and the platelet count again fell to low values. This may be analogous to the increased sensitivity of response to heparin in the presence of thrombocytopenia

TABLE IV.—Platelet Counts During Dextran Sulphate Therapy in Four Patients

Case No.	Total Duration of Therapy	Day of Therapy	Platelet Count
1	23 days	Before	212,000
		2	208,000
		10	183,000
		15	234,000
3	10 "	23	250,000
		Before	307,000
		7	366,000
		11	272,000
4	14 "	16	230,000
		Before	356,000
		2	285,000
		6	310,000
5	14 "	10	275,000
		16	306,000
		Before	204,000
		2	140,000
		5	202,000
		12	106,000
		26	178,000

reported by Conley *et al.* (1948), and emphasizes the necessity for caution in the administration of these anticoagulants to patients with low platelet counts.

Case 3, as described above, was treated with dextran sulphate for 10 days, during which time the oedema of the right leg (due to thrombosis of the deep veins and superficial phlebitis of varices) subsided and no haemorrhagic manifestations occurred. It was decided to continue treatment with an oral anticoagulant (phenindione), and this was instituted three days after cessation of the course of dextran sulphate. On the following day a few red cells were seen in the urinary deposit, and on the next day a profuse haematuria with clot retention occurred. At this time the coagulation time was normal. Subsequent investigation revealed a right-sided hydronephrosis, a mild left hydronephrosis, and a grossly trabeculated bladder associated with uterine prolapse. In view of the interval between the cessation of dextran sulphate administration and the occurrence of the haematuria, and also because of the normal coagulation time when this complication occurred, it seemed unlikely that the haemorrhage could have been caused mainly, if at all, by the dextran sulphate. However, another feature of this patient's subsequent history was possibly related to dextran sulphate therapy. Six weeks after her discharge from hospital (eight to nine weeks after the course of dextran sulphate) she developed a transient partial alopecia from which she had recovered fully two months later. The present case is the first within our own experience to show this side-effect, but Donzelot *et al.* (1955) reported its occurrence in 6 out of the 60 cases they treated with dextran sulphate and it was encountered in 3 out of 11 cases treated by Cohen and Tudhope (1956).

Discussion

The present results confirm and extend previous reports concerning the cumulative effect in human subjects of repeated intravenous injections of dextran sulphate. This cumulative effect is in sharp contrast with the effect of heparin similarly administered in doses of equivalent *in vitro* potency. It is generally agreed that the anticoagulant effect of a single intravenous dose of 5,000 units of heparin lasts two to three hours (Estes and Allen, 1950; Duff, Linman, and Birch, 1951; Brown and Douglas, 1952), and that, to secure a satisfactory clinical and anticoagulant effect, repeated intravenous injections of 10,000 units or more must be given at four- or six-hourly intervals throughout a course of therapy—that is, 40,000 to 60,000 units daily.

In contrast, the present investigation has shown that when a total dosage of 30,000–48,000 units of dextran sulphate is given within the first three to four days, the first evidence of cumulation appears. Thereafter continuous control of the coagulation time and prothrombin time and a satisfac-

tory recovery from the effects of thrombo-embolic disease can be secured with a daily dosage of 8,000 to 16,000 units given in single or divided intravenous doses. Intramuscular injections were not used in our patients, but this route has been employed with apparent success by Donzelot *et al.* (1955). It should be noted that the intravenous dosage scheme now recommended is larger than that used by Donzelot *et al.*, who, using somewhat different criteria of the clinical efficacy of dextran sulphate, obtained results which they regarded as satisfactory by reducing intravenous dosage after a few days to as little as 2,500 units daily or on alternate days, suggesting an even more pronounced difference from heparin in duration of effect.

In considering what might determine this disparity in duration of effect between the two anticoagulants, it is convenient to scrutinize separately the relative proportions of an administered dose which are excreted and retained.

With regard to the proportions excreted, obviously disparity might arise if considerably more of one drug than the other were eliminated. It has been shown by many workers (for references see Jaques *et al.*, 1953) that 40–60% of the dose of heparin administered intravenously can be recovered from the urine in the human subject and in experimental animals. This percentage is very similar to that now found for dextran sulphate. Disparity in duration of effect might also result from selective elimination of qualitatively different fractions of the injected material; for instance, a fraction of small molecular weight and low biological activity in the case of one drug but not in the case of the other. Most commercial heparins are known to be greatly heterodisperse in regard to molecular size and activity (for references see Walton, 1955), and, as mentioned above, evidence has been presented that the fraction recovered from the urine, uroheparin, does differ in physical characteristics and activity from the material injected. In the present experiments, employing the dextran sulphate commercially available, no difference could be detected between the excreted fraction and the original material.

With regard to the portion retained in the body, while it may be assumed that the anticoagulant activity of these drugs is mediated only by the fraction actually present in the circulating blood and free to interact with the "clotting proteins" of the plasma, it is also necessary to consider the distribution of these drugs in the total body fluids. It has long been appreciated that small diffusible molecules injected into the blood rapidly gain access to the extravascular tissue-spaces. It is only in recent years that it has been shown that even relatively large, charged molecules may also pass into the extravascular compartment, and that the concentration in the blood in such instances depends on the establishment of an equilibrium between the concentrations in vascular and extravascular fluid. This concept, generally applied to bodily constituents by Schoenheimer (1942), has been supported, for instance, in the case of individual plasma proteins in experimental animals and man by the work of Whipple and Madden (1944), Miller *et al.* (1949), Sterling (1951), Myant (1952), Gitlin and Janeway (1953), and others.

In applying this concept to the distribution in the body of polysaccharide sulphates it has seemed reasonable to question whether material of such relatively large molecular size and high electro-negative charge could, in fact, permeate through capillary membranes. But it is known that both heparin and dextran sulphate, when added to plasma, form loose complexes with the plasma globulins as a result of which the charge on the polysaccharide sulphate molecule is partially neutralized. With regard to molecular size, a study of the composition of lymph in animals has shown that in certain regions the blood capillaries are freely permeable to the largest protein molecules and even to small particles (Field *et al.*, 1937). Recently direct evidence of the passage of heparin into the extravascular compartment has been provided by von Kaulla and Pratt (1955), who demonstrated that the concentration in lymph alters in parallel with that in the plasma after intravenous injection,

thus supporting the contention that an equilibrium between heparin levels in vascular and extravascular fluids is accomplished.

The pattern of cumulative effect resulting from repeated injections of dextran sulphate is such as to suggest that if a similar equilibrium between vascular and extravascular compartments occurs, the latter may serve as the main reservoir. This might explain why, early in therapy, when this reservoir is low, the coagulation time reverts rapidly to normal. On the other hand, after a few days' treatment, when the reservoir has been raised, the next injection is followed by a slower fall in plasma concentration and coagulation time. Finally, after the administration of the last dose of a prolonged course, the reinforcement of plasma concentration from the extravascular compartment might explain the slow decline to a normal coagulation time occupying a period of about 48 hours, as compared with an effect lasting only five to seven hours from the same dose at the beginning of treatment.

The rate of inactivation or destruction of the portion of the drug retained in the body must also influence its duration of effect. In the case of heparin it has been suggested that inactivation is effected by an enzyme "heparinase" (Jaques, 1940). However, this enzyme has been isolated only from rabbit liver. An attempt to obtain similar material from beef liver was unsuccessful (Jaques and Keeri-Szanto, 1952). The enzyme from rabbit liver was found to show lack of specificity in that, in addition to acting upon heparin derived from various species, certain synthetic polysaccharides were also degraded. Recently it has been found that a dextran sulphate similar to that used in the present experiments is also susceptible to attack by rabbit heparinase preparations (Jaques and Cho, personal communication).

If, as postulated, the cumulative effect of dextran sulphate in man is accompanied by accumulation in the extravascular compartment, it seems likely that the rate of inactivation or destruction of dextran sulphate must occur more slowly than that of heparin, which, similarly distributed, shows no cumulative effect. Preliminary experiments (Wiegel, Ricketts, and Walton, unpublished) with ^{14}C -labelled dextran sulphate suggest that, in rats, metabolic breakdown (as measured by the appearance of $^{14}\text{CO}_2$ in the expired air) does occur at a slow rate, but direct comparison with the rate of metabolic turnover of heparin in experimental animals or man has not yet been attempted.

Nevertheless, if the inactivation of these anticoagulants in the body is in fact accomplished enzymatically, as the present evidence indicates, it is tempting to suggest that differences between given species in the relative turnover rates of these drugs might be accounted for by differences in the substrate-specificity of their enzymes. Thus the observed disparity in duration of effect of heparin and dextran sulphate in man might be due to a more marked specificity of the human enzyme for the "natural" substrate, heparin, which is accordingly degraded more quickly and completely than the synthetic analogue dextran sulphate. On the other hand, the similar duration of effect of the two drugs in the rabbit might be due to the ability of rabbit heparinase to degrade both anticoagulants with equal facility.

Whatever the mechanism involved, it is clear that the cumulative action of dextran sulphate in man confers upon this drug certain immediate practical advantages over heparin for anticoagulant therapy. These advantages include lessened cost, reduced discomfort to the patient, and reduction in the number of man-hours of skilled medical attention necessary for the actual administration of the anticoagulant, all of which accrue from the longer spacing of injections which is possible once the patient is stabilized at the selected level of response. These advantages become more marked where treatment is given for prolonged periods.

On the other hand, prolonged therapy with dextran sulphate, as with heparin, appears to be accompanied by the occurrence of transient alopecia as a late sequel in some patients. A survey of 105 cases known to us to have been

treated with dextran sulphate suggests that this side-effect occurs in about 10% of cases, affecting males and females alike. However, in cases treated early in the series, since we were unaware of the time-lag that may occur before the alopecia develops, it is possible that cases were overlooked because the follow-up was not long enough. Estimates of the incidence of alopecia following treatment with other polysaccharide sulphates vary from 19% ("treburon"—Hirschboeck *et al.*, 1954) and 70% ("thrombocid"—May, 1951) to 54–66% for heparin (Merz, 1950) and 78% for heparin or thrombocid given in conjunction with dicoumarol (Fischer *et al.*, 1953).

In addition to its use as an anticoagulant for established cases of thrombosis, heparin has been advocated recently for prophylaxis and treatment in conditions associated with atheromatosis and accompanied by abnormally high plasma cholesterol and lipoprotein levels (Graham *et al.*, 1951). The biochemical abnormalities are said to be corrected and the clinical condition is improved thereby.

Preliminary observations suggest that dextran sulphate is similarly effective in "clearing" lipaemic plasma, altering the distribution of molecular species of lipoproteins and their electrophoretic mobilities, and lowering the plasma cholesterol, but that these effects occur with greater intensity and for a longer duration than the changes occurring with similar doses of heparin. Further work on this aspect of the clinical use of dextran sulphate will be reported later.

Although, in this series, alopecia was the only side-effect encountered which appeared to be directly related to dextran sulphate therapy, it must be emphasized that the accumulated experience with this anticoagulant is still small compared with that accruing from the extensive use of heparin. It is therefore still necessary to advocate careful clinical and pathological investigation of all cases in which dextran sulphate is used.

Moreover, although the overall anticoagulant effect of dextran sulphate resembles that of heparin, there is evidence that these two anticoagulants show both quantitative and qualitative differences when compared by a variety of methods (Mussett and Perry, 1955; Grasset and Schwartz, 1955; Astrup *et al.*, 1955; Soulier, 1955), due to differences in the nature of their interventions in the blood-coagulation mechanism (Forwell and Ingram, 1956). This suggests that further clinical experience will be necessary before a final evaluation can be made of the place of dextran sulphate in the treatment of thrombo-embolic disease.

Summary

Dextran sulphate, administered by intermittent intravenous injections to five patients suffering from thrombo-embolic disease, was found to have a marked cumulative effect when treatment was prolonged beyond three to five days. As a result reduction in the size of dosage and/or lengthened spacing of injections could be effected without materially affecting the clinical efficacy of dextran sulphate as an anticoagulant.

The cumulative effect in man could not be accounted for on the basis of the urinary excretion of a smaller percentage of the injected dose than that of heparin, the naturally occurring analogue of dextran sulphate.

A dosage schedule of dextran sulphate, similar in spacing of injections but larger in relation to body weight, did not produce a cumulative effect in rabbits. In this species a slightly larger proportion of the injected dose was excreted in the urine than the proportion found in man.

It is suggested that in man dextran sulphate differs from heparin in duration of effect because of a slower rate of metabolic breakdown in the body and consequent accumulation, probably in extravascular fluid.

In addition to its direct effect upon the blood-coagulation mechanism, dextran sulphate relieved oedema in cases of thrombophlebitis and produced effects similar to those of heparin on the plasma lipoproteins and plasma cholesterol.

Our thanks are due to Professor A. P. Thomson for his interest in this study, to Drs. E. Bulmer, C. F. Hawkins, G. M. Holme, and Clifford Parsons for permission to treat and publish details of cases under their care at the General Hospital and Queen Elizabeth Hospital, Birmingham. We are indebted to Dr. M. J. Meynell for determination of the prothrombin time and other pathological investigations and to Dr. H. A. Ellis for clinical assistance. The dexalate used in this investigation was generously supplied by Messrs. Glaxo Ltd. This work was carried out while one of us (S. M. J.) was in receipt of a grant from the Medical Research Committee, United Birmingham Hospitals Endowment Fund.

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"Whatever the cause, it has been remarked at post-natal clinics how women at this stage [the early post-natal months] may indulge in very acrimonious comments about their husbands, especially in relation to their sexual demands. But this hostility, though virulent, is transient. Surely at this stage there is much conflict in the wives' minds, and they and their husbands need both support and comfort from society, rather than a demand that they should evince a bliss which theory and tradition expect. 'She's got everything she wants . . . a husband, a baby, a new home. She must be in her seventh heaven. What more can she want?' This style of comment only adds to the burden of guilt, when discontent arises. It may also induce the girl to wonder if she is abnormal, in that she cannot throw off anxiety and tension, and assume the glow which is the *sine qua non* of young mothers in magazines! Possibly now the first bitterness is sown. Certainly by the time the first child is 3 or so, it is quite common for the parents to need matrimonial guidance."—Mrs. HEIGER writing in the October issue of *Marriage Guidance*.

DEXTRAN SULPHATE: USE AS AN ANTICOAGULANT, AND ACTION IN LOWERING SERUM CHOLESTEROL

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The sulphuric esters of several polysaccharides of high molecular weight possess an anticoagulant action similar to that of heparin (Chargaff *et al.*, 1936; Astrup *et al.*, 1944). Many of these compounds cause precipitation of fibrinogen (Astrup and Piper, 1946) and agglutination of platelets (Piper, 1945), and when injected into animals lead to intractable bleeding (Astrup *et al.*, 1944). Walton (1951, 1952, 1953, 1954) showed that dextran sulphates of high molecular weight had similar biological actions but that compounds of smaller molecular weight (about 7,500) caused no such toxic effects. Ricketts (1952) prepared and studied the properties of a series of sulphuric esters of dextran which differed in molecular weight and sulphur content. Dextran sulphate of molecular weight of about 7,500 was non-toxic, but toxicity developed with increasing molecular weight. Anticoagulant activity was independent of molecular weight but depended on the number of sulphate groups for each glucose unit. Ricketts and Walton (1953) prepared a dextran sulphate which had anticoagulant action but was not toxic.

A clinical trial of dextran sulphate of optimum molecular weight and sulphur content showed that this substance was an effective anticoagulant and had an action similar to but more prolonged than that of heparin (Ricketts *et al.*, 1953).

We report the effect on the clotting-time of single and repeated intravenous injections of dextran sulphate sodium ("dexalate") and describe the use of this drug in the treatment of thrombotic disease. The change in serum total cholesterol during prolonged treatment with dextran sulphate is also described.

Methods

Measurement of Clotting-time.—By venepuncture 2 ml. of blood was withdrawn, using a sterile dry syringe, and approximately 0.5 ml. of blood was added to each of three clean, dry test-tubes, 0.75 cm. internal diameter. The test was timed from the entry of blood into the syringe. The tubes were at once placed in a water-bath at 37° C., and at intervals of one minute each tube was lifted and tilted through 90 degrees. When the blood did not flow on tilting, the tube was inverted and gently shaken, to break the film of clot on the surface of the blood. The end-point was reached when no blood flow occurred with this manoeuvre. The average of the results from the three tubes was taken as the clotting-time. In the control of dextran sulphate therapy this method of estimating clotting-time was more satisfactory than determining the end-point of clotting by tilting to 90 degrees only. By the latter method lower values were obtained, which did not give a reliable guide to the control of dosage. In two patients an attempt was made to control therapy by clotting-times measured without inversion

and shaking of the tubes, but this led to overdosage with the development of toxic effects.

Estimation of Serum Total Cholesterol.—To 24 ml. of a mixture of equal parts of acetone and ethyl alcohol was added 1 ml. of serum and the mixture allowed to stand for 18 hours. It was then centrifuged and 5 ml. of the supernatant was evaporated to dryness. The residue was dissolved in 5 ml. of chloroform, and 3 ml. of a reagent prepared by mixing one part concentrated H_2SO_4 and 10 parts acetic anhydride was added to the solution. The mixture was placed in the dark at 20° C. for 20 minutes, and then the intensity of green colour was measured in a colorimeter (EEL), using Ilford 204 tricolor red filter. A standard solution of cholesterol in chloroform was estimated with each batch of sera. To exclude physico-chemical interference with the estimation, samples of blood from untreated patients were divided into two portions. To one portion was added dextran sulphate to produce a concentration of 1% (three samples) and 0.1% (one sample), and to the other an equal volume of saline. The serum total cholesterol was then estimated. On no occasion was there a difference greater than 5 mg./100 ml. between the serum total cholesterol of each pair. Thus dextran sulphate in concentrations of 0.1 and 1% did not interfere with the method by which serum total cholesterol was estimated.

Standardization of Dextran Sulphate.—The anticoagulant activity of dextran sulphate was at first assayed in terms of international standard heparin units. This was unsatisfactory, and a new unit of dextran sulphate has been defined as the activity of 0.04 mg. of a standard preparation of dextran sulphate kept in the Department of Biological Standards, National Institute for Medical Research, London (Mussett and Perry, 1956). One dextran sulphate unit is approximately equivalent in anticoagulant activity to one international unit of heparin. We have expressed all doses of dextran sulphate in terms of standard dextran sulphate units.

Effect on Clotting-time of a Single Intravenous Injection of Dextran Sulphate

A single intravenous injection of 7,500 units of dextran sulphate was given to each of six volunteers, and the clotting-time was measured during the following eight hours. The initial clotting-time before the injection was the average of three separate estimations.

Table I shows that in four of the six cases the clotting-time was prolonged to more than twice the initial level for six hours. In the other two cases the corresponding periods of prolongation were about three and five hours respectively.

TABLE I.—Effect on Clotting-time of Single Intravenous Injection of 7,500 Units of Dextran Sulphate

Patient	Patient's Weight (Kg.)	Initial Clotting-Time (Min.) (Mean of Three)	Clotting-time (Min.) at Intervals After Dextran Sulphate				
			30 min.	2 hr.	4 hr.	6 hr.	8 hr.
1	43.2	5	23	22	16	14	10
2	67.8	8	64	25	21	20	14
3	67.6	5	20	12	12	10	8
4	61.0	6	22	13	7	7	—
5	72.2	6	26	29	20	12	10
6	81.2	8	77	33	24	8	—

Effect on Clotting-time of Repeated Intravenous Injections of Dextran Sulphate

Repeated intravenous injections of dextran sulphate were given to 11 patients, of whom seven had acute myocardial infarction, three had persistent angina following a previous myocardial infarction, and one had thrombosis of the inferior vena cava. In each case the clotting-time before starting treatment was the average of three separate estimations. An attempt was made to prevent the clotting-time falling below twice the level before treatment. The dose of dextran sulphate was kept constant at 5,000 units, and the frequency of dose was varied, depending on the clotting-time, which was measured at intervals during each day.

It was found that injections were required eight-hourly during the first 24 hours. Thereafter the frequency could be reduced, and after 48 hours the clotting-time could be maintained at a minimum of twice the pre-treatment level with injections every 12 hours. In all patients who continued treatment long enough, one injection every 24 hours was sufficient from the eleventh day onwards, and in most patients this dosage was sufficient much earlier. In nine courses of treatment with dextran sulphate lasting 14 days or longer the average dose on each day is shown in Fig. 1. Illustrative cases showing the control of the clotting-time by repeated doses of dextran sulphate are shown in Figs. 2 and 3. The clotting-times recorded were measured immediately before the next injection was given—that is, they are minimum values.

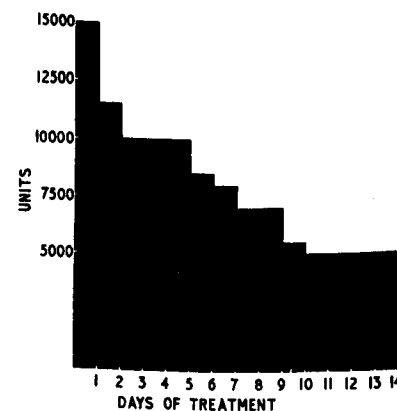


FIG. 1.—Average dose of dextran sulphate on each day of treatment in nine cases.

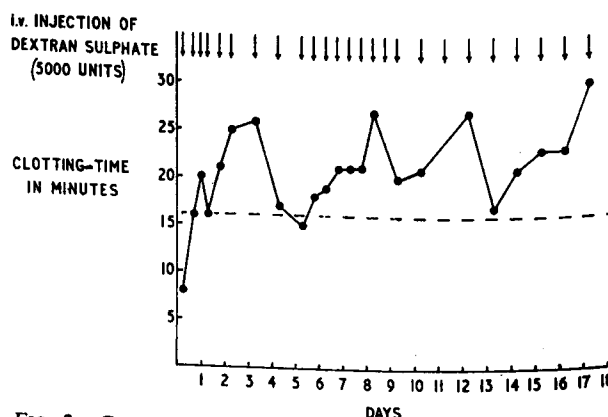


FIG. 2.—Control of clotting-time during treatment with dextran sulphate in a patient with persistent angina following myocardial infarction. Twice the clotting-time before treatment is indicated by the broken line.

At the end of treatment the return of the clotting-time to normal was gradual, taking three to four days.

The variation in clotting-time during 24 hours after an injection of 5,000 units of dextran sulphate was studied in one patient on the first and fourteenth days of treatment.

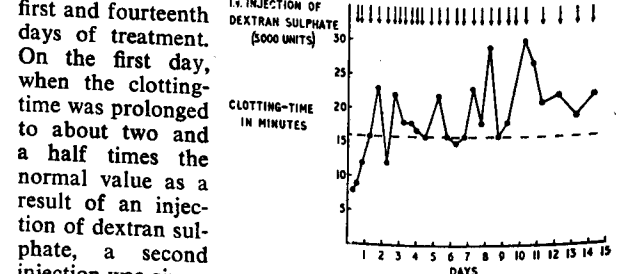


FIG. 3.—Control of clotting-time during treatment with dextran sulphate in a patient with acute myocardial infarction. Twice the clotting-time before treatment is indicated by the broken line.

Following this there was an abrupt initial rise followed by a steady fall, to reach twice the patient's normal value in five hours (Fig. 4). In the second series of observations, made when the patient had been stabilized on one injection of dextran sulphate daily, there was a similar initial rise, but the fall was much more gradual, and a satisfactory

anticoagulant effect persisted for over 24 hours (Fig. 4). It should be noted that in both series of observations the clotting-time immediately before the injection was prolonged to approximately the same extent.

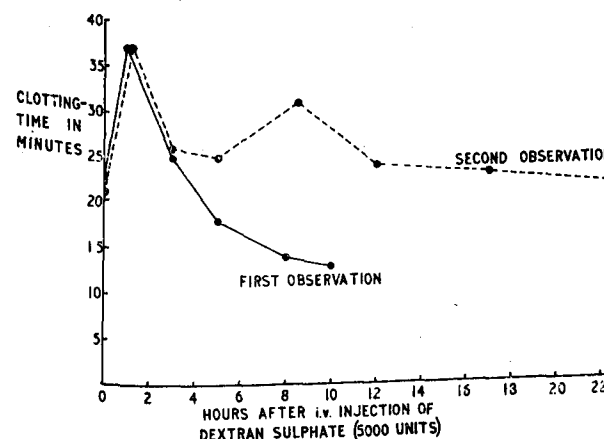


FIG. 4.—Change in clotting-time following an intravenous injection of 5,000 units of dextran sulphate on the first day of treatment (first observation) and the fourteenth day of treatment (second observation) in the same patient.

Effect of Dextran Sulphate on Serum Total Cholesterol

In nine cases the serum total cholesterol was measured before and at intervals during treatment with dextran sulphate; the results are shown in Fig. 5. The value for serum cholesterol before treatment is the average of at least two separate estimations, and in each case not less than four subsequent values were obtained and expressed as percentages of the initial value. There was a marked fall in serum total cholesterol in all cases, reaching 50–60% of the initial level after 6–12 days of continuous treatment. The average value of serum total cholesterol before treatment, the lowest level recorded, and the day of treatment on which this occurred are shown in Table II.

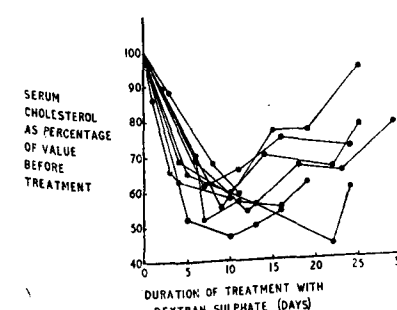


FIG. 5.—Change in serum total cholesterol during treatment with dextran sulphate in nine cases.

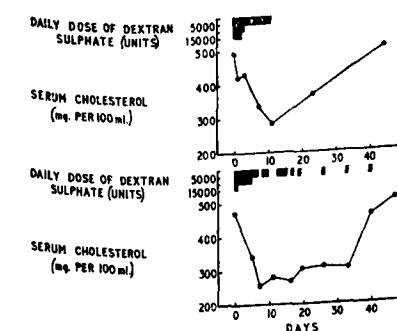


FIG. 6.—Change in serum total cholesterol in a patient with familial hypercholesterolaemia (1) during and after continuous treatment with dextran sulphate (upper curve), and (2) during a second course of continuous treatment followed by weekly injections (lower curve).

began to revert towards the original level. In six of these patients it was noted that the rise corresponded with the reduction in dosage from 10,000 to 5,000 units daily.

A patient with familial hypercholesterolaemia was given two courses of dextran sulphate, and a profound fall in serum total cholesterol occurred on both occasions (Fig. 6).

Thirteen days after the first course of treatment had been stopped the serum total cholesterol was still only 76% of the original value. After the second course of treatment weekly intravenous injections of 5,000 units of dextran sulphate were given, and at first the reduction in serum cholesterol appeared to be maintained; but these weekly injections did not prevent the return of serum total cholesterol to its original level within 28 days (Fig. 6).

TABLE II.—Maximum Fall in Serum Total Cholesterol During Dextran Sulphate Treatment

Patient	Average Serum Total Cholesterol Before Treatment (mg./100 ml.)	Lowest Serum Total Cholesterol (mg./100 ml.)	Day of Treatment on which Serum Total Cholesterol was Lowest
1	486	287	11
2	486	254	7
3	258	115	22
4	320	190	10
5	230	125	12
6	207	115	9
7	180	105	9
8	292	180	7
9	435	205	10

Patient 1 received two separate courses of treatment.

One patient, whose serum total cholesterol at the end of continuous treatment was approximately 60% of the original level, was given weekly intravenous injections of 5,000 units of dextran sulphate. With this dosage the reduction in serum total cholesterol persisted for only seven days. Another patient, whose serum total cholesterol at the end of continuous treatment was 78% of the value before treatment, was given weekly injections of 10,000 units of dextran sulphate. In this case the cholesterol had returned to its original level in nine days and thereafter did not fall.

Toxic Effects

A mild degree of alopecia was observed in three male patients, occurring after 14–21 days of continuous treatment. No other toxic effects were noted in this series of patients when the dosage of dextran sulphate was controlled as described above. Two additional patients, not included in the present study, developed diarrhoea, with the passage of blood in the stools after 14 days of treatment. The dosage in these two cases was controlled by clotting-times measured by simply tilting the tubes, without inverting and shaking, with the result that lower values of clotting-time were recorded. In an attempt to maintain prolongation of the clotting-time, a higher dosage of dextran sulphate was given to these two patients than to any of the other patients. There was a profound fall in serum total cholesterol in both these cases, from 230 to 65 mg. and from 340 to 130 mg. per 100 ml. respectively.

Discussion

At present the regime of anticoagulant therapy most frequently employed is intravenous injections of heparin, usually given at six-hourly intervals for two days, followed by oral administration of ethyl biscoumacetate or phenindione. A serious drawback to the use of heparin is that frequent intravenous injections are required to maintain an adequate prolongation of the clotting-time.

We have shown that following a single intravenous injection of 7,500 units of dextran sulphate, the clotting-time was prolonged to more than twice the normal for four to six hours. Duff *et al.* (1951) reported that an intravenous injection of 7,500 units of heparin resulted in lengthening of the clotting-time to twice normal for only three to four hours. The response of different subjects to a single dose of dextran sulphate was variable, as with heparin (de Takats, 1943).

A more important finding is the cumulative effect of dextran sulphate. Three injections, each of 5,000 units, were required in the first 24 hours, but thereafter the frequency of dosage decreased, so that with most patients injections at

12-hourly intervals were sufficient to maintain suitably prolonged clotting-times from the third or fourth day of treatment onwards. The frequency of dosage could be further reduced to once daily after 5 to 11 days of treatment.

We have tried to keep the clotting-time continuously greater than twice normal and have not allowed it to fall to an almost normal level between injections, as is often permitted during heparin treatment.

In all patients cumulation has proceeded until eventually one injection of 5,000 units every 24 hours was sufficient. Thereafter no further cumulation appeared to occur, although two patients were treated for a further period of over two weeks with 5,000 units every 24 hours. Ricketts *et al.* (1953) also obtained evidence of an additive effect after several injections of dextran sulphate.

Dextran sulphate appears to be a suitable substitute for heparin in initial anticoagulant treatment. Heparin is commonly used only for 48 hours until ethyl biscoumacetate or phenindione has become effective; for this purpose the present results suggest that 5,000 units of dextran sulphate given eight-hourly for 24 hours and then 12-hourly for a further 24 hours would be safe and effective in prolonging the clotting-time.

Continuous treatment over a period of several weeks is a practical procedure with dextran sulphate, as with many patients one injection daily sufficed after the first week. This has some advantages over the combination of heparin and oral anticoagulant. One venepuncture daily for the injection of dextran sulphate is not any more arduous than the daily venepuncture required to obtain blood for estimating the prothrombin time. Our results suggest that, once the period of maintenance treatment is reached, estimations of clotting-time are necessary only every two or three days. As with heparin, the anticoagulant effect of dextran sulphate can be quickly neutralized with protamine sulphate (Walton, 1951).

Reports have appeared of certain other sulphated polysaccharides—the polysulphuric esters of polyanhydromannuronic acid, polyhexuronic acid, and polygalacturonic acid—which have been found to have clinical value as anticoagulants (Seifter and Begany, 1948; Hirschboeck and Madison, 1950; Mangieri *et al.*, 1951; Scholz and Barker, 1951). There have been several reports of undesirable side-effects following the use of these compounds; the commonest toxic manifestations appear to have been alopecia and diarrhoea (Hirschboeck *et al.*, 1954), but generalized vasomotor collapse has also occurred (Sorenson and Wright, 1950).

Since Hahn (1943) showed that an injection of heparin cleared the turbidity of lipaemic plasma in dogs, many workers have confirmed this in man (Anderson and Fawcett, 1950; Block *et al.*, 1951; Utz *et al.*, 1953). There is evidence that the degree of clearing of turbidity of alimentary lipaemia by heparin is less in coronary artery disease than in normal persons (Block *et al.*, 1951; Oliver and Boyd, 1953). It has been shown that transient changes in the distribution of the lipoprotein fractions occur after the injection of heparin (Graham *et al.*, 1951; Rosenberg, 1952; Chandler *et al.*, 1953), but most workers have noted no effect on the total amount of cholesterol in the blood following a single injection of heparin (Anderson and Fawcett, 1950; Block *et al.*, 1951; Eder and Russ, 1952; Chandler *et al.*, 1953; Herzstein *et al.*, 1954; Soffer and Murray, 1954).

Repeated doses of heparin at intervals of 2 to 14 days kept the lipoprotein pattern altered in some patients but had little or no effect on the serum cholesterol (Graham *et al.*, 1951). However, Basu and Stewart (1950) reported that heparin in therapeutic doses produced a fall in the level of serum cholesterol after 24 hours, and Hollister and Kanter (1955) found that in two patients with essential hyperlipaemia intravenous injections of 100 mg. of heparin three times weekly produced a fall in all fractions of the blood lipids. Daily intramuscular injections of heparin in chicks produced a small decrease in total plasma cholesterol and other lipid fractions after four weeks (Opdyke *et al.*, 1955).

W. D. Brown (1952) reported that dextran sulphate had similar effects to heparin in clearing alimentary lipaemia, and single doses of other polysulphated esters of polysaccharides—"treburon" and "paritol"—have also been shown to clear alimentary lipaemia (Brown *et al.*, 1952; Ackerman and Zilversmit, 1953) without influencing serum cholesterol levels (Zinn *et al.*, 1952). On the other hand, Chandler *et al.* (1953) found that treburon given by buccal absorption produced a significant reduction in serum cholesterol and serum phospholipids five to seven hours after administration. Treburon given under these conditions had no effect on the clotting-time.

We have shown that intravenous injections of 5,000 units of dextran sulphate two or three times daily consistently produced a profound fall in serum total cholesterol. This reduction in cholesterol was not maintained when the dosage was reduced to 5,000 units daily in response to the lengthened clotting-time. With the methods of administration investigated so far, it has not been found possible to produce a sustained fall in the serum total cholesterol without an excessive prolongation of the clotting-time.

Summary

A single intravenous injection of 7,500 units of dextran sulphate produced an increase in the clotting-time to more than twice normal for four to six hours.

With repeated injections of dextran sulphate, cumulation occurred so that the clotting-time could be maintained at more than twice normal by a dosage of 15,000 units in the first 24 hours, 10,000 units daily for the next 4 to 10 days, and thereafter 5,000 units daily.

During treatment with dextran sulphate there was at first a profound fall in serum total cholesterol. This reduction persisted only while the dosage was 10,000–15,000 units daily.

It is suggested that dextran sulphate is an effective anticoagulant for clinical use and provides a possible alternative to the usual combination of heparin and oral anticoagulant. However, toxic effects may occur, particularly if the dose is not carefully controlled.

The development of a mild degree of alopecia was observed in three male patients. Overdosage in two cases resulted in diarrhoea, with the passage of blood in the stools.

We wish to express our thanks to Professor G. M. Wilson for much helpful advice and criticism; to Dr. A. Jordan and the staff of the Department of Chemical Pathology, Royal Infirmary, Sheffield, who performed all the estimations of serum total cholesterol; to Dr. H. Swan, for assistance with the early part of the work; and to Glaxo Laboratories Ltd., who supplied the dextran sulphate used in this work.

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PLACE OF DIRECT SURGERY IN TREATMENT OF OBLITERATIVE ARTERIAL DISEASE*

BY

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Obliterative arterial disease may be due to a variety of causes, including thrombosis after an injury, coarctation of the aorta, thromboangiitis obliterans, an embolus, or the condition of so-called primary arterial thrombosis. I shall not discuss the place of direct surgery in the treatment of these lesions beyond mentioning that it is the best treatment for coarctation of the aorta and for thrombosis of a major artery after an injury, a good treatment for primary thrombosis and some emboli, but only occasionally possible in patients with thromboangiitis obliterans. I am concerned mainly with atherosclerosis and the place of arterial reconstruction operations in the treatment of this all too common disease.

Atherosclerosis is a general disease which affects the arteries of the whole body, and it is an important principle that an arterial reconstruction operation can have only a local effect. Therefore this type of surgery is justified only when the local manifestations of this general disease predominate to an unusual extent. In many patients symptoms arise from the occlusion of several arteries, and it is obviously a mistake to reconstruct the femoral artery of a patient who suffers from angina pectoris and intermittent claudication. On the other hand, it is justifiable to reconstruct the femoral artery of a patient who suffers from angina pectoris and gangrene of a toe; from the patient's point of view an arterial reconstruction operation is a smaller procedure than a major amputation (Rob, Eastcott, and Owen, 1956). Fortunately, in a fair proportion of patients atherosclerosis remains relatively localized. This is particularly so in patients with occlusion of the abdominal aorta or iliac arteries, and sometimes so in those with thrombosis of the popliteal, femoral, carotid, mesenteric, renal, and subclavian vessels. In my view, at least 50% of patients with occlusion of the abdominal aorta and iliac arteries are suitable for a reconstruction operation, about 25% of those with femoro-popliteal thromboses, and probably about 5% of those with an internal carotid thrombosis, although this latter figure is merely a rough estimate.

*Carbutt Memorial Lecture delivered at Guy's Hospital on May 29, 1956.

Thrombosis of Abdominal Aorta and Iliac Arteries

The symptoms produced by this lesion are variable. One patient may be able to walk slowly for half a mile before the onset of the pain of intermittent claudication, and another with an almost identical thrombosis may have gangrene; the symptoms depend upon the efficiency of the collateral circulation. From a surgical point of view this lesion may be divided into two types—the extensive occlusion extending from the iliac arteries below to the renal arteries above (Fig. 1), and the localized occlusion usually confined to the region of the bifurcation of the abdominal aorta (Fig. 2).

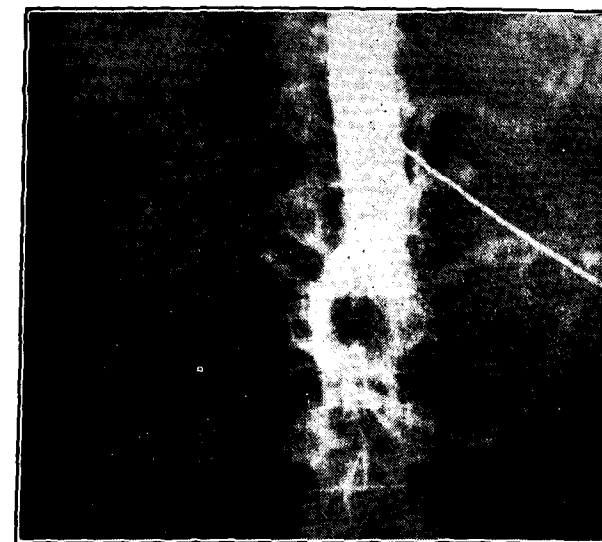


FIG. 1.—Thrombosis of the abdominal aorta in a man aged 36. The occlusion has reached the renal arteries and there is a partial occlusion of the left renal artery. The patient had grade IV hypertension with a blood pressure of 210/110.

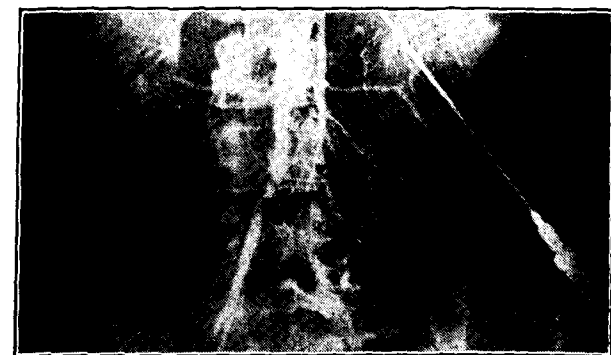


FIG. 2.—Thrombosis localized to the region of the aortic bifurcation. This patient, a woman aged 34, had gangrene of her right foot. An arterial reconstruction was successful.

It is a relatively simple matter to restore the blood flow in most of the patients with the localized type of occlusion. We have had only one death out of 28 such operations and only two recurrent thromboses, and each of these affected only one iliac artery. On the other hand, those with high occlusions present a major problem and require a major operation. For these patients it is necessary to clamp the aorta above the renal arteries and insert a plastic prosthesis or homologous arterial transplant from this level to the iliac arteries. Two of our seven patients with this lesion have died as a result of the operation, both from renal failure, but the risk of this has been reduced by using hypothermia. Because of the good results obtained with surgery in those patients with localized occlusions and the high mortality of conservative care in those with an occlusion which has

reached the mouths of the renal arteries, we now advise operation in the majority of patients with thrombosis of the abdominal aorta, exceptions being those with clinical coronary artery disease and those with evidence of active generalized atherosclerosis. It may be only after inspection of the arteries at operation that this latter group can be diagnosed.

The high mortality of occlusions which have reached the renal arteries is due to renal failure or hypertension. The former is due to occlusion of both renal arteries, with infarction of the kidneys, but the latter is of special interest. Thrombosis of the abdominal aorta at the level of the renal arteries does not cause hypertension. Fig. 3 is the blood-

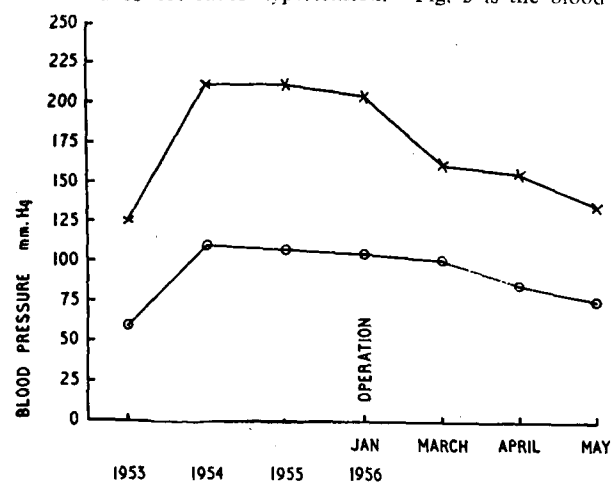


FIG. 3.—Blood-pressure chart of the patient whose aortogram is shown in Fig. 1. When he was first seen his blood pressure was normal, but following the partial occlusion of the left renal artery severe hypertension developed. This was relieved by surgery.

pressure chart of the patient whose aortogram is shown in Fig. 1. When first seen in 1953 at the age of 35 he had a normal blood pressure and an occlusion of the abdominal aorta in the region of its bifurcation. Operation was advised but refused. He was kept under observation, and in 1954 his blood pressure rose to 220/110; he still refused operation, but by late 1955 he was crippled by hypertensive headaches and his vision was failing, with papilloedema and retinal haemorrhages. The aortogram (Fig. 1) now showed a partial occlusion of the left renal artery. Reconstruction of the aorta and removal of this kidney lowered his blood pressure to normal (Fig. 3) and cured his symptoms. We have had two patients of this type; the other was successfully operated on in 1952 and is well to-day. These patients raise the interesting point of the place of atherosclerosis of the renal arteries in the production of hypertension (Howard, Berthrong, Gould, and Yendt, 1954). A partial occlusion of this type may produce a Goldblatt type of renal lesion, and in my view it is worth doing aortograms on a proportion of patients with severe essential hypertension to see if one cannot detect a localized lesion of this type.

Femoro-Popliteal Artery

Patients with occlusion of this artery present either with the symptom of intermittent claudication as their main complaint or with rest pain and gangrene. For those with rest pain and gangrene an arterial reconstruction operation is the treatment of choice, because the alternative is usually a major amputation. It is surprising how often it is possible to save the limb of such a patient. In our experience such a procedure is possible for about 20% of patients with gangrene of the toes and feet; we have saved twenty such limbs, and two were diabetics. A patient with gangrene and clinical evidence of an aortic, iliac, or femoro-popliteal thrombosis should have an arteriogram to see if his limb could be saved. While this may well mean four or five arteriograms for each successful arterial reconstruction, the

results, particularly in patients below 65 years of age, should be worth the trouble.

On the other hand, the symptom of intermittent claudication presents quite a different problem. Fully 80% of such patients have a lesion, usually of the femoro-popliteal artery, which is anatomically suitable for arterial reconstruction, but only about 25% or less should be treated surgically, and this applies to both the end-to-end and the by-pass types of operation. This latter method is the best, but in my view the selection of patients should not be relaxed, chiefly because of the general nature of this disease. Patients with femoro-popliteal thromboses often have coronary atherosclerosis. We have one simple rule: a patient with intermittent claudication due to a femoro-popliteal thrombosis should have an arterial reconstruction operation only if he is unable to work. The business man who can do his work but who cannot play golf should be treated conservatively.

Table I shows the results we have obtained with direct surgical operations in patients with obliterative arterial disease, the procedures being either thrombo-endarterectomies or arterial reconstructions by the end-to-end or by-pass technique. The follow-up is between one and six years.

TABLE I.—Follow-up. Arterial Reconstruction Operations in 109 Patients with Obliterative Arterial Disease

Artery	No. of Patients	Thrombosed in Hospital	Thrombosed Later	Now Patent
Aorta and iliacs	35 (3 died in hospital)	1	1 (+ 1 dead since discharge)	29
Femoral	48	11	15 (+ 2 dead since discharge)	20
Popliteal	17	1	5	11
Others	9	2	3	4

It is of interest that patients with popliteal occlusions have done a little better than those with femoral blocks, because this is against the general trend, where the larger the vessel is the better are the results. A possible explanation of this may be that the collateral circulation is very much better around a femoral than around a popliteal thrombosis. This means that occlusion of the popliteal artery produces major symptoms early in its course, whilst a similar occlusion of the femoral artery may produce little disturbance, and so surgery becomes necessary only in those patients with marked atherosclerosis. In my view, the state of the host artery is a major factor in the late recurrence rate in these patients; in general, those with severe atherosclerosis do badly.

Carotid Arteries

Occlusion of the internal carotid artery often begins as a plaque of atheroma situated just above the carotid bifurcation. In most patients the occlusion is complete and direct surgery cannot do any good, but in a minority the occlusion is partial and the patient can be cured by surgery (Eastcott, Pickering, and Rob, 1954). These nearly complete occlusions may produce intermittent cerebral symptoms or the effects may be continuous; in either case the results of surgery may be dramatic. In one of our patients the continuous neurological abnormalities included a partial right-sided hemiplegia and the patient was unable to sign his own name; an arterial reconstruction operation has removed all his abnormal physical signs and he has returned to work in a responsible position with a shipping company. It is important to stress that many cerebral arteriograms fail to include the carotid bifurcation on the x-ray film, and this will fail to demonstrate such a lesion. Carotid arteriograms, in common with all other arteriograms, must show the site of needle puncture on at least one of the films.

Arteries of the Upper Limb

It is most unusual for thrombosis of one of these vessels to need a reconstruction operation, because the collateral

circulation is usually so good. However, on four occasions we have reconstructed such vessels (subclavian and axillary) in patients who were unable to work because of the symptoms of ischaemia, and the results have been worth while.

Type of Reconstruction Operation

Table II gives our results with the various arterial reconstruction operations in all our patients over the last six years irrespective of the reason for the operation, and Table III lists the disease for which the artery was reconstructed.

For patients with obliterative arterial disease it is only occasionally possible to resect the occluded segment and restore continuity by a direct end-to-end anastomosis, but when this can be done it is the best procedure. In my view the next most satisfactory operation is thrombo-endarterectomy. This is of particular value in localized occlusions of the aorta and iliac arteries, but it is sometimes of value in vessels as small as the popliteal. Two important

TABLE II.—Method Used in 228 Arterial Reconstruction Operations

Operation	No. of Patients	Thrombosed Early and Late	Dead (including Operation Deaths)	Now Patent
Direct suture	25	1	3	21
Thrombo-endarterectomy	24	5	1	18
Autogenous vein	25	15	4	6
Homologous artery	109	34	10	65
Plastic cloth	19	0	5	14
Polyvinyl alcohol	26	9	5	12

TABLE III.—Reason for Operation in the 228 Patients Listed in Table II

Reason	No. of Patients	Thrombosed Early and Late	Dead (including Operation Deaths)	Now Patent
Injury	17	5	4	8
Congenital abnormality	12	0	0	12
Aneurysm or A-V fistula	85	19	16	50
Obliterative disease	109	39	6	64
Malignancy	5	1	2	2

points in choosing patients for this procedure are the size of the thrombosed segment and the state of the vessel wall of the proximal and distal to the occlusion, but, as the tables show, with careful selection the results have been very good. In our hands autogenous vein grafts have given good results. The disappointing results in patients with atherosclerosis. The tables show that homologous arteries have been satisfactory, and most of the thromboses in this group have been in patients with obliterative disease of the femoral and popliteal arteries; but the maintenance of an artery bank is by no means easy, and so we use a plastic prosthesis, either of plastic cloth or of polyvinyl alcohol sponge, for the reconstruction of the aorta and iliac arteries.

Anticoagulants

We use anticoagulants locally during the operation, and then from the third or fourth post-operative day as a long-term measure in patients with obliterative arterial disease. The idea is that these patients are likely to thrombose their arteries, either the one which has been reconstructed or another such as the coronary. Long-term anticoagulant therapy possibly reduces the incidence of this. Since 1952 we have kept many of our patients on phenindione ("dind-evan") in sufficient dosage to prolong the prothrombin time to just less than twice the patient's control level. It has caused little trouble beyond the need for regular control, and we now do not even stop the drug for such procedures as another surgical operation. With the prothrombin time at this level one can operate and fail to notice any change in the patient's bleeding. The value of this measure is still unproved.

Conclusion

Our follow-up shows that with careful selection the results of direct surgery in the treatment of obliterative arterial disease can be good. They are best in patients with occlusions of the aorta and iliac arteries and they are most gratifying in patients with gangrene of the toes and feet, cerebral symptoms due to partial internal carotid occlusion, or hypertension. Good results also follow the reconstruction of the femoro-popliteal artery in patients with intermittent claudication, but here selection is particularly important. In my view the by-pass type of operation is the best procedure for occlusions of this vessel, but its reintroduction has not widened the indications for surgery in patients with this general disease, unless the reason for operating is gangrene or rest pain.

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SOME DELAYED COMPLICATIONS OF INOCULATION

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For several years we have been aware of a number of curious disturbances which may occur during the first or second week after inoculation or vaccination. This paper is based upon a large number of clinical observations; no attempt is made to offer a detailed explanation of these disturbances, but rather to consider in what way they fit into the disease pattern of other syndromes and what is their long-term significance.

It has long been known that reactions could follow various inoculation procedures, and such reactions have usually been considered under "immediate reactions," as the delayed "serum sickness" type of reaction, or as anaphylactic reactions. We have not been particularly concerned with immediate reactions and have not met with any true anaphylactic reactions, but in the group of conditions related to serum sickness we have found the greatest variety of disease syndromes.

Present Investigation

With few exceptions, our observations were made upon young healthy adult recruits between the ages of 18 and 20. Within the first few weeks in the Service these recruits received various inoculations and all were vaccinated. As a rule, the first T.A.B.T. injection was given at the same time as the vaccination, and most of our observations were made in the period one to two weeks after this double procedure. A second T.A.B.T. injection was given six weeks after the first, following which only occasional reactions were seen. This can be attributed to various factors, but chiefly to the fact that those who reacted to the first injection were not usually subjected to a second, while those who did

not react to a first injection rarely experienced trouble with injections given subsequently. Isolated cases have occurred after other procedures, and are mentioned later.

A large number of recruits pass through the region in which our group of four hospitals is situated, and approximately 200,000 have been inoculated and vaccinated during the past few years. We therefore had an excellent opportunity of studying a number of relatively rare occurrences in addition to the more frequent and minor disturbances. We have no accurate means of determining the actual incidence of major delayed reactions, but can give a rough estimate of some 0.25 to 0.3% of all those inoculated.

The delayed reactions usually occurred some seven to ten days after inoculation and, as already stated, corresponded approximately to the serum-sickness group. It is interesting to note that the great majority of delayed reactors experienced no immediate local reaction; and conversely, those who suffered immediate reaction did not have these delayed disturbances. The delayed reactions appear to affect chiefly the joints and the reticulo-endothelial system, though other tissues and systems may become involved.

No major neurological sequelae of the type described by Miller and Stanton (1954) were noted to follow inoculation. However, a number of patients developed headaches, meningism, and even stupor as a transitory symptom-complex, associated with the appearance of a few lymphocytes and a slight rise in protein in the cerebrospinal fluid. These cases were usually of too short duration (24-48 hours) to allow of detailed investigation, and none, so far as we know, has subsequently developed neurological trouble.

Very occasionally the reaction seems to have started off an irreversible cycle of events leading to the appearance of a syndrome resembling the collagen disorders.

Arthropathies

Such a wide variation in these joint manifestations occurred that to present a typical case would be misleading. A single large joint may be swollen and painful; a number of joints may be involved in succession; or there may be stiffness and pain only, without obvious swelling. Marked constitutional upset with high fever, sweating, tachycardia, and the like may be present or there may be little or no general upset.

Joint symptoms may subside rapidly and spontaneously or persist for long periods and respond to treatment with difficulty. In many cases it has proved difficult or impossible, on clinical grounds, to differentiate a delayed allergic arthropathy from a "rheumatic fever"; similarly, syndromes resembling acute rheumatoid arthritis and acute rheumatic carditis have followed an inoculation reaction. It would appear to be of great importance to establish a connexion between these artificially induced syndromes and those which occur spontaneously; for their differentiation is in some cases difficult because the disease process is identical.

So far as the arthropathies are concerned, the clinical differentiation is usually a matter of degree; thus, in typical "acute rheumatic fever" in this age group the E.S.R. is usually higher, the joint symptoms are more severe, and the constitutional disturbance is greater than in the allergic arthropathies. In many cases, however, these extremes are not present and there are no satisfactory criteria other than the history of recent inoculation. The early therapeutic trial of salicylates is not to be recommended. Whether they are used or not, the symptoms may subside rapidly; in the case of the allergic reactions because of spontaneous remission, and in the rheumatic fevers because of the specific therapeutic effect. Thus, if the patient be rendered symptomless at too early a date the whole picture becomes obscure and it is never entirely clear what the original disease was. This, of course, is of tremendous long-term significance to the patient, for a past history of rheumatic fever might be held

against him medically for the rest of his life, whereas a transient allergic arthropathy would usually be entirely disregarded.

The picture is made more confusing by the apparent risk of precipitating a "true rheumatic fever" in patients who have a history of rheumatic fever in childhood or who give a strong family history of rheumatic disorders. We have in many cases noted a history of joint pains in childhood, but such a history must be accepted with caution, for it is quite possible that some of these patients were experiencing an allergic arthropathy from some other antigen. The risk of inducing an irreversible rheumatic syndrome following T.A.B.T. inoculation is greatly increased when there is a strong constitutional tendency to such trouble; therefore great care should be taken in the administration of any allergy-provoking substances in such cases.

We have seen several cases in which an apparently allergic syndrome followed ten days after inoculation and developed into a typical acute rheumatoid picture, although starting with just the same large-joint involvement as any rheumatic fever. In one such case, of great severity, spindling in the fingers and wasting of the small muscles of the hand developed, and nodules were noted in the limbs. Biopsy of the latter proved them to be recent rheumatic nodules. This patient responded only to cortisone, rapidly and dramatically improving to an apparently complete "cure," and did not relapse after treatment was stopped. He has remained well during the subsequent few months that we have seen him. In his case there had been no previous rheumatic trouble, but his mother had suffered from a severe rheumatoid arthritis.

We originally intended to regard any patient who developed a carditis as a case of true rheumatic fever, but we were forced to change our view up to a point, because several cases developed cardiac involvement, confirmed by E.C.G., in the course of a febrile rheumatic illness occurring in the second week after inoculation. In two such instances an aortic leak was heard during the course of the illness, though no clinical evidence of valvular damage remained after recovery. Cortisone was again found to be effective when salicylates had failed to control the illness. In three other cases originally regarded as simple allergic arthropathies a transient heart-block was noted, and two of them showed a Wenckebach phenomenon.

Those with monarticular lesions may be referred to hospital as suffering from a traumatic or other orthopaedic condition. It is interesting to note that trauma may, in fact, play a part in the appearance of a delayed joint reaction, just as it may in other rheumatic or gouty conditions, whether the trauma be old or recent.

Collagen Disorders

We have so far commented chiefly upon the arthropathies, these forming the group most often seen. However, at least one case developed a generalized "collagen disorder" strongly suggestive of periarteritis nodosa, though histological proof was lacking. This patient was admitted seven days after vaccination and T.A.B.T. inoculation; he had a gross purpuric eruption over the ankles and lower limbs, and there was swelling of the ankle- and knee-joints. He had a high swinging fever and appeared to be very ill; he developed a number of curious necrotic skin lesions, and later a perforation of the nasal septum about a quarter of an inch (6 mm.) in diameter. No evidence of septicaemia could be obtained from a blood culture or by other means, and none of the skin lesions became infected. There was marked albuminuria with microscopic haematuria and some elevation of the blood pressure. During the first few days no specific therapy was given, but when it became apparent that the condition would not spontaneously subside salicylates were administered in full dosage, and, as these had proved ineffective in doses of 240 gr. (16 g.) a day, cortisone was given, with immediate and lasting effect. There was no relapse, and the patient has remained well, though there was slight residual albuminuria.

Reticulo-endothelial Disturbances

Splenic enlargement was noted so often in subjects who had received T.A.B.T. and vaccination that it is now regarded as a common finding in the few weeks subsequent to inoculation. It may appear without any other evidence of a delayed reaction, and sometimes occurred in association with slight enlargement of the liver, and occasionally with a more generalized lymph-node enlargement. Two or three cases were seen with a mild transient jaundice occurring ten to fourteen days after inoculation, but there was no evidence of haemolysis to account for the jaundice. Another occasional finding was abdominal pain, particularly in the right iliac fossa, which may well be almost indistinguishable from acute appendicitis. A number of such patients were operated on, and the only findings were enlarged ileo-caecal lymph nodes which histologically showed a non-specific inflammatory reaction. These various findings in the spleen, liver, and abdominal glands all suggest a reticulo-endothelial disturbance, and one would therefore expect to find bone-marrow and probably peripheral blood changes in addition. This, in fact, is so. Many bone-marrow smears were examined, and frequently a slight preponderance of reticulum cells was present. In peripheral blood there was often an unexplained increase in abnormal mononuclear cells in the seven to ten days after inoculation, whether or not the patient had had a reaction.

Disturbances associated with purpura were a most important group. Twenty-two cases were studied in detail, and, in addition, large numbers of transient mild purpuric eruptions were seen. The connexion between these cases following inoculation and the syndrome of "idiopathic purpura" seems to us to be extremely close, and this clinical impression is substantiated by much previous published work on acute vascular purpura. Thus Whitby and Britton (1953) stated: "The aetiology [of acute vascular purpura] is ill-understood, but there is evidence to suggest that the acute vascular purpura may be the result of an immunological disturbance affecting the small blood vessels throughout the body."

In the anaphylactoid group of purpuras the process is regarded as immuno-allergic, affecting the epithelium of the blood vessels, joints, intestinal tract, and renal glomeruli; and relapse in the so-called essential thrombocytopenic purpura is thought by many to be of a similar nature.

Tocantins (1936) showed that platelets are antigenic and that they are antigenically similar to capillary endothelium. Clark and Jacobs (1950) prepared an antiserum from vascular endothelium, and after injection haemorrhages into the skin and internal organs were seen which did not cause any reduction in the platelets.

Whitby and Britton (1953) have summarized existing knowledge by suggesting that: "In principle, the antigen, an infection, a drug, or a toxin for example, may be regarded as forming a complex with capillary endothelium or platelets, thereby initiating active immunization. The resulting antibodies may have a potentiality for damaging endothelium or destroying platelets, or both. There is little doubt that many cases, at one time thought to be essential thrombocytopenia, have in fact been immuno-allergic vascular phenomena arising from the sensitization of some foreign or noxious substance."

Many of our cases of purpuric eruptions following inoculation were severe and bleeding occurred into the skin, into the bowel, and into the genito-urinary tract.

Typical Cases

The findings in some typical cases are here briefly described.

A youth of 18 complained of swollen, painful ankles ten days after T.A.B.T. and vaccination. Both ankles were grossly swollen, tender, and painful, and a petechial rash was present over the lower limbs. Hess's test was strongly positive. Blood findings: haemoglobin, 12.4 g./100 ml.; P.C.V., 39%; E.S.R.,

87 mm. in one hour; W.B.C., 10,200 per c.mm.; platelets, 350,000 per c.mm.; bleeding-time, clotting-time, blood films, and marrow films, normal. After four days the swelling and rash subsided and within four to five weeks the E.S.R. and haemoglobin had resumed normal levels and the patient was entirely symptomless.

In the following case an apparently pre-existent bleeding tendency was brought to light by inoculation and produced a severe episode.

A girl of 18 had a widespread and well-marked petechial rash ten days after T.A.B.T. inoculation; she gave a history of always bruising extremely easily and having had repeated small epistaxes. The skin rash became confluent in parts to form ecchymoses, and blood was found in the urine and stools. The liver and spleen were not palpable. Blood findings: bleeding-time, 30 minutes; clotting-time, 6 minutes; platelets, under 10,000 per c.mm. on several estimations; E.S.R., 18 mm. in one hour; W.B.C., 8,000 per c.mm. (polymorphs 56%, lymphocytes 40%, monocytes 2%, eosinophils 2%); sternal marrow, hyperplastic with considerable normoblastic hyperplasia; megakaryocytes, normal in appearance and number. After her admission the next menstrual period was excessive and persisted for ten days. There had been no previous menorrhagia. After six weeks the rash had partly subsided, but she continued to produce fresh crops of petechiae and the platelets were still under 10,000 per c.mm. In view of the age and sex of the patient, splenectomy was advised and undertaken by Mr. Simmons at the Manchester Royal Infirmary. The post-operative period was uneventful and there has been no relapse.

From time to time patients were seen with a symptom-complex closely resembling a Henoch-Schönlein syndrome. The following is an example.

A male patient was admitted with a well-marked purpuric rash limited to the legs below the knee-joints and associated with swollen and tender ankle-joints. On the second day he experienced colicky central abdominal pain, accompanied by the passage of bright-red blood in the stools and frank haematuria. The blood and marrow findings were completely normal. The condition resolved spontaneously, and within two to three weeks had entirely subsided.

Discussion

We have described a few examples of the types of purpura seen following T.A.B.T. injections. As a rule the petechial rash is limited to the lower limbs and there is swelling in or around the ankle-joint, but usually this is not very painful. The blood findings are often negative, except for a transitory fall in haemoglobin and a rise in the E.S.R., and these minimal blood findings are characteristic of the allergic purpura group.

In the case of the girl who had thrombocytopenia there seems little doubt that the acute relapse was related or entirely due to an immuno-allergic vascular phenomenon arising from sensitization to her inoculation. We believe that this case of thrombocytopenia provides some support to the contention that many of the so-called acute essential thrombocytopenias have, in fact, been immuno-allergic phenomena arising from sensitization to some foreign substance. In this respect we should compare that case with the production of an allergic arthritis in a patient who has previously had a rheumatic disorder and who therefore presumably has a rheumatic diathesis.

The question of the aetiology of rheumatic syndromes as a whole is obviously relevant to this discussion. We make no attempt to review accepted theories except to note that the most widely held view is that acute rheumatic fever is almost certainly due to an allergic reaction to streptococcal infection. We wonder whether exactly the same process, but on a much less severe scale, may not have occurred in the cases we saw. Obviously, where a streptococcal infection is present there is a constant source of antigen to provide a continuous allergic process, and this would be expected to be far more damaging than one isolated injection of antigen. It seems to us that in those cases where the patient has an extreme degree of sensitivity, or where there is a strong family background of rheumatism or a past history of rheumatic disorder, one isolated injection of antigen is

sufficient to set up a continuous clinical syndrome which is indistinguishable from that occurring "naturally."

The experimental work of Rich (1945) is of special interest. He demonstrated changes in cardiac muscle and skin tissues seemingly identical to those of rheumatic fever when repeated injections of antigenic horse serum were given. However, it has not been possible to reproduce the whole clinical syndrome of a self-perpetuating rheumatic fever syndrome by these or any other means (Holbrook, 1953). We believe that under certain circumstances such a syndrome very occasionally follows inoculation procedures.

Whilst it is noted that the majority of delayed reactions of all types have followed a combined T.A.B.T. and vaccination procedure, similar disturbances have often been seen after either has been given separately. The reactions to vaccination are too well known to require description, but as these generally occur after about the same time interval—that is, seven to ten days—many of the cases have presented a rather confused pattern owing to the fever and malaise from the vaccination becoming superimposed upon the allergic reaction. In point of fact, it is quite possible that many of the delayed symptoms from vaccination are actually allergic.

A further clinical observation, though not statistically substantiated, is that infective conditions of all kinds, including upper respiratory infections, segmental pneumonias, and skin and tissue infections, are more common during the seven to ten days following inoculation, and this may help to make recognition of an underlying cause rather difficult. A possible explanation of this observation is that all the immunological processes are disturbed at this time, giving rise to a general lowering of resistance to infection.

We have, so far, mentioned only T.A.B.T. and vaccination reactions, but we do not believe that these are in any way due to specific antigens; it is merely that we have been able to observe so many delayed reactions because of the enormous scale of the procedures. We have seen occasional rheumatic syndromes after Mantoux-testing and also during the course of a delayed pulmonary reaction to lipiodol bronchography. It is interesting to note, in this connexion, that one of us has, in fact, suffered both a delayed pulmonary reaction to lipiodol (Robertson and Morle, 1951) and also a delayed allergic arthropathy to a Mantoux test.

Summary

Clinical observations have been made upon the reactions occurring one to two weeks after T.A.B.T. injection and vaccination and certain other procedures. These may involve the joints, closely resembling acute rheumatic fever or acute rheumatoid arthritis. There may actually be an apparent rheumatic carditis. A syndrome resembling periarteritis nodosa following inoculation is described. Various purpuric manifestations, identical with the so-called immuno-allergic vascular purpuras, are discussed. Changes in the reticulo-endothelial system, including spleen, liver, lymph nodes, and bone marrow, are described.

The significance of these delayed reactions is discussed, especially in connexion with the aetiology of the rheumatic and purpuric disorders.

We wish to thank the Director-General of Medical Services for permission to publish this article.

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QUANTITATIVE EXAMINATION OF BONE MARROW IN GUINEA-PIGS AFTER GAMMA IRRADIATION

A PRELIMINARY NOTE

BY

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Previous work on the quantitative study of the bone marrow of the guinea-pig has shown that there are three main cell groups—myeloid, erythroid, and lymphocytic. The lymphocytes were found to constitute an unexpectedly high proportion of the total nucleated cells (Harris *et al.*, 1954). In a recent series of 10 normal animals (Harris and Harris, 1956), out of a total nucleated count of 1,814,000 ($\pm 86,000$) per c.mm. marrow there were about 430,000 ($\pm 42,000$) lymphocytes, or just under 25%, a figure which agrees closely with that of Sawitsky and Meyer (1948). So large a number of lymphocytes cannot possibly be due to contamination of the marrow with blood (Yoffey, 1954).

The question at once arises whether the presence of all these lymphocytes in the marrow is a purely incidental phenomenon, or whether they may function as stem cells for the myeloid and erythroid series. On this, perhaps the most controversial of all problems in haematology, it was felt that a quantitative analysis of marrow changes in conditions of severe marrow damage and subsequent regeneration should yield more precise information than has hitherto been available. If lymphocytes really can function as stem cells, then under these circumstances the course of the recovery should be associated with significant changes in the marrow lymphocytes.

Despite the very extensive investigations which have already been made upon the effect of irradiation on the haemopoietic system, some initial experiments indicated that a quantitative technique would make possible a much more precise analysis of the changes occurring. This communication presents the results of further investigations along these lines.

Material and Method

The dose of irradiation chosen was such that it produced marked changes in the haemopoietic organs, but at the same time involved as small a mortality rate as possible. For the guinea-pig, the minimum lethal dose for 50% of animals within 30 days of irradiation is said to be approximately 200–250 r (Ellinger, 1945). A dose of 150–170 r was ultimately selected as the dose that best fulfilled the above requirements. Marked changes in the bone marrow have occurred when using this dose, and in addition distinct cellular simplification has been achieved at a certain stage in recovery.

All animals used were males of a standard strain (Dunklin-Hartley) and about 400 g. in weight at the time of irradiation. A preliminary blood count was made, using blood obtained from an ear vein. Total R.B.C., W.B.C., and reticulocyte counts were made, together with a differential white cell count and haemoglobin estimation. An interval of about 10 days then elapsed, after which the animal was irradiated. Total-body irradiation was given, a cobalt-60 unit being the source of irradiation. It was performed under general anaesthesia (intraperitoneal pentobarbitone sodium) to ensure uniform dosage.

In each animal at a certain period after the time of irradiation a second blood investigation was made, followed immediately by quantitative examination of the bone marrow, using the technique described in previous papers from this department (Yoffey, 1955; Harris, 1956). Differential marrow cell counts were made upon smears fixed in methyl alcohol and stained by MacNeal's tetrachrome stain. One thousand cells were counted in each experiment.

Observations were made at daily intervals after irradiation until the fourth day and thereafter on alternate days up to the 28th day, with final observations on the 35th day.

Results

The results given are based upon 79 experiments, and further work is proceeding. The number of experiments in each group is shown in the accompanying Table. Comparison is made with the mean values obtained by quantitative examination of the bone marrow in ten normal animals whose mean weight was about 400 g.

Table Showing Number of Experiments and Time of Observation

Days: ..	1	2	3	4	6	8	10	12	14	16	18	20	22	24	26	28	35
No. ..	5	4	4	4	3	5	5	4	6	6	4	6	2	4	6	5	

Total Nucleated Cells

Our experiments show that the count is already reduced below normal by the first day after irradiation. The lowest level is reached by the sixth day, being 674,000 per c.mm. marrow, which is approximately one-third of normal. This is followed by a gradual return to normal by the 20th day. However, though the number of cells is approximately back to normal, differential counts reveal that there is a far from normal distribution of the main cell groups at, and for some days after, this stage.

Myeloid Cells

The vast majority of cells in this group are neutrophils. Twenty-four hours after irradiation there is initially a slight increase in the total myeloid cells which is due to the presence of increased numbers of mature or nearly mature cells (562,000 band and mature neutrophils per c.mm. marrow, compared with 431,000 per c.mm. in the controls). The more immature cells are decreased at this time. After this the number of cells decreases, reaching a very low figure by the 14th day, being 47,000 per c.mm. marrow. By the 18th day granulocytes are beginning to reappear in the marrow in large numbers, and have reached almost normal levels by the 20th day after irradiation. The increase continues, and reaches well above normal by the 22nd and 24th days (1,130,000 and 1,146,000 per c.mm. respectively). Thereafter there is a decrease to more normal values.

Subdivision of the neutrophils into two groups—immature (that is, metamyelocyte or earlier forms) and mature (that is, band and segmented cells)—shows that the great majority of cells present up to the 14th day are of the mature variety. In the interval between the 12th and the 14th day after irradiation there is a rather sharp fall, reaching as low as 6,000 cells per c.mm. It is of interest that a marked neutropenia occurs in the blood from the 14th to the 18th day after irradiation.

A rapid re-population of the marrow with immature neutrophils begins on the 16th day, and within a period of two days they have risen to well above normal. A peak level is reached on the 20th day after irradiation, when the number of immature cells is approximately double that of the normal. After this time the level of immature cells gradually returns towards normal.

The more mature forms of neutrophils begin to reappear in the marrow between 18 and 20 days after irradiation, reaching their maximum between the 22nd and 24th days.

At this time their level in the marrow is about twice normal. Subsequently the mature neutrophils return to more normal figures over a period of four days.

Erythroid Cells

The erythroid precursors would appear to be very sensitive to irradiation, and even by 24 hours there is a low content of these cells, which at this time are less than one-third of normal. Low levels (less than 100,000 per c.mm.) persist until the 12th day, after which they rise to normal within a period of four days. A continued elevation of these cells occurs, reaching a maximum (about twice normal) by the 20th day. There then follows a decline to normal levels.

Lymphocytes

These cells, like the erythroblasts, are very sensitive to irradiation, and after 24 hours their number in the marrow is less than one-third of the normal value. A low level persists until the 4th day, but after this time the marrow lymphocytes tend to rise gradually, and have exceeded the normal figure by the 10th day. They continue to increase until by the 16th day their numbers have approximately doubled in comparison with the controls. After the 16th day the lymphocytes fall quite rapidly to subnormal values, minimal levels being reached on the 22nd and 24th days after irradiation (approximately one-third of normal). However, by the 28th day the number of lymphocytes in the bone marrow has again returned to normal.

Discussion

There have been two outstanding findings in these experiments. Firstly, the lymphocyte, although very sensitive to irradiation, recovers quickly relative to the erythroid and myeloid series. A level well above normal is reached between the 14th and the 16th day after irradiation, and this

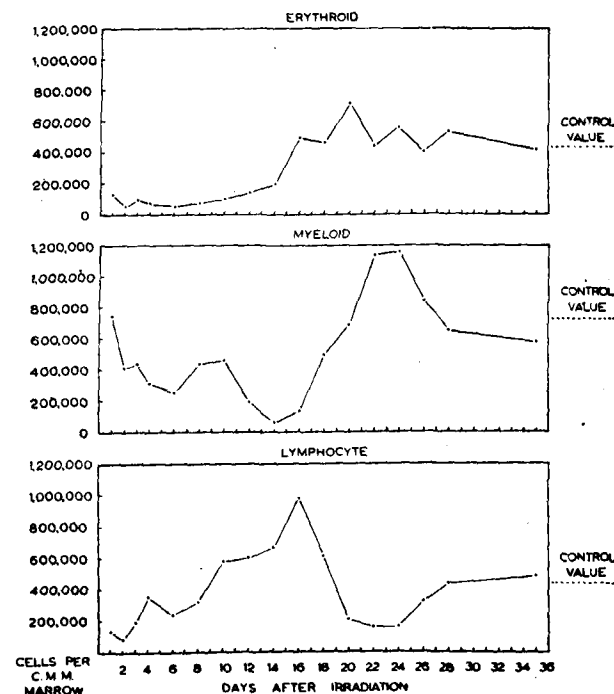


FIG. 1.—Erythroid, myeloid, and lymphocyte changes in guinea-pig marrow after gamma irradiation.

marked accumulation of lymphocytes precedes the regeneration of cells in both the erythroid and the myeloid groups (Fig. 1). Furthermore, at this time of high lymphocyte content in the marrow numerous lymphocyte-like cells appear with a characteristic morphology. These we describe as transitional cells (Yoffey and Courtice, 1956). The observations appear to confirm those of Brecher *et al.* (1948),

who investigated the effects of x rays on the lymphoid and haemopoietic tissues of albino mice. These authors noted that lymphocytopenia appeared to be normal by the 7th and 10th day after irradiation, and even to be raised above normal by the 14th day. An abrupt temporary rise in marrow lymphocytes occurred on the 10th day and accompanied a persistent blood lymphopenia. A similar relationship between blood and marrow lymphocytes has been noted in these experiments. Brecher *et al.* also describe the appearance of a distinct cell type, a lymphocytic-like cell (resembling the lymphoidocyte of Pappenheim) which they suggest is a stem cell of the granulocytic series.

The second finding is that the great decline in marrow lymphocytes occurring after the 18th day corresponds closely with the presence of large numbers of both erythroid and myeloid cells in the marrow (Fig. 2). An inverse relationship between the levels of mature neutrophils and lymphocytes in the bone marrow has been noted in a quantitative study of the effect of leucocytosis-promoting factor on guinea-pig bone marrow (Harris *et al.*, 1956).

A remarkable increase in the immature forms of both myeloid and erythroid cells occurs over the short period of two to four days. Since there is no obvious increase in the number of mitotic figures, and in view of the marked decline (following a peak) in lymphocyte content of the marrow, it is reasonable to postulate a direct relationship between the accumulation of lymphocytes and the recovery of the other cell series. The appearance of forms of cell having a transitional appearance between a typical small lymphocyte and the blast precursors of myeloid and erythroid cells further supports this hypothesis.

The low level of erythroid precursors in the bone marrow 24 hours after irradiation is identical with that of the lymphocytes. This is in agreement with the findings of Bloom and Bloom (1947), who investigated the effects of

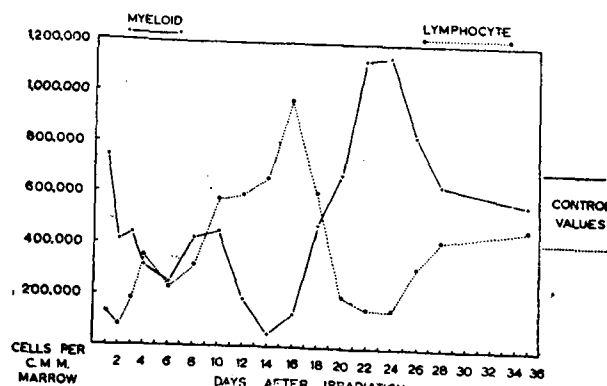


Fig. 2.—Changes in guinea-pig marrow after gamma irradiation: showing decline in marrow lymphocytes after the 18th day, corresponding closely with the presence of large numbers of myeloid cells.

irradiation on haemopoietic tissues in various animals. They conclude that the erythroblast is as sensitive to irradiation as the small lymphocyte. Recovery of the erythroid series in the present experiments precedes that of the myeloid series by an interval of between two and four days. Rosenthal *et al.* (1951) in a semi-quantitative study of bone marrow in rats following total-body x-irradiation, noted that there was evidence of erythroid regeneration 12 days after irradiation, compared with 15 days for the myeloid series. They also remarked that from the 12th day onwards the bone-marrow lymphocyte count increased more than the blood level. Valentine and Pearce (1952) investigated the relative sensitivity of erythroid and myeloid elements in cats after total-body irradiation. They concluded that erythroid tissue is less sensitive to irradiation than myelopoietic tissue, as gauged by recovery times.

The initial rise of mature and nearly mature neutrophils in the marrow occurring 24 hours after irradiation has been noted by other workers (Aubertin and Beaujard, 1908;

Rosenthal *et al.*, 1951; Latta and Waggener, 1954). Rosenthal *et al.* remarked that the fall in myeloid elements of the rat bone marrow occurring 24 hours after irradiation involves the more immature cells, there being a slight rise in the more mature, segmented, cells at this stage. The sharp fall in the level of mature neutrophils occurring in the interval between 12 and 14 days after irradiation suggests that the duration of life for immature neutrophils within

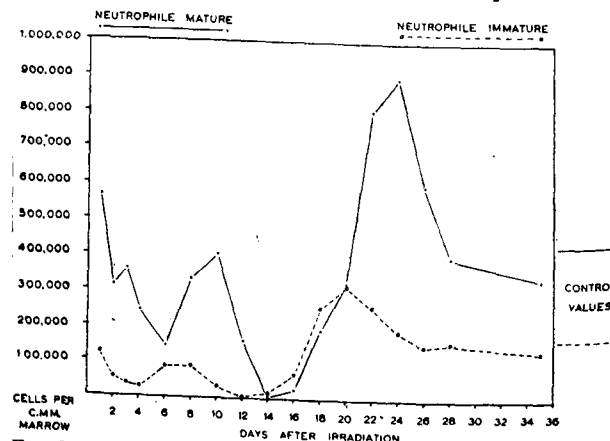


Fig. 3.—Changes in mature and immature neutrophils in guinea-pig marrows after gamma irradiation.

guinea-pig bone marrow is at least 14 days. Restoration of granulocytes occurs with such remarkable rapidity that within four days they have increased from 47,000 per c.mm. to 482,000 per c.mm. Comparison between the peaks of immature and mature neutrophils in the marrow (Fig. 3) shows that they are separated by an interval of between two and four days. It therefore appears that the time taken under these conditions for immature neutrophils to mature in the bone marrow is from two to four days.

Summary

Quantitative examinations of bone marrow in the 400-g. male guinea-pig have been made at varying intervals up to five weeks after total-body irradiation.

The results confirm the well-known fact that the lymphocyte is very sensitive to radiation, but also indicate that there is a marked accumulation of these cells in the bone marrow between 10 and 18 days after irradiation. This accumulation occurs at the same time as a lymphocytopenia in the blood. The presence of a large number of lymphocytes in the marrow precedes the recovery of the stem cells in both the myeloid and the erythroid series. Accompanying the accumulation of lymphocytes, numerous cells are seen which morphologically appear to be transitional between the lymphocyte and the typical blast precursors of the myeloid and erythroid series. The significance of the findings is discussed.

During the marrow regeneration, erythropoiesis seems to reach a peak at about the 20th day, and myelopoiesis between the 22nd and 24th days. At the period of sustained erythropoiesis and myelopoiesis the inverse relation to the marrow lymphocytes, which fall precipitously, is very striking.

Regeneration of cells in the myeloid group begins two to four days after that of the erythroid group. Evidence suggests that the time taken for immature neutrophils to mature in guinea-pig bone marrow in the recovery from irradiation is in the region of two to four days.

I wish to thank Professor J. M. Yoffey for suggesting this research subject and for his encouragement throughout the work.

I am also grateful to Dr. R. C. Tudway, who has allowed me to use the facilities of the Radiotherapy Department of the United Bristol Hospitals and to the physicists at Bristol General Hospital for their ready co-operation. Miss J. A. Drury has been of great technical assistance in these experiments. The work reported in this communication has been aided by a grant from Messrs. Reckitt and Colman, Ltd., Hull.

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BLOOD PYRUVATE AND α-KETOGLUTARATE IN NORMAL AND DIABETIC SUBJECTS

BY

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The blood concentrations of α-keto acids in patients with diabetes mellitus have been the subject of conflicting reports. Thus Gey (1953) observed raised blood pyruvate levels in some diabetic patients, and α-ketoglutarate levels in some diabetic patients, and Villano (1952) and Seligson and Shapiro (1952) stated that the blood concentrations of both pyruvate and α-ketoglutarate were increased in diabetes. Other workers (Bueding *et al.*, 1942b; Klein, 1942) reported that the fasting blood pyruvate was normal in diabetic patients, and Lestrade and Guest (1951) and van Marken Lichtenbelt and Florijn (1952, 1955) found normal blood pyruvate values in diabetic acidosis and normal blood pyruvate communication (Smith and Taylor, 1955) we reported that the blood concentrations of pyruvate and α-ketoglutarate, measured by a specific paper chromatographic method, were normal in a group of ambulant diabetic patients. This work has now been extended to a larger number of diabetic patients, including those with more severe grades of the disease.

The fluctuations in the blood pyruvate after the administration of glucose to diabetic patients have been studied by several workers. Most of them (Himwich and Himwich, 1946; Klein, 1942; Bueding *et al.*, 1942a; Miller *et al.*, 1952) reported that diabetics showed little change in blood pyruvate after glucose, but the results of Root *et al.* (1946) and Amatuzio *et al.* (1952) suggested that diabetic patients did not respond as a uniform group in this test. In general, patients with a mild form of the disease showed a rise in blood pyruvate, whereas in patients with severe diabetes this rise was either delayed or absent. It is now generally accepted that diabetes mellitus is not a single disease entity, and Lawrence (1951) has distinguished two main clinical

types—the obese patients not requiring insulin and the thin insulin-requiring patients. It therefore seemed of interest to investigate the effect of the administration of glucose on the blood concentrations of pyruvate and α-ketoglutarate in these two clinical types of diabetic patients.

Experimental

Analytical Methods.—The blood concentrations of pyruvic and α-ketoglutaric acids were measured by the method of Taylor and Smith (1955), except that tungstic acid, in the amounts used by Seligson and Shapiro (1952), was substituted for metaphosphoric acid as the protein precipitant. This modification reduced emulsion formation during the extraction procedure and slightly improved the recoveries of the α-keto acids. All the blood specimens were obtained from arm veins, no clenching or unclenching of the fist being allowed before or during collection. Blood glucose was estimated by the method of Nelson (1944) on the same venous blood samples.

Clinical Material.—Single blood samples were obtained from 12 normal subjects and 17 ambulant diabetic patients attending the out-patient clinic. The blood specimens were collected approximately three hours after breakfast, and a sample of urine was also obtained from each diabetic patient at the same time and tested for ketone bodies. The diabetic patients were taken at random and were free from disease apart from their diabetes.

Oral Glucose Test.—Twelve normal subjects and 16 diabetic patients were fasted overnight and urine samples were obtained from the diabetic patients and tested for ketone bodies. Each subject was allowed to rest on a bed for one hour before the first (0 hour) specimen of blood was collected. A 25% (w/v) solution of glucose (equivalent to 1.75 g. of glucose per kg. body weight) was then given by mouth and blood specimens were collected at intervals of one, two, and three hours. Thirteen of the diabetic patients were divided into two main groups according to Lawrence (1951), and the details of the patients are given in Table I. The first group ("obese" group) comprised six patients who gave a history of recent gain in weight or who had maintained weight on a low-calorie diet and were not ketosed.

TABLE I.—Classification and Details of the Diabetic Patients
Used for Oral Glucose Test

Case No.	Sex	Age	Recent Weight Change	Treatment	Urine Test	
					Rothera	Gerhardt
<i>Obese Group</i>						
1	F	23	Gain	New patient	0	0
2	M	59	Maintained	Diet	0	0
3	F	53	"	New patient	0	0
4	F	46	Gain	" "	0	0
5	F	52	Maintained	" "	0	0
6	F	62	"	Diet	0	0
<i>Thin Group</i>						
7	M	26	Loss	Insulin	0	0
8	M	33	"	"	0	0
9	M	34	"	New patient	+++	0
10	F	55	"	Insulin	+	0
11	M	30	"	New patient	+++	++
12	M	46	"	" "	+++	++
13	M	33	"	" "	+++	+

The second group of seven patients ("thin" group) gave a history of great loss of weight and severe ketosis before insulin therapy; four patients in this group were new untreated patients and the remainder were under treatment, their insulin being stopped for 24 hours before the test. A further small group of three obese diabetic patients showing a recent significant loss of weight was also studied.

Results

The blood pyruvate, α-ketoglutarate, glucose, and urine ketone results for the individual diabetic patients, together with the mean results for the normal subjects, are given in Table II. In all the following tables the significances of

the differences between the means have been analysed by Student's *t* test and values of *P* are included. The minimum acceptable level of significance has been taken as *P*=0.02.

The results show that there were no significant differences between the means of the blood concentrations of the α -keto acids in both groups. In the diabetic group there was no correlation between the blood concentrations of pyruvic and α -ketoglutaric acids and either the blood glucose concentration or the presence of ketosis.

Blood Pyruvate and α -Ketoglutarate after Oral Glucose

Normal Subjects.—Table III gives the blood glucose, pyruvate, and α -ketoglutarate results in 12 normal subjects before and at intervals of 1, 2, and 3 hours after the oral administration of glucose. The blood pyruvate concentration was significantly increased one and two hours after the glucose had been given, and the blood α -ketoglutarate tended to reach a peak value at two hours, although the differences were not significant.

TABLE II.—Blood Pyruvate, α -Ketoglutarate, and Glucose in Normal Subjects and Ambulant Diabetic Patients

	Pyruvate (μ g./100 g.)	α -Ketoglutarate (μ g. 100 g.)	Glucose* (mg./100 ml.)	Urine Tests	
				Rothera	Gerhardt
<i>Diabetic Patients (17)</i>					
1	212	163	280	0	0
2	369	96	220	0	0
3	350	140	235	0	0
4	295	101	400	+++	++
5	200	72	227	+++	+
6	687	66	150	+	0
7	420	109	246	0	0
8	390	—	262	+++	++
9	357	67	337	+++	+
10	310	95	450	+++	0
11	334	134	200	0	0
12	315	57	94	0	0
13	475	95	208	++	0
14	296	48	224	+	0
15	410	95	350	+++	0
16	248	76	290	0	0
17	821	134	72	0	0
Mean $\pm$ standard deviation	382 $\pm$ 159	97 $\pm$ 33	250 $\pm$ 96		
Range ..	212-821	48-163	72-450		
<i>Normal Subjects (12)</i>					
Mean $\pm$ standard deviation	318 $\pm$ 60	104 $\pm$ 27	96 $\pm$ 16		
Range ..	257-448	76-170	67-113		

Statistical significance of differences between results:—For normal and diabetics: pyruvate, *P*=0.3; α -ketoglutarate, *P*=0.6.

TABLE III.—Blood Concentrations of Glucose, Pyruvate, and α -Ketoglutarate in 12 Normal Subjects after Oral Glucose. Results Given as Means $\pm$ Standard Deviation and Ranges

Estimation	Time (Hours)			
	0	1	2	3
Glucose (mg./100 ml.)	84 $\pm$ 9 66-93	108 $\pm$ 31 71-162	83 $\pm$ 19 61-130	69 $\pm$ 9 60-83
Pyruvate (μ g./100 g.)	225 $\pm$ 41 159-361	340 $\pm$ 47 267-410	336 $\pm$ 90 210-514	272 $\pm$ 57 235-372
α -Ketoglutarate (μ g./100 g.)	90 $\pm$ 30 50-120	116 $\pm$ 39 39-187	142 $\pm$ 65 44-252	84 $\pm$ 40 38-148

Statistical significance of differences between results:—Pyruvate, 0 and 1 hour, *P*=0.001; 0 and 2 hours, *P*=0.01; 0 and 3 hours, *P*=0.1. α -Ketoglutarate: 0 and 1 hour, *P*=0.1; 0 and 2 hours, *P*=0.05; 0 and 3 hours, *P*=0.8.

TABLE VI.—Details and Blood Pyruvate, α -Ketoglutarate, and Glucose Concentrations after Oral Glucose in Three Obese Diabetics showing Recent Loss of Weight

Case	Age	Sex	Ketouria		Treatment	Blood Glucose (mg./100 ml.)				Blood Pyruvate (μ g./100 g.)				Blood α -Ketoglutarate (μ g./100 g.)			
			Rothera	Gerhardt		0	1	2	3	0	1	2	3	0	1	2	3
1	55	M	0	0	New patient	160	295	310	303	315	261	360	—	77	88	104	—
2	68	F	Trace	0	Diet	250	330	358	362	448	269	271	255	111	103	138	129
3	67	F	0	0	New patient	226	390	405	410	249	194	304	365	48	59	91	122

Diabetic Patients.—Obese Group: The results (Table IV) show that the blood pyruvate increased significantly one hour after the glucose was given; the one-hour pyruvate value was not significantly different (*P*=0.2) from that found in the normal subjects. **Thin Group:** Table V shows that, unlike the findings in the normal subjects and obese diabetic patients, the blood pyruvate did not rise either one hour or subsequently after the administration of glucose. The decrease observed at one hour was not statistically significant (*P*=0.3). Comparison of the one-hour pyruvate values between the three groups showed a highly significant difference (*P*<0.001) between the thin diabetics and normal subjects, and between the thin and obese diabetics. The blood α -ketoglutarate increased steadily and in contrast to the other group of patients was still significantly raised after three hours.

Obese Diabetics with Recent Loss of Weight.—The clinical details and results of the three obese patients with a history of recent weight loss are given in Table VI. The blood pyruvate failed to rise one hour after the glucose, and in all cases showed a slight fall comparable to that observed in the thin diabetic group.

Discussion

The results in Table II confirm the conclusions of our earlier report (Smith and Taylor, 1955) that the blood concentrations of pyruvate and α -ketoglutarate are normal in ambulant diabetic patients exhibiting a wide range of blood glucose concentrations. In the diabetic patients there was no correlation between the blood concentrations of the α -keto acids and the presence or absence of ketosis. Additional evidence in favour of these conclusions is provided

TABLE IV.—Blood Concentrations of Glucose, Pyruvate, and α -Ketoglutarate in Six Obese Diabetics after Oral Glucose. Results Given as Means $\pm$ Standard Deviation and Ranges

Estimation	Time (Hours)			
	0	1	2	3
Glucose (mg./100 ml.)	222 $\pm$ 42 177-300	335 $\pm$ 52 273-408	350 $\pm$ 65 271-415	329 $\pm$ 63 245-407
Pyruvate (μ g./100 g.)	287 $\pm$ 52 213-326	387 $\pm$ 65 244-458	282 $\pm$ 83 165-384	286 $\pm$ 88 161-390
α -Ketoglutarate (μ g./100 g.)	102 $\pm$ 30 63-139	107 $\pm$ 26 66-136	137 $\pm$ 58 75-249	116 $\pm$ 33 77-160

Statistical significance of difference between results:—Pyruvate: 1 and 0 hour, *P*=0.02; 0 and 2 hours, *P*=0.9; 0 and 3 hours, *P*=0.9. α -Ketoglutarate: 0 and 1 hour, *P*=0.8; 0 and 2 hours, *P*=0.3; 0 and 3 hours, *P*=0.5.

TABLE V.—Blood Concentrations of Glucose, Pyruvate, and α -Ketoglutarate in Seven Thin Diabetics after Oral Glucose. Results Given as Means $\pm$ Standard Deviations and Ranges

Estimation	Time (Hours)			
	0	1	2	3
Glucose (mg./100 ml.)	272 $\pm$ 102 148-470	471 $\pm$ 79 370-580	563 $\pm$ 89 425-680	478 $\pm$ 47 435-525
Pyruvate (μ g./100 g.)	281 $\pm$ 150 168-554	193 $\pm$ 87 129-333	233 $\pm$ 123 139-475	260 $\pm$ 202 103-557
α -Ketoglutarate (μ g./100 g.)	69 $\pm$ 7 58-74	102 $\pm$ 47 51-171	122 $\pm$ 30 89-155	122 $\pm$ 24 100-151

Statistical significance of differences between results:—Pyruvate, 0 and 1 hour, *P*=0.3; 0 and 2 hours, *P*=0.6; 0 and 3 hours, *P*=0.8. α -Ketoglutarate: 0 and 1 hour, *P*=0.1; 0 and 2 hours, *P*=0.01; 0 and 3 hours, *P*=0.001.

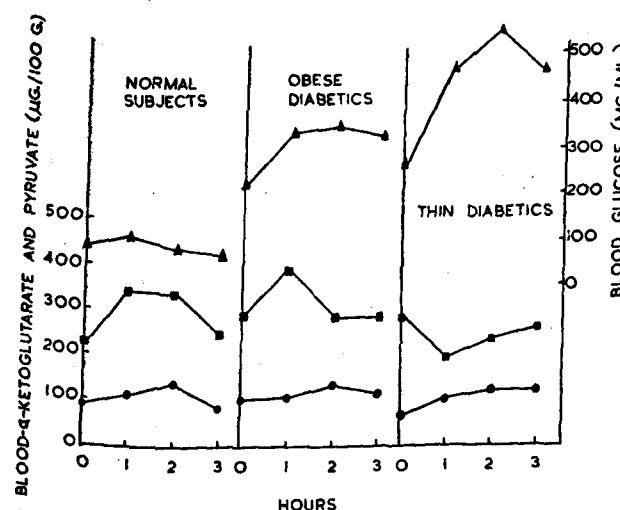
by comparison of the fasting levels (0-hour specimens in the oral glucose test) of the α -keto acids from normal subjects and the selected diabetic patients, considered as a group (Table VII). Again there were no significant differences in the blood α -keto acid concentrations between the normal subjects and diabetic patients. Similar results have been described by Klein (1942) and Bueding *et al.* (1942b). However, when the diabetic patients were divided into the two main clinical types the blood pyruvate levels of the "obese" group were found to be significantly higher than those of the normal subjects (Table VII).

TABLE VII.—Fasting Blood Levels of Pyruvate, α -Ketoglutarate, and Glucose in Normal Subjects and Diabetic Patients. (Figures in Parentheses are the Number of Patients in Each Group; Results Given as Means $\pm$ Standard Deviation and Ranges)

Estimation	Normal Subjects (12)	All Diabetic Patients (16)	Obese Diabetics (6)	Thin Diabetics (7)
Glucose (mg./100 ml.)	84 $\pm$ 9 66-93	242 $\pm$ 75 148-470	222 $\pm$ 42 177-300	272 $\pm$ 102 148-470
Pyruvate (μ g./100 g.)	225 $\pm$ 41 159-361	294 $\pm$ 109 168-554	287 $\pm$ 52 213-326	281 $\pm$ 156 168-554
α -Ketoglutarate (μ g./100 g.)	90 $\pm$ 30 50-120	85 $\pm$ 28 48-139	102 $\pm$ 30 63-139	69 $\pm$ 7 58-74

Statistical significance of differences between results:—Pyruvate: normal and all diabetics, *P*=0.1; normals and obese diabetics, *P*=0.02; normals and thin diabetics, *P*=0.3. α -Ketoglutarate: normals and all diabetics, *P*=0.7; normals and obese diabetics, *P*=0.5; normals and thin diabetics, *P*=0.2.

A more striking difference was the blood pyruvate concentration measured one hour after the oral administration of glucose (see Chart). Both the normal subjects and "obese" diabetics showed a significant rise in blood pyruvate at one hour, whereas the "thin" diabetics failed to show this rise, the blood pyruvate tending to fall at one hour. The majority of previous workers (Klein, 1942; Bueding *et al.*, 1942a; Himwich and Himwich, 1946; Miller *et al.*, 1952) have studied insulin-requiring diabetics and



Mean values of blood concentrations of glucose, pyruvate, and α -ketoglutarate after the oral administration of glucose to normal subjects and to "obese" and "thin" diabetic patients. Δ =Glucose. $\blacksquare$ =Pyruvate. $\bullet$ =Ketoglutarate.

found there was either no change or a slight delayed increase in blood pyruvate after glucose or a high carbohydrate meal. However, Root *et al.* (1946) observed that a rise in blood pyruvate after oral glucose occurred in two patients with "mild" diabetes not receiving insulin, and that this rise was absent or delayed in more severely diabetic patients. Amatuzio *et al.* (1952) gave intravenous glucose and noted that a rise in blood pyruvate, which was not statistically significant, occurred at one hour in "mild" diabetics, not receiving insulin, whereas in "severe"

diabetics receiving insulin a significant fall in blood pyruvate occurred at 30 minutes followed by a delayed rise after two hours.

The present results are of interest because the diabetic patients were selected and divided into two groups according to the clinical criteria of Lawrence (1951), and Bornstein and Lawrence (1951) have shown that plasma insulin activity could be demonstrated in the "obese" type but not in the "thin" type. This finding has been confirmed by Vallance-Owen *et al.* (1955), who used an independent method of assay for plasma insulin-like activity. The possible correlation between the one-hour pyruvate response and the presence or absence of plasma insulin activity after the administration of glucose in these two groups of diabetic out-patients merits further investigation.

One of the possible explanations of the rise in blood pyruvate in the normal subjects and "obese" diabetic patients is that the administered glucose was actively metabolized. Lynen (1954) and Glock and McLean (1955) have stressed the dependence of lipogenesis on the presence of active glycolysis, and it may be postulated that the occurrence and maintenance of obesity in the "obese" diabetic group is due to their ability to metabolize glucose without added insulin. Similarly, the absence of an increase in the blood pyruvate at one hour in the "thin" diabetic group may be a reflection of their comparative inability to utilize glucose. It is of interest that Miller *et al.* (1955) have demonstrated that "stable" diabetics convert more 14 C glucose to 14 CO₂ than "labile" ketotic diabetics.

An alternative explanation of the pyruvate results is that the production of a larger glucose diuresis in the "thin" diabetic group may have caused an increased renal excretion of pyruvate, which would explain the absence of a rise in the blood pyruvate at one hour. However, this possibility appeared unlikely because the one-hour blood pyruvate did not rise in the three obese diabetics with a recent history of weight loss, in whom the glucose-tolerance curves, and hence presumably the extent of the glycosuria, were similar to the "obese" group showing a rise in blood pyruvate. These three patients, although obese, resembled the "thin" diabetic type in the recent loss of weight and failure to show a rise in blood pyruvate one hour after glucose, and may represent an intermediate type of the disease, but this must remain speculative until larger numbers of such patients have been studied.

In contrast to the behaviour of the blood pyruvate after the administration of glucose, the blood α -ketoglutarate followed a similar pattern in the normal subjects, and the "obese" and "thin" diabetics (see Chart). The values tended to reach a maximum at two hours and then declined during the following hour in the normal subjects and "obese" diabetics, but remained significantly raised in the "thin" diabetics at three hours. No explanation of these results can be offered at present.

Summary

Normal blood concentrations of pyruvate and α -ketoglutarate were found in ambulant diabetic patients in blood specimens collected either three hours after a meal or after an overnight fast.

When diabetic patients were divided into two main clinical types, the administration of oral glucose caused a significant rise in blood pyruvate in the "obese" group at one hour, similar to that found to occur in normal subjects, but not in the "thin" group.

Some of the implications of these results are discussed.

We wish to thank the normal subjects and diabetic patients for their willing co-operation; the medical and nursing staff of the diabetic clinic, King's College Hospital, for their help with the patients; and Dr. R. D. Lawrence and Professor C. H. Gray for their encouragement during the work. We are grateful to

Miss E. Quilley for technical assistance and to the Board of Governors of King's College Hospital for grants towards the cost of the work from their endowment funds.

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THROMBOSING ARTERIOSCLEROSIS RESULT OF LONG-TERM ANTICOAGULANT THERAPY

BY

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Man lives with arteriosclerosis, and dies of the complicating thrombosis. The combination represents a disease entity which should be called "thrombosing arteriosclerosis." The symptoms depend on the seat of thrombosis—giving angina pectoris or coronary infarction, cerebral accidents, or intermittent claudication—and the prognosis is first and foremost the prognosis of arteriosclerotic heart disease.

Thrombosing arteriosclerosis is confined to man alone. We are not able therefore to produce the disease in experimental animals, because they cannot achieve thrombosis spontaneously even if some part of the coagulation system may be influenced during experiments with hypercholesterolaemia in animals (Dedichen, 1950).

Since 1950 I have been giving long-term anticoagulant therapy to out-patients with arteriosclerosis, 149 of whom have been under constant treatment for one year or more (Table I). This report gives the results of treatment with phenindione ("phenylindanedione"), using a method described elsewhere (Dedichen, 1953).

TABLE I.—Number of Cases and Duration of Treatment

	No. of Patients	Months of Treatment	Average Length of Treatment
Coronary thrombosis or angina pectoris	86	2,693	31 months
Intermittent claudication	63	2,016	32 "
Total	149	4,709	31.6 "

Results and Treatment

Of 86 patients with coronary disease, 12 died during the period of observation (Table II), giving a mortality rate of 5% a year. This is in conformity with the results of Owren

(1954, 1955), who since 1949 has been treating coronary thrombosis and angina pectoris with long-term anticoagulant therapy, and whose results have been confirmed by Bjerkelund (1956). Among the 63 patients with intermittent claudication in this series eight deaths occurred during the period of observation—that is, 5% a year.

TABLE II.—Cause of Death

	Coronary Thrombosis or Angina Pectoris	Intermittent Claudication
Sudden death	5	6*
Coronary thrombosis	2	
Heart failure	2	
Cancer	1	1
Other causes	2†	1 (suicide)
Total	12	8

* One died fourteen days after cessation of two years' therapy.
† One died fourteen days after cessation of therapy, owing to bleeding from gastric ulcer.

The main cause of death was arteriosclerotic heart disease. Of the patients with intermittent claudication, 54% had clinical signs or symptoms of arteriosclerotic heart disease when treatment was started, or developed such signs during the period of observation. It is therefore difficult to establish the group to which the particular patient belongs. I have followed the rule that the symptoms which bring the patient to the clinic for treatment have been definite. The two groups correspond closely as regards mean age, blood pressure, and cholesterol values (Table III); but there is a greater frequency of women in the coronary group. Diabetes occurred in only three of the 149 cases.

Complications.—Severe haemorrhage necessitating admission to hospital occurred six times: haematemesis, twice (once gastric ulcer); gross haematuria, three times; and haemoperitoneum once (from regional ileitis). Nose bleeding was also a complication. Slight haematuria has not been of importance and is not recorded. Six patients out of a total of 200 treated have shown signs of sensitization to phenindione, with rash, and have been switched over to dicoumarol.

TABLE III*

	No. of Patients			Cholesterol (mg./100 ml.)	B.P.	Average Age
	M	F	Total			
Coronary thrombosis or angina pectoris	86	15	106	280	150/90	57.5
Intermittent claudication	63	4	80	278	160/90	58.3

* This includes 37 cases on long-term treatment.

Comments

The prognosis of intermittent claudication is difficult to establish with certainty. The selection of material will of course influence the mortality, and here the percentage of complicating diseases, such as diabetes, is of great importance. Of 280 patients at the Mayo Clinic (Allen, Barker, and Hines, 1946), 116 were followed up after three years and showed a mortality of 54.6%, 20% had diabetes, and 70 had undergone amputation. Six of my patients had chronic ulcers—five being healed during treatment—and one underwent amputation.

The beneficial effect of anticoagulant therapy is thought to be due to the prevention of further intravascular thrombosis, giving time for development of collaterals. Other pharmacological effects of the anticoagulants have not been recorded.

Other factors which may influence the course of the disease are exercise, diet, and smoking habits.

Exercise.—The modern treatment of arteriosclerosis is a more active concept, the patient being encouraged to take exercise. This view is probably to some degree due to

observations on London Transport workers made by Morris *et al.* (1953)—which showed that the mortality of coronary thrombosis is higher in the group of employees with less activity (drivers in comparison with conductors)—and on London postmen. Our patients are instructed to take daily exercise, if possible one hour's walking a day, and to try to accelerate the speed up to (but not beyond) the point where they are forced to stop or slow down.

A 52-year-old officer was able to walk at a speed of 30 steps a minute at the start of treatment. After two years' treatment he could walk at 110 steps a minute.

Diet.—The patients have been encouraged to reduce their weight and avoid heavy meals, particularly fatty ones. The following case illustrates the role of fat and of exercise in arteriosclerosis.

A 36-year-old man spent his holidays in the mountains (Hardangervidda) the year after the liberation. There he met friends from the resistance movement—farmers who had assisted in taking care of sabotage groups during the war. He was overwhelmed with all sorts of dairy produce, which had been so scarce for years. During his three weeks' stay (taking long hikes almost every day and getting a lot of exercise) he developed thrombosis of the abdominal aorta, which was almost completely obliterated. He has since got coronary disease as well. There are no signs of Buerger's disease or of familial cholesterolaemia.

The role of the diet as compared with the importance of exercise has been commented on in another observation (Dedichen *et al.*, 1951). The frequency of thromboembolism after operation declined during the war and rose again afterwards. Here exercise must be left out of the picture.

Tobacco.—Many patients have been heavy smokers, but their smoking habits have not been recorded with such consistency as to form a background for further comment. About half the patients have stopped smoking. There have been difficulties in persuading patients to stop smoking, particularly in the elder group. Some have stopped for more than a year without showing any improvement in the condition.

Summary

The mortality rate in a series of 149 out-patients with thrombosing arteriosclerosis on long-term treatment with anticoagulants has been shown to be 5% a year.

It makes no difference whether the process is localized to the heart or to the arteries of the limbs.

I thank Nyegaard and Co., Ltd., of Oslo, for supplies of phenylindanedione.

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The advances made during the last decade in educating blind, deaf, epileptic, and similarly handicapped children are reported in *Education of the Handicapped Pupil* (Ministry of Education Pamphlet No. 30, price 2s., H.M.S.O.). "Between January, 1946, and January, 1955," the pamphlet reports, "the number of special schools increased from 528 to 743, the number of pupils in them from 38,499 to 58,034, and the number of full-time teachers from 2,434 to 4,381." One-year training courses for teachers of educationally sub-normal children are held by London, Birmingham, and Leeds Universities: Manchester University's Department of Education of the Deaf can now take 65 students yearly; and Birmingham hopes to open a training course for teachers of the blind in 1956-7.

EYE INJURIES DUE TO FIREWORKS

BY

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In an attempt to ascertain the number of eye injuries due to fireworks on November 5, 1955, seventy hospitals with eye out-patient departments in the London postal area were circularized. The ophthalmic registrar or deputy was asked to give details of patients who, as a result of accidents with fireworks, sustained eye injuries which necessitated their admission to hospital. Forty-four replies were received, which included those from all the London teaching and ophthalmic hospitals. It was felt that details of minor injuries not requiring in-patient treatment would be difficult to obtain, but the replies contained information relating to 25 such injuries, including the case of a man whose cornea was scratched while rescuing a cat frightened by fireworks.

Details of Injuries

Fourteen people, all male, between the ages of 3 and 46 suffered major eye injuries (see Table). These can be divided into two groups—that is, those due to flash burns and those due to direct injury by the firework.

Summary of Eye Injuries Due to Fireworks on November 5, 1955, in the London Postal Area

Case	Age	Sex	Type of Injury	Mode of Injury	Result
1	7	M	Superficial burns of right eye and lids	Exploding firework	No permanent damage
2	14	M	Superficial burns around eyes and lids	Making fireworks at home	" "
3	7	M	Severe contusion of globe. Iridodialysis, hyphaema	Struck in eye by firework	Permanent damage
4	11	M	Superficial burns of lids and cornea	Exploding firework	No permanent damage
5	14	M	Corneal staining, commotio retinae	" "	" "
6	37	M	Perforated cornea. Prolapsed uveal tissue and vitreous (previous retinal detachments)	? Hit by rocket	No perception of light in injured eye
7	12	M	Hyphaema, commotio retinae, small vitreous haemorrhage	Lighting one firework from another	No permanent damage
8	14	M	Bilateral, superficial corneal abrasions. Corneal F.B.s	Firework blew back into face	" "
9	46	M	Ruptured globe with prolapsed tissue, laceration of lid	Hit by falling rocket stick	Excision of eye
10	3	M	Superficial burns of face, corneal abrasions and F.B.s	Firework exploded in face	No permanent damage
11	11	M	Superficial burns of face, large corneal abrasions	Exploding firework	" "
12	20	M	Burns to lids and conjunctiva, corneal abrasions and F.B.s	Making fireworks with red phosphorus, pot. chlorate, and flour	" "
13	7	M	Superficial burns to lids and corneal abrasions	Exploding firework	" "
14	13	M	Superficial burns to both lids, superficial burns to right cornea, deep burns to left cornea	" "	Right eye normal. Permanent damage to left eye

Flash Burns.—Ten patients were admitted to hospital with flash injuries involving the eye and the skin around the eye. This is a similar type of injury to that suffered by gunners in the last war. There were superficial burns involving skin, cornea, and conjunctiva with singeing of the eyelashes, eyebrows, and hair. At the same time multiple minute foreign bodies were blown into the face, speckling

the cornea and conjunctiva of the palpebral opening and causing corneal abrasions. Nine of these injuries settled rapidly on local treatment and were left without permanent damage. One boy (Case 14) suffered burns to both corneae, the left cornea being severely damaged, leaving a deep vascularized opacity which limits vision to counting fingers.

Direct Injuries.—These more unfortunate victims were struck by a larger portion of the firework. Case 9 illustrates this type of injury. This man, aged 46, was standing outside his front door watching the fireworks in the surrounding gardens, when he was struck in the eye by a falling rocket stick. When seen in the casualty department he had a laceration of the upper lid, and when the lids were opened it was found that there was a large transverse split in the cornea through which extruded the lens, uveal tissue, and vitreous. Three days after toilet and suturing of the wound the blind painful eye was excised. Three other similar injuries (Cases 3, 6, and 7) occurred, one resulting in a blind eye, another in severe damage with impaired vision, and the third with no permanent damage.

Discussion

The only records in the medical literature concerning eye injuries due to fireworks were published in the United States of America. Between 1937 and 1946 the six annual summaries of the Fourth of July injuries show a decreasing incidence of firework accidents involving the eye. In 1937 there were 16 patients who lost the vision of one or both eyes and 294 who received eye injuries of a less serious nature; the figures for 1946² were 1 and 44 respectively in the two groups.

Large quantities of fireworks were ignited in London last year on November 5, which was a fine Saturday evening, and it is perhaps gratifying to note that only 14 eye injuries were serious enough to require in-patient hospital treatment. Eleven patients (78.5%) were boys aged 3 to 14 years. Most injuries were of a minor character, and the problem does not seem to be serious enough to urge for legislation about the sale of fireworks. However, four injuries were of a serious nature, one eye being lost. It is of special interest that the lost eye was due to a falling rocket stick, and another severe injury was thought to be due to a rocket. This might suggest that further efforts be made to ensure that all the falling parts of rockets disintegrate before reaching the ground.

Summary

On November 5, 1955, 14 eye injuries due to fireworks occurred in the London postal area, and required admission of the patient to hospital.

A review of the literature shows that no figures are available for previous years in this country.

I wish to thank the many ophthalmic surgeons who replied to my letter, and especially those surgeons at King's College, Moorfields, Royal Eye, St. Alfege's, St. James', Western Ophthalmic, and Whipps Cross Hospitals whose cases are mentioned above. My thanks are also due to Mr. L. H. Savin and Mr. T. Keith Lyle for their help and encouragement in preparing this report.

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1. *J. Amer. med. Ass.*, 1939, 112, 236.
2. *ibid.*, 1946, 132, 442.

King Edward's Hospital Fund for London have issued a pamphlet entitled *Notes on Diets for Old People in Homes and Institutions*, which is obtainable from the Fund at 10, Old Jewry, London, E.C.2, price 1s. The pamphlet stresses that "many old people on entering hospital are undoubtedly suffering from malnutrition," and the need for protein foods does not become less with age but perhaps even increases. Small meals at frequent intervals are recommended, with special emphasis on a milk drink at bedtime to prevent insomnia due to hunger. Daily menus are suggested, and the twenty pages of recipes, allowing enough for 30 portions, cover all meals.

Medical Memoranda

An Unusual Cause of Obstructed Labour

A case of obstructed labour due to an unusual abnormality is reported.

OBSTETRIC DETAILS

A para-1 was first seen when 34 weeks pregnant. On examination twins were presenting as breeches; this was confirmed by x-ray examination.

Seven weeks later one of us (D.J.) was called to a general-practitioner maternity home. The legs and trunk

of the first twin had been delivered, but two doctors had failed to bring down the arms. We brought down the arms without difficulty, noting that the cord had stopped pulsating, but attempts to extract the foetus failed. What was apparently part of the second twin could be felt, but there was no actual obstruction and there was plenty of room for one head to come through.

The uterus was becoming increasingly irritable, and the patient was transferred to the main hospital, where an x-ray examination showed a double-headed monster. It was decided to endeavour to decapitate one head by the abdominal route and then deliver the remaining head vaginally.

On opening the abdomen by a low transverse incision, longitudinal rupture of the lower segment was seen to have occurred. Amputation of one head presented some difficulty, as the other head obstructed proper access to the neck. The whole foetus was therefore delivered abdominally. Closure of the uterus was difficult owing to the paper-thinness of the lower segment. The uterus retracted well, but moderate bleeding from the vagina persisted, presumably from the site of the uterine rupture, which ceased spontaneously after three hours. Nine pints (5.1 litres) of blood and 2 pints (1.1 litres) of plasma were administered in seven hours.



Fig. 1.—Photograph of monster.



Fig. 2.—X-ray photograph of monster.

Penicillin and streptomycin were given as a prophylactic. Apart from a rise of temperature to 100.2° F. (37.9° C.) on the second day, the temperature remained normal throughout the patient's convalescence.

DESCRIPTION OF FOETUS

The foetus, as can be seen in Figs. 1 and 2, was a dicephalic monster. The two heads and necks were of normal size, but the contiguous surfaces of the heads were slightly flattened from pressure. The trunk, arms, and legs

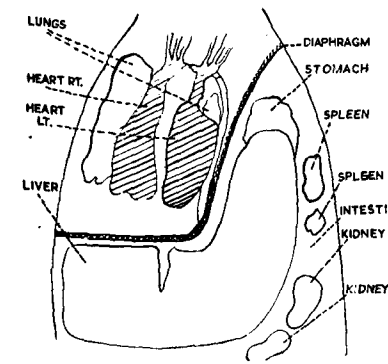


Fig. 3.—Diagram of viscera in thoracic and abdominal cavities.

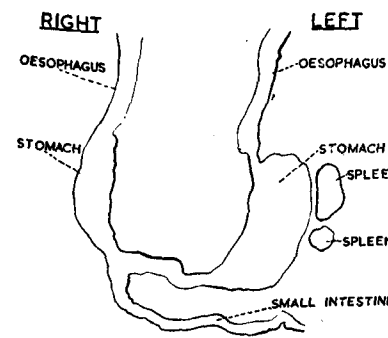


Fig. 4.—Diagram of twin oesophagus and stomach.

of the left lobe of the liver, and some of the small intestine. A separate oesophagus and stomach were associated with each head, but the duodenum fused just beyond the pylorus and thereafter there was a single intestinal tract.

As the specimen was required for preservation the spine was not dissected, but radiographs showed the fusing of the two spinal columns in the mid-dorsal region.

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Schizophrenia in Uniovular Twins: Recovery

The study of uniovular twins is of great value in establishing a genetic element in schizophrenia. Two fallacies must be excluded. Firstly, one must remember that twins occupy the same place in the family hierarchy and are apt to have very similar conditioning factors in upbringing and education; secondly, one must exclude the possibility of *folie à deux*, of infection between two persons who live in close association. Both these were fully excluded in the unique case recorded by Craike and Eliot Slater (1945), in which the twins were separated at the early age of 9 months and were brought up in completely different environments. Nevertheless, they both developed paranoid schizophrenic disorders with similar symptomatology.

The pair recorded below were not completely separated until the age of 17, when each went to study in distant

separated universities. But even before that time there had been a number of differences in environmental stresses; yet they both developed schizophrenic illnesses with similar symptomatology within a year of each other. Both made good recoveries with insulin shock treatment and resumed their studies.

CASE REPORT

Twin B, born one hour later than twin A, suffered a severe scalding of her legs with shock at the age of 2½. Up to about the age of 10 (I.Q. then recorded as 137) the twins did not show significant differences, but differentiation became marked after B developed an eye ulcer which kept her away from school for a while, and she had to be moved to a lower form. Twin A began to forge ahead. Twin B became frustrated in the competition with A; however hard she tried, A always came first. Finding she could not beat her sister in arts, she took up science, entering a university in October, 1950. She had an attack of shingles in December, 1952, but some weeks earlier had become excessively religious. The acute breakdown occurred in March, 1953, at the age of 20. She began to pray for the conversion of her parents, was alternately elated and depressed. On admission to hospital she exhibited an ambivalence of mood and thought: at times she would describe herself as the Virgin Mary or Queen of the Realm, talked of opening up the Kingdom of Heaven, wanted to get married to the Lord Jesus; at other times she called herself Judas Iscariot, thought she had sold herself to the devil and ought to be crucified. After undergoing a course of E.S.T. (9 shocks) and I.S.T. (30 comas) she made an excellent recovery. In October, 1953, she resumed her studies, and took her B.Sc. in August, 1954.

Twin A developed the first signs of schizophrenia about a year later. In December, 1953, she became intensely self-critical, accused herself of laziness and apathy, maintained that she had led a deplorable life, described herself as despicable and a menace to everybody. On admission to hospital about a month later she claimed that she had seen God in the form of a light, was told that she would give birth to a child who would be called "Love," and thought that she had a special mission on earth. A Wechsler-Bellevue II gave her an I.Q. of 137. The Rorschach, M.M.P.I., and Szondi tests all pointed to a schizophrenic illness. After a course of I.S.T. (50 comas) she made a good recovery. Early in 1955 she obtained an honours degree.

COMMENT

Folie à deux can be excluded because the twins studied at far-separated universities for over three years. Moreover, in the earlier years, twin A was the more dominant and stronger character, but it was twin B who first developed schizophrenia; also, twin A informed me that she had no sympathy with B's religious ideas. Though as children they were often confused because of similarities, as time passed differences of environmental strains and stresses determined differences in their personalities, and they soon grew away from each other. Nevertheless, a strong genetic factor doomed each of them to schizophrenic breakdowns with similar psychic patterns and subsequent recoveries.

Of the 41 uniovular twins reported by Eliot Slater (1953), in which one member was schizophrenic, there was concordance in 28 instances, and in only 9 of these did the ages of onset differ by one year. This indicates that environmental factors are also of importance in the development of schizophrenia. In the pair reported here environmental differences were not strikingly marked, and this no doubt helps to account for the similarity of onset and clinical picture.

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Reviews

"STARLING"

Principles of Human Physiology. Originally written by E. H. Starling, M.D., F.R.C.P., C.M.G., F.R.S. Twelfth edition by Sir Charles Lovatt Evans, D.Sc., F.R.C.P., F.R.S., LL.D., with chapters on the special senses by H. Hartridge, M.A., M.D., Sc.D., F.R.S. (Pp. 1,233+xii; illustrated. 65s.) London: J. and A. Churchill Ltd. 1956.

This volume possibly represents the last edition of this book. It is at the same time in many respects the best. To compare it with the earlier editions as written by Starling and the later editions as written by Sir Charles Lovatt Evans has been an interesting and fruitful study and is the basis of the statement that it is the best of the twelve. Each has in its generation been outstanding, and the comparison has been of interest to see the way the two authors measured up to the task. Starling had the easier task in a way: he initiated the book; he told of the physiology of his time as it appeared to him as he wrote each edition, and he spoke from his heart as one of the best teachers and most brilliant lecturers and one of the great originators of the subject. Evans, his pupil, took up where Starling relinquished at the time when the fission of physiology into the different disciplines of biochemistry, pharmacology, biophysics, and experimental medicine was well under way. Each was still adding new facts and new interpretations to biology; it alone could integrate these new findings in terms of the newer physiology. In so doing Evans has succeeded in preserving the unity of the book, aided in the section on the special senses by Professor Hamilton Hartridge and in the excellent index by Dr. Grace Eggleton.

The size of the book has been unaltered since the eleventh edition. The new material includes sections on the adrenal hormones, fat metabolism, intracellular and end-plate potentials, and conduction in the spinal cord. The volume has become very compact in the process and is essentially a standard of reference for the research worker and advanced student. This aspect of "Starling," which is due to Evans, is well shown by two particular points: the historical introduction to each section, and the arrangement of references to original papers as footnotes with reviews and monographs at the ends of the chapters. It may well be that no book should exist for more than 30 or 40 years. After that its basic plan needs scrapping and a new book to be written with a new balance between the different disciplines and aspects. In this case "Starling" would appear to be an exception in that its adaptation to modern developments in the subject is outstanding.

A. ST. G. HUGGETT.

THE DISEASES OF DICKENS

Charles Dickens and his Family: A Sympathetic Study. By W. H. Bowen. (Pp. 182. No price.) Privately printed by W. Heffer and Sons Ltd., Cambridge. 1956.

Mr. W. H. Bowen, in his foreword to this book, tells us that it developed first out of his interest in the medical history of Charles Dickens, but that it gradually expanded into a series of studies of the novelist and some members of his family, including his father, his mother, and his wife. For medical readers the chapter on the medical history of Charles Dickens will hold the most interest. Dickens died at 58 years of age, and Mr. Bowen, out of his surgical knowledge, makes the retrospective diagnoses of renal calculi, chronic renal disease, gout, anal fistula, and cerebral atheroma.

Sir Henry Thompson, first consulted in 1867 about the novelist's great toe, decided that the trouble was due to an inflamed bunion associated with erysipelas. In 1869 he may have altered the diagnosis to gout, but, if he did, Syme, seen a week later in Edinburgh, ridiculed the notion that gout was the cause of the inflammation and supported the original bunion hypothesis. The many mistakes made by

Victorian consultants, unfortified as they were by our diagnostic advantages, are matters of history; their diagnostic triumphs are forgotten. Moreover, Dickens's later consultation with Sir Thomas Watson, when the first symptoms of cerebral arteriosclerosis appeared, shows that the Victorians did not escape our prognostic perplexities. The question to be decided by the great man was: Should the Readings (those histrionic triumphs made familiar to us in this generation by Emyln Williams) be resumed? Sir Thomas Watson, after Dickens's death, defending his agreement that they should be continued, wrote: "I expressed some apprehension that he might fancy we had been too peremptory in our injunctions of mental and bodily repose in April, and I quoted the following remark, which occurs somewhere in one of Captain Cook's voyages, 'Preventive measures are always invidious, for when most successful, the necessity for them is least apparent.'"

This book is well written and it is an interesting supplement to existing biographies. It has no index and no bibliography.

D. V. HUBBLE.

DERMATOLOGY AND MYCOLOGY

Clinical Selections in Dermatology and Mycology. By Frederick Rehm Schmidt, A.B., M.D. Contributions by thirty-six specialists from various lands. (Pp. 505+xx. 80s.) Springfield, Illinois: Charles C. Thomas. Oxford: Blackwell Scientific Publications. 1956.

This is a most attractive and interesting volume which will entertain and stimulate the dermatologist and mycologist. It contains a collection of essays written in uninhibited fashion by some 36 physicians and scientists, mostly from those countries which "comprise the Americas." The essays are founded upon experience in very differing climates and among different races and peoples, and express the opinions which the specialists have built upon that experience—opinions which do not necessarily coincide with those of the usual textbooks. How different from our own is the experience of some of the contributors is indicated by the following observation: "The incidence of pyogenic disorders would be greatly reduced in countries where the cost of the antibiotic drugs is high, if good soap were available at a price that everyone could pay. This would put an end to ineffective cleansing with wood ashes and alkaline fruit juices."

Some early papers are devoted to spasm of the smallest arteries and arterioles as an important aetiological factor in disease, and treatment with vasodilating agents is recommended for affections as diverse as herpes simplex, allergic dermatoses, pityriasis rosea, and leprosy. Riehl contributes an excellent paper on tuberculosis of the skin, Hailey on familial benign pemphigus, and Becker on the melanoma. A most instructive chapter on sunlight and skin diseases in the Tropics is written by Corrales-Padilla, and another on deficiency dermatoses by Schmidt. There is much to be learnt about nutritional disorders, pigmentary disturbances of the skin, and the effects of light from this study of their behaviour in the various American countries. Lichen simplex was seen much more frequently in the Japanese and Chinese than in the Caucasian, and more often in the Filipino than in either. A large part of the work is devoted to fungous and infective diseases not met with in Britain, but the general contribution to knowledge made by these studies is of value to the whole field of medicine. The authors are to be congratulated upon a pleasing and valuable work.

J. T. INGRAM.

In revising *Bellows' German Dictionary* for its third edition (Longmans, Green and Co., 15s.) the compilers have separated the German-English from the English-German section instead of showing both on the same page. The new type and format make it a clear and handy volume. Features of the dictionary are a short section on German grammar, a glossary of German motoring terms, and the inclusion of translated phrases where their key words appear in the text.

BRITISH MEDICAL JOURNAL

LONDON

SATURDAY NOVEMBER 3 1956

SPENS AND PRESENT DISCONTENTS

At last a further stage has been reached in the long-drawn-out negotiations between the profession and the Government over the fulfilment of the Spens recommendations by the latter. When the profession's Negotiating Committee met the Ministers in August Mr. R. H. Turton, giving ground a little, invited the Committee to provide a legal report on what it believed to be a contractual obligation of the Government to carry out the recommendations of the Spens Committees; and this necessitated an examination of the meaning of the recommendations. A document published in this week's *Supplement* presents the results of this examination by the Association's legal advisers, under Sir James Millard Tucker.

The substance of the obligation is, in the words of this week's document, "that the rates of remuneration that would thereafter become payable to the individual serving members of the profession would at all times conform with the requirements involved in the recommendations of the Spens Committees." The obligation is a general overriding one to the profession as a whole. Personal contracts relating to pay are merely the formal agreement with individuals of rates of pay which were fixed as in accord with the Spens recommendations at a given date of review. But, if the scales of pay recommended require periodical adjustment when certain events occur, individual personal contracts would have to be amended. "This," the document states, "follows from the fact that continuing compliance with those requirements still remains as an overriding contractual obligation of the Government to both branches of the profession as a whole. In short, the requirements of the Spens recommendations, whatever they may be, remain at all times the paramount and governing consideration in relation to remuneration." The legal verdict is that of common sense, and in line with the interpretation consistently given for years past in these columns.

It is then asked whether the Spens recommendations "envisage and require periodical adjustments" of remuneration in the light of changes in the value of money or increases in other professional incomes, "at any rate where these changes are of a substantial character." The Minister of Health in August this

year asserted that the Spens recommendations applied only to remuneration at the time of entry into the Service. The document effectively deals with these contentions of the Minister by reference to the wording of the Spens Reports, to what has hitherto been accepted by Ministers of Health, and to the construction put on the recommendations by Mr. Justice Danckwerts in making his award in 1952. In brief, the matter is governed by the terms of reference which required the Spens Committee, in 1945, "to frame their recommendations with due regard to the desirability of maintaining in the future" the proper social and economic status of doctors in a public service, and its power to attract suitable recruits. No limitation was put upon the duration of the future. Clearly the Committee's task was to produce a long-term policy. The base line for the recommendations was the year 1939. And the Committee determined what should have been the proper scales of net remuneration in 1939 to maintain the proper social and economic status of the medical profession and its power to attract suitable recruits. They found that the actual total net remuneration of general practitioners in 1939 fell short by some £3m. of the desired total. This revised "what-should-have-been" in 1939 became the standard to which all future adjustments should be referred—adjustments related to the changed value of money and to the increases in other professional incomes. Ministers have recognized the need for periodical adjustment of practice expenses: "It would be an odd result if one factor is clearly to take account of all subsequent changes in the value of money, and the other is not." Perhaps the most convincing evidence that the Government know very well that the Spens recommendations envisaged continuing adjustments is given in the observation by the Ministry's Deputy Accountant-General quoted in the document, and by the fact that the adjudicator, Mr. Justice Danckwerts, made his award in relation to two betterment factors calculated for different periods.

The closely knit and—so it would seem—unanswerable argument is there for all to read in this week's *Supplement*; but no one can feel otherwise than cynical and weary in reflecting that Minister after Minister has resorted to every trick of evasion in order to escape honouring a bond entered into by Government and profession in 1948. Our correspondence columns during the past weeks show that the present and mounting discontent is as much with the National Health Service as a whole as with the Minister's procrastination and prevarication over pay. There is something fundamentally wrong, it is felt, in a sickness scheme which gives everyone everything, or almost everything, apparently free of charge. Such a scheme, it is thought, puts a premium on irresponsibility. The report of the World Medical Association

tion on medical aspects of social security¹ expressed anxiety on this score in a conclusion which contained the following observations: "Doctors are interested in and welcome plans for medical care which enable them to look after their patients more efficiently. . . . While they recognize that society has an obligation to help those who . . . are handicapped in the struggle to survive, they fear the demoralizing effects of State paternalism exercised on adults. . . . In what is called the Welfare State social security schemes loom large, and in these schemes the provision of (apparently) free medical services is important. . . . The more the State does for the individual in this direction, the less is the individual sense of obligation and responsibility."

Several recent correspondents have looked inquiringly at what is being done elsewhere, especially in the Dominions. The medical services, for example, organized under the guidance of the British Medical Association in Australia have features which are growingly attractive to many who are disillusioned by the British scene. In Australia the essential drugs, "the life-savers," are free to everyone without discrimination, and everyone has to pay for the simple household remedies, the total cost of which so grossly inflates the drug bill of the N.H.S. in Britain. To put a tax on all prescriptions, as both Labour and Conservative administrations have done, is to make the worst of all worlds. In Britain the private patient, who helps to pay for the public service through taxation, is not allowed to take advantage of only one set of its provisions—the pharmaceutical services—though he was promised that this should be possible. In Britain the general practitioner is paid according to the number of "heads" he collects on a list. In Australia, as in many other countries, the reward is in direct relation to the service given. These differences in running medical services in other countries, so the argument seems to run, may well be improvements. Certainly in Australia the public and the profession appear to be content.

The discontent expressed in recent letters in the *Supplement* cannot be lightly dismissed, nor is it by any means related solely to the present dispute with the Ministers about pay. Our correspondence columns give voice to a disquieting sense of frustration and almost apathy. If this spirit becomes widespread, then no amount of extra money in doctors' pockets will attract suitable recruits to the profession of medicine. The Spens Reports were rightly concerned that pay in a publicly organized service should be such as to attract suitable recruits and to maintain the proper social and economic status of the practitioner in it. And the profession is going to insist that the Government shall keep to its bargain, stick to its

word, honour its bond. But, once this battle is over, all concerned might well look at the N.H.S. as a whole, and at its many particulars, to see if indeed it is such as to attract suitable recruits, is such as to give Britons the best possible medical service and British doctors the best possible chances of providing it. It is evident that many doctors do not believe it does in the conditions of to-day.

SURVIVAL AT SEA

Those looking for the sensational in the report¹ from the Medical Research Council on "The Hazards to Men in Ships Lost at Sea" will be disappointed. Professor R. A. McCance and his co-authors have an unemotional approach to the subject, but their final report makes absorbing reading. They collate the information obtained from the survivors of 448 wartime (1940-4) sinkings, involving 27,000 men and women. The main question the authors asked themselves was, "How many failed to survive, and why?" first in the actual sinking, then in the sea waiting to be picked up, and finally, while on lifeboat or raft, until eventual rescue. Nearly all possible factors are considered, and the influence of each on the survival rate is brought out clearly in numerous tables and histograms; factors not discussed, presumably for lack of reliable information, are age, sex, injury, and the all-important intangible, morale.

Seventy per cent. of the ships sank within fifteen minutes of being hit; nevertheless in this time 48% of the boats and 45% of the rafts were launched. When ships stayed afloat for thirty minutes or more 72% of boats were launched. More than a quarter of those at risk either died in the sinking or were never picked up. The authors consider this initial mortality needlessly high; alternatives to lifeboats should, they suggest, be capable of being manned and got away under all conditions, and some should be manoeuvrable against wind and sea to pick up men helpless in the water. Only an experienced seaman could say whether this is a valid criticism. Eight per cent. of those who reached lifecraft subsequently died. Thus only two-thirds of all the men and women from the stricken ships survived, and then not unscathed. "Immersion foot" took its toll, often with eventual amputation, whenever the sea temperatures

were below 20° C. An additional hazard, numerically unimportant, was attack by sharks or other fish, which could be fatal. According to this report fuel oil, even when swallowed, was not the danger it was reputed to be.

The chances of being picked up were, of course, reduced by darkness and bad weather, but cold was not quite as lethal as others had predicted.² Many men survived prolonged immersion in cold water: 31 out of 40 men picked up after sixty minutes in water at -1° C. survived. With sea temperatures below 10° C. 17% of the survivors died within 24 hours of rescue, but no man died within 24 hours of being picked up from warmer water. In the cold high latitudes the men had protective clothing, and this seemed to help even during immersion. All but 1,587 of those who reached the lifecraft were eventually rescued; one-third of these losses were accounted for by the 4% of lifecraft which were never found again. The chances of being rescued within ten days were good, 80% of lifeboats launched, and about the same proportion of rafts, being picked up within this time, half of them within 48 hours.

The report first examines sea temperature as a factor associated with the 1,000-odd deaths in the boats that were rescued. Below 10° C. the mortality rate in the boats was 20%, and in warmer waters it was between 6 and 7%. Deaths from cold occurred with sea temperatures up to 20° C., and even in warmer waters cold at night was sometimes complained of and protective suits were generally appreciated. Men became injured to heat and sunburn within the first few days, and there was no special call for the shade and protection from the breeze suggested by J. L. Gamble.³ The mortality rate among 12,340 survivors adrift for two days or less was only 2%, but 25% of 905 who were in the boats for 15 days or more died. Some long voyages were successful; only one man out of 23 was lost on a 49-day voyage which began in mid-Atlantic in the region of the doldrums; but on a 77-day voyage, starting from almost the same area, only one man survived out of 20. The causes of death could not be determined, but lack of food and water was undoubtedly contributory; on 11 out of 175 voyages no food at all was available, and on some of the voyages there was no water. Some may remember hearing stories of food and water containers being so rusted up that it was impossible to open them when required, but there is no mention of this in the report. The Board of Trade ration of biscuits, milk tablets, pemmican, and chocolate seems to have been the standard; on only eight voyages were fish and birds caught. The food available provided 300 to 400 calories per man per day. Pemmican, physiologically undesirable in any case,⁴ was disliked; but tinned fruit and sweets were much

appreciated—evidence in favour of the suggested carbohydrate diet for castaways.⁵ Fat provided one-third of the calories.

Water is essential to the castaway. Of 113 men on voyages lasting from 3 to 15 days with no water available, 57 died—53 in less than 6 days. On voyages of more than 32 days with 4 oz. (114 ml.) of water or less per man per day, 90% died. With 4 to 8 oz. (114 to 228 ml.) per day survival rates were excellent, for only one man died out of 62 adrift for at least 37 days, and the overall survival rate for voyages of three days or more was 92%. Increasing the water supply to more than 8 oz. (228 ml.) daily raised the survival rate to 98% for any length of voyage. These survival rates are higher than would have been predicted from laboratory trials⁶—for instance, in one experiment a 3% loss of body weight occurred in 48 hours with a daily water intake of 8 oz. (228 ml.). This apparent discrepancy was caused by unmeasured supplements of rain water. But as rain cannot be relied upon it is surely unwise to suggest that, provided there is a daily minimum of 4 oz. (114 ml.) of water, there is little to worry about. Uncritical acceptance of this might imply that the present lifeboat ration of 110 oz. (3.2 l.) per man could be reduced and discourage crews from accepting the earlier recommendation⁷ of the Medical Research Council to take as much extra water as possible. The report makes no mention of attempts to supplement water supplies by fish juice—a practice of questionable value⁸ recommended by A. Bombard⁹—but sea water was drunk in unspecified quantities on some voyages. The mortality of the sea-water drinkers was 38.8%, ten times that of those who drank only fresh water, but, contrary to theoretical expectation,¹⁰ their mortality was less, instead of more, marked at higher temperatures. There are physiological reasons why it is dangerous to drink sea water, even in small amounts,¹¹ but recent American work suggests that it may be physiologically permissible to eke out fresh water with limited amounts of sea water.⁵ According to the figures in the report the mortality of the sea-water drinkers did diminish as the fresh-water supplies increased, but with so many other factors involved this theory can be neither proved nor disproved from the information available.

POSTGRADUATE MEDICAL SCHOOL OF LONDON

Thirty-five years ago the first Minister of Health, Dr. Christopher Addison (later Lord Addison) appointed a committee under the chairmanship of the Earl of Athlone to investigate the needs of medical practitioners for further education in medicine in London. With commendable promptness the committee issued its report in June, 1921, and one of its

¹ McCance, R. A., Ungley, C. C., Crosfill, J. W. L., and Widdowson, E. M., "The Hazards to Men in Ships Lost at Sea, 1940-1944," *Spec. Rep. Ser. med. Res. Coun. (Lond.)*, No. 291, 1956, H.M.S.O., London.

² Molnar, G. W., *J. Amer. med. Ass.*, 1946, 131, 1046.

³ Gamble, J. L., *Proc. Amer. phil. Soc.*, 1944, 88, 151.

⁴ Ladell, W. S. S., *Brit. med. Bull.*, 1947, 5, 9.

⁵ Wolf, A. V., *Nutr. Rev.*, 1956, 14, 161.

⁶ Brown, A. H., Gosselin, R. E., and Adolph, E. F., in *Physiology of Man in the Desert*, 1947, Chap. 18, New York.

⁷ Medical Research Council War Memorandum, No. 8, *A Guide to the Preservation of Life at Sea after Shipwreck*, 1943, H.M.S.O., London.

⁸ Wolf, A., *Sci. Amer.*, 1956, 194, 70.

⁹ Bombard, A., *The Bombard Story*, 1956, Harmondsworth.

¹⁰ Ladell, W. S. S., *British Medical Journal*, 1954, 2, 359.

¹¹ Hervey, G. R., and McCance, R. A., *Proc. roy. Soc. B*, 1952, 139, 527.

¹² Elkinton, J. R., and Danowski, T. S., *The Body Fluids*, 1955, p. 59, Baltimore.

¹ *Supplement to the British Medical Journal*, 1952, 2, 83.

recommendations was the "institution of a post-graduate medical school attached to a large and well-equipped hospital." Thereafter the pace became slower. It was not until 1930 that a "practicable" scheme was finally arrived at and approved by the Government. This made provision for the conversion of the Hammersmith Hospital (then under the control of the London County Council) into a post-graduate teaching hospital of 400 beds and a medical school with residential accommodation. The Athlone Committee had regarded it as essential that the post-graduate medical school should be part of the University of London, and this was accepted by the Government.

In 1931 a Royal Charter was granted to the school, and Sir Austen Chamberlain, who was also taking an active part in the management of the London School of Hygiene and Tropical Medicine, was appointed the first chairman of the governing body. One of the more serious financial crises to which we have since become accustomed was then approaching its climax, and only £200,000 was made available to start the scheme instead of the expected £500,000. The foundation stone was laid by Mr. Neville Chamberlain, then Chancellor of the Exchequer, in 1933, and two years later the school was officially opened by King George V. Though seriously handicapped by the drastic curtailment of the original plans, the school established itself firmly in the years before the second world war, being staffed as four professorial units. The professors, readers, and assistants were whole time, but help was given with teaching by members of the staff of other London hospitals.

The outbreak of the second world war put a stop to the expansion of the school, but much good work was done during the war in acclimatizing refugee doctors, in training undergraduates, in holding courses for serving medical officers in the medicine and surgery of war, and in the undertaking of special research work. Since the end of the war there have been some structural changes: the war-damaged hospital has been repaired (there are now 694 beds), a building for the Medical Research Council's cyclotron has been opened, and new laboratories have been provided on top of the existing school buildings. Last year a new unit for the investigation of metabolic disorders was opened. In an attempt to make more room for students the library was taken over as a laboratory in 1947, and the books were housed in a prefabricated hut as a temporary measure: they still remain there. Under the National Health Service Act the Hammersmith Hospital was joined with the West London Hospital in Hammersmith Broadway

and St. Mark's Hospital, City Road, to serve as a teaching unit under the same board of governors, and with the creation of the British Postgraduate Medical Federation in 1945 the organization of postgraduate medical education in London was put on a much more satisfactory basis. Along with the various specialist institutes in London, the British Postgraduate Medical School at Hammersmith—renamed the Postgraduate Medical School of London—became an institute of the Federation, of which Sir Francis Fraser is the director.

In spite of the difficulties caused by inadequate accommodation the Postgraduate Medical School has more than fulfilled the high expectations of its founders. King George V, when opening the school in 1935, said that he hoped it would "play an imperial role in the winning and dissemination of medical knowledge, in the relief of suffering among my people in this country and overseas, and in enabling the doctors of all lands to come together in a task where all must be allies and helpers." Thanks to the brilliance and eagerness of the staff of the school it has indeed played an "imperial role," for it is the only medical school in Great Britain and the Commonwealth devoted wholly to postgraduate education in medicine, surgery, and pathology. The work of the school is directed primarily to the training of teachers and specialists, and at the present time thirty-three professorships in the Commonwealth and elsewhere are held by former members of the staff or of students of the school. Since it came into existence the school has contributed to the further education of about 12,000 qualified doctors, of whom over 5,000 have come from outside the United Kingdom. In research, too, the school has been outstandingly successful: in fact, few medical institutions in the world have so consistent a record. Among methods of investigation which the Postgraduate School has played a leading part in developing are cardiac catheterization and liver biopsy, and workers at the school have made many important contributions to the knowledge of renal disorders, hypertension, anaemia, silicosis, besides exploring such new fields as the relationship between blood groups and disease and the use of heart-lung machines in cardiac surgery.

The success of the school has had the natural consequence of attracting to it an ever-increasing number of medical graduates wishing to take advantage of its unique facilities, and the time has now come for putting into effect the plans which have been made for an orderly expansion of the school buildings. The school's financial grant from London University can be used only for maintenance expenses, and therefore a public appeal is being made for the £750,000 which

is the estimated cost of the extensions. Details of this appeal and of the impressive buildings which have been designed are given elsewhere in this issue (p. 1052). The achievements of the Postgraduate Medical School in the past twenty years have enhanced the reputation of British medicine, and medical men and women all over the Commonwealth will hope that the organizers of the appeal will soon be able to hand over the sum which is needed to give the school the buildings it deserves.

THE DIABETIC FOOT

The higher incidence of atherosclerosis in diabetics is still a matter of some dispute, largely because the criteria of diagnosis of arterial disease have varied with different investigators. This problem is further complicated by the occurrence of diabetic neuropathy, which can produce pain and coldness in the foot and also tissue loss leading to chronic ulceration and gangrene. Apart from neuropathy and ischaemia, the increased susceptibility of the poorly controlled diabetic to staphylococcal sepsis has also to be kept in mind. Moreover, in many cases all three disorders will be present in varying degree. Their proper assessment is important in planning treatment and considering prognosis. In a paper published in last week's *Journal* Drs. Wilfrid Oakley, R. C. F. Catterall, and M. M. Martin¹ have helped to throw some new light on the problem.

In neuropathic lesions loss of appreciation of pain is the important sign. Areas of pressure necrosis occur on the toes and bony points, favoured by the characteristic deformity of dorsal dislocation of the toes, which makes any normal shoe ill-fitting. If the trauma is allowed to continue ulceration will result, and this may be complicated at any time by sepsis. In many of these cases the blood supply is adequate, and suitable treatment, including avoidance of pressure, good control of the diabetes, and possibly surgery, usually results in normal healing. Arterial disease in diabetics often presents with gangrene. In the majority of patients this is confined to one or more toes and is due to thrombosis of the digital artery. When the foot is involved, with the development of severe pain of a burning nature while at rest, the anterior and posterior tibial arteries are the site of the thrombosis. The foot is discoloured, is hyperaesthetic, and cold, and the ankle pulses are absent. In the diabetic, in contrast to the non-diabetic, occlusion of one of the main trunks is uncommon, but it does occur. In such cases a prior history of pain in the calf on exercise will be forthcoming. Speaking on this subject recently at the Royal Society of Medicine, Professor C. G. Rob² emphasized that, when gangrene of a main vessel is suspected, arteriography is an essential investigation, so that the feasibility of arterial reconstruction, either by endarterectomy or by the insertion of a by-pass graft, can be considered.

¹ Oakley, W., Catterall, R. C. F., and Martin, M. M., *British Medical Journal*, 1956, 2, 953.
² See *British Medical Journal*, 1956, 2, 880.
³ *New Engl. J. Med.*, 1955, 283, 685.

Dr. Oakley and his colleagues rightly recommend a more urgent approach when the question of amputation arises. The use of antibiotics has tended to postpone surgical removal of the dead part in the expectation that the infection will subside. Because drainage is inadequate, the reverse is more often true. The gangrenous toe should be disarticulated at an early stage and the wound left open to granulate. When gangrene has spread beyond the toes amputation below the knee is necessary. The most important single precaution in such an operation is the avoidance of tension. Again the wound is better left open and secondary suture carried out later.

If treatment is to be effective a proper understanding of foot lesions in the diabetic is essential. Neuropathy seems to be a more frequent cause of such lesions than arterial occlusion; because their development is insidious they may remain unrecognized and unattended for some time, perhaps until sepsis complicates the picture. In a review³ of 502 diabetic patients with surgical abnormalities of the feet the Committee on Diabetes of the Massachusetts Medical Society found that the great majority had had a lesion for one or two months before entering hospital. This delay was largely responsible for the average hospital stay exceeding 30 days. One-fifth of the patients were in hospital for 60 to 100 days. These findings underline the need for early recognition of foot lesions in diabetics and for their early treatment. Patients are often allowed to be up and about for too long; and to rely on the use of antibiotics in the face of unresolved infection or of deficiency in the blood supply is to take a serious risk. Furthermore, many diabetic patients are unaware of the dangers of the painless foot and of the need for regular medical supervision, with early care of what may seem to be a trivial lesion.

WORLD POPULATION

The population of the world has more than doubled itself in the last hundred years, and the United Nations Statistical Office estimates the 1954 figure as 2,652 million.¹ More than half (1,451 million) live in Asia. Europe contributes a total of 404 million, America 357 million, Africa 210 million, Oceania 14 million, and the U.S.S.R. (not included in Europe or Asia) 214 million. The most densely populated continent is Europe, with 82 persons per square kilometre. Asia comes next, with 54 persons per square kilometre, and other continents are more sparsely populated with fewer than 10 persons per square kilometre. In the past four years an increase of 148,000,000 has meant that every day there have been an additional 100,000 mouths to feed. By 1980 world population will exceed 3,500 million if the present tendency continues²; by 2056 it will have reached 6,000 million.³ The present rate of increase varies in the

¹ *Demographic Yearbook 1955*, United Nations, Geneva.
² *Proceedings of the World Population Conference, Rome, 1954*, Summary Report, p. 27, United Nations, Geneva.
³ *The Times*, August 31, 1956.
⁴ *Ibid.*, July 27, 1956.
⁵ *Manchester Guardian*, July 27, 1956.
⁶ *P.E.F. World Population and Resources*, 1955, London.

different continents. Oceania has the highest rate of over 2.5% per year, owing in part to the large amount of immigration. Contrary to what is often popularly supposed, the U.S.A. has the next highest annual rate of increase with 2.0%. Asia, Africa, and the U.S.S.R. have an annual increase of about 1.5% and Europe one of 0.7%.

There are widely divergent views in different countries on the treatment of this problem. This is typified by recent newspaper articles^{4,5} which discussed the present position in China and Japan respectively. At the present time the population of China is probably more than 600 million, or about a quarter of the world's total. Its rate of increase has been variously estimated, but may be as high as 2%. The density of the population is low by comparison with many countries, being only 60 persons per square kilometre (that of England and Wales is 293 per square kilometre). However, owing to climatic conditions it is unevenly distributed, nearly one-half of the area being inhabited by only one-twentieth of the population. Nevertheless, official Chinese policy says that she can provide room for a further 600 million people. In Japan, on the other hand, the population has almost reached 90 million. Before the war this figure was regarded as "explosion point," and the Japanese Government is treating the problem as one of great seriousness. It was recently estimated that there are 1,500,000 legal or illegal abortions annually, almost equal to the number of live births, and this high abortion rate keeps the Japanese birth rate down to 19.4 per 1,000. The difficulties of getting Western methods of birth control generally adopted in the Orient seem to be almost insuperable, at least at present. Moreover, we still know little of the potential resources for increasing world food production whether on land or in the sea.

The Food and Agriculture Organization of the United Nations has estimated that world output of food has increased by about 1% per annum since 1938.⁶ The present increase in world population is of the order of 1.5% per annum. However, the position is more serious than this global estimate may lead us to believe. Outside China the population in the Far East is increasing at about 1.3% per annum, while the increase in food supply is only about 0.04%. This problem certainly presents "a challenge to which the generation which has penetrated the secrets of the atom should be capable of finding a constructive reply."⁷

CHLORPROMAZINE JAUNDICE

It has long been recognized that jaundice can occasionally develop as a result of exposure to various drugs or chemicals. Cinchophen, carbon tetrachloride, and trinitrotoluene are well-known examples. The jaundice in the majority of these patients has developed as a result of severe injury to the parenchymal cells of the liver. Some substances—arsine, for example—cause jaundice as a result of intense haemolytic action on the erythrocytes. During the recent war a third and exceed-

ingly important mechanism of iatrogenic jaundice was discovered—namely, the transmission of the virus of homologous serum jaundice by incompletely sterilized needles or syringes. More recently yet a fourth variety of jaundice has been recognized, which is seriously limiting the use of some otherwise beneficial drugs. The therapeutic agents that have been most frequently blamed are chlorpromazine¹ and methyl testosterone,² though some cases have been attributed to arsenic³ and to manganese.⁴ The clinical and laboratory findings in this fourth group are quite distinct from the others in that the jaundice is typically obstructive in character and the degree of parenchymal damage is negligible.

Since the illness induced by chlorpromazine and methyl testosterone is usually mild, and the lesion apparently reversible when the drug is withdrawn, opportunities of studying the morbid anatomical changes are few. A. A. Stein and A. W. Wright,⁵ however, have recently had four cases, of which three came to necropsy as a result of their non-hepatic disease; from the fourth a biopsy specimen was obtained during laparotomy for suspected extrahepatic biliary obstruction. The lesions, although at different stages in the different specimens, were all of the same type.

In the earliest stage the centrilobular liver cells showed a slight degenerative change and were deeply stained with bile. The adjacent Kupffer cells were similarly stained, and the bile canaliculi in the central zones were distended with plugs of bile. The more peripherally situated canaliculi and the bile ducts in the portal tracts were normal. Cellular infiltration of the portal tracts, which in cases of viral hepatitis is usually severe, was slight and mostly lymphocytic. Clinical improvement of the jaundice was associated with reduction of bile staining of parenchymal and Kupffer cells and the disappearance of the biliary plugs in the canaliculi.

The pathogenesis of this form of jaundice is not at present understood. The most widely held view, with which Stein and Wright agree, is that an increase in the viscosity of the bile impedes its flow along the narrow bile canaliculi. In consequence bile accumulates upstream—that is, in the centrilobular zones. The mild degenerative changes seen in the liver cells could then be regarded as a consequence of the obstruction of outflow of their secretion. Alternatively, the stagnation of bile in the centrilobular capillaries might well result from the lack of secretion pressure by the functionally impaired parenchymal cells, and, since the centrally situated cells have the furthest distance along which to propel their secretion, this tends to accumulate in the centrally situated canaliculi. The final decision must obviously await the development of a technique for determining the viscosity of freshly secreted bile. In either event some impairment of function of the parenchymal cells is implied, despite the present lack of laboratory or histological confirmation.

¹ Lemire, R. E., and Mitchell, R. A., *A.M.A. Arch. Intern. Med.*, 1955, 85, 840.
² Almaden, P. J., and Ross, S. W., *Ann. Int. Med.*, 1954, 40, 146.
³ Hanger, P. M., Jr., and Gutman, A. B., *J. Amer. med. Ass.*, 1940, 115, 263.
⁴ Klempner, P., *J. Mount Sinai Hosp.*, 1937, 4, 279.
⁵ Stein, A. A., and Wright, A. W., *J. Amer. med. Ass.*, 1956, 161, 508.

THE B.M.A. VISIT TO THE U.S.S.R.

BY

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At the invitation of the Ministry of Health of the U.S.S.R. and the Academy of Medical Sciences a party of seven, representing the British Medical Association, visited the Soviet Union from August 4 to 26, 1956. The party consisted of Sir Geoffrey Jefferson, who acted as leader, Dr. Mary Esslemont, Mr. Ian Fraser, Professor G. W. Pickering, Dr. Ralston Paterson, and myself, with Dr. Alexander Duddington as interpreter. It will be recalled that in 1955 a party of six Soviet medical men and women visited Great Britain as guests of the B.M.A.

Members of a delegation such as ours must receive impressions as medical visitors, as guests, and as tourists in the country visited, and these impressions are likely to have varied from member to member, since our experience and our spheres of work were all different. The following is an account of some of my impressions.

The Academy of Medical Sciences

In our capacity as medical visitors with varying interests we naturally tended to break up into two and sometimes three groups, though on a number of occasions we paid visits as a whole group. We were received at the Academy of Medical Sciences of the U.S.S.R. in Moscow by the President, Professor Bakulev, and some of his colleagues, who discussed with us the organization of the Academy. The Academy carries out its function of promoting and organizing medical research through three divisions—of Medical Biological Sciences; of Clinical Sciences; and of Hygiene, Microbiology, and Epidemiology. In each division are a group of institutes, as, for example, the Institutes of Pharmacology, Virology, Nutrition, Surgery, Chest Surgery, Neurosurgery, Therapy (Internal Medicine), and the Brain Institute. There are twenty-one institutes in the three divisions. Many are situated in Moscow, some in Leningrad, and the remainder in other cities of the Union. The Academy has 110 full members and 150 associate members. Full and associate members are elected by secret ballot by the Academy in full meeting from amongst the most prominent people working in the various fields, on the proposals of the institutes, the merit of the work done having been assessed by the Presidium of the Academy through an advisory committee.

Alongside the Academy with its institutes is the Ministry of Health, which also controls a series of institutes throughout the country. The Presidium of the Academy and the Scientific Committee of the Ministry of Health combine to draw up a five-year plan of research, laying down the main problems to be tackled and apportioning these between the two groups of institutes.

Atherosclerosis and Hypertension

Much active work is evidently going on of which we were able to see only a fraction, owing solely to limitations of time and place and in no way from any reluctance on the part of our hosts. Whatever we asked to see was open to us. In one laboratory after another we saw work going on on the experimental production of atherosclerosis by cholesterol feeding and similar means. The three who visited him in his laboratory in Leningrad were greatly impressed by Professor Anitchkov, who described experimental cholesterol-induced atherosclerosis as early as 1912 and has been working on the problem ever since. This fine



FIG. 1.—Professor Anitchkov in conversation with Professor Pickering in Leningrad.

old man, who, as he said, had survived two major wars and two revolutions, is evidently a first-class experimental pathologist and a teacher of the highest standard with whom it must be a privilege to work.

In the Institute of Therapy in Moscow Professors Mesnikov and Speranski are concerned with two lines of approach, amongst others, to problems of atherosclerosis and hypertension; in the former, the preventive or mitigating effect on experimental atherosclerosis of ascorbic acid and of sedatives such as phenobarbitone and chloral hydrate, and the aggravating effects of vitamin D, of cerebral stimulants, and of hypertension; in the case of hypertension, the production of stable hypertension in dogs by the induction of Pavlovian neuroses. They are developing their view that human hypertension in the initial stages represents a neurosis in the Pavlovian sense. This view is also the basis of work proceeding in the Medico-Biological Research Station at Sukhumi in Georgia (director, Professor Yudkin), which we were enabled to visit. Here a large colony of experimental monkeys is kept in which spontaneous stable hypertension is attributed to the spontaneous occurrence of neuroses and in which the experimental production of Pavlovian neurosis is followed in a proportion (unspecified) of cases by stable hypertension, and in others by what is claimed, less convincingly, to be myocardial infarction without coronary atherosclerosis.

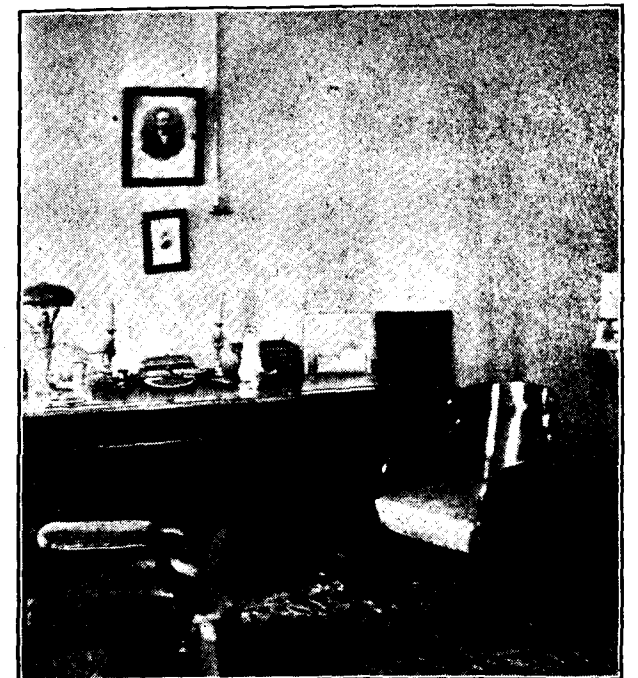


FIG. 2.—Pavlov's study.

At the Pavlov Institute of Physiology in Leningrad active work is going on in following up Pavlov's concepts of higher nervous activity, cortico-visceral relations, and the inheritance of acquired characteristics. Pavlov's own laboratory at the Institute of Experimental Medicine of the First Leningrad Medical Institute, where he worked till his death in 1936, is preserved as a museum of the great man, his study still containing the furniture and articles (even his breakfast dishes and mail) which were there on his last morning.

At the Brain Institute, under Professor Sarkisov, who broke his holiday in the Crimea to meet us in Moscow, there is interesting work on cerebral function and localization in dogs by means of electrodes implanted at different levels and maintained *in situ*.

Hospitals

We visited hospitals and saw work in operating theatres and wards. The hospitals we visited in Moscow, Leningrad, and Kiev were all 50 to 150 years old, though scheduled for replacement. The façades of some are handsome, others have little architectural merit. Many are designed on the sprawling multi-pavilion plan with rather unkempt grounds. The wards and their associated rooms—laboratories and offices—are clean, tidy, and brightly decorated with flowers and plants in greater profusion than we are accustomed to.

The wards—the biggest I saw had 20 beds—are more crowded than in British hospitals, but most have more accommodation for up-patients, who, for instance, have their meals at tables in the spacious central corridor of the ward unit. Ward furniture appears to be adequate without being lavish or specially modern.

Hospital staffing seemed to be on a generous scale so far as medical staff is concerned, but at the Botkin Hospital (a Moscow municipal teaching hospital of 2,400 beds in 28

units) the ratio of patients to nurses was said to be 15–20 to 1. We formed the impression that many of the duties carried out by nurses in British hospitals fall to doctors in Soviet hospitals. We found it impossible to distinguish between women doctors, nurses, and orderlies in the hospital wards because no distinctive uniforms are worn.

The hospital patient population in general medical and surgical wards was similar, in respect of types of illness, to ours except for the almost total absence of elderly people with degenerative vascular disease and its consequences. True, there were many cases of myocardial infarction, but I doubt if we saw a single case of cerebral thrombosis. A home-nursing service based on the district polyclinics is available, and use may be made of this in regard to geriatric cases.

The general approach to treatment of the common medical and surgical conditions was similar to our own.

Anticoagulants are used for myocardial infarction, though figures illustrating results were not forthcoming; parenteral hexamethonium is used for hypertension but is in short supply, and the newer oral hypotensive agents are not available; emergency gastrectomy is carried out for severe bleeding peptic ulcers, and some surgeons, but not all, carry out immediate gastrectomy for perforation of peptic ulcers except in young patients; thyrotoxicosis is treated by thyroidectomy or by radio-iodine according to the preferences of the physicians or surgeons into whose care the patients happen to come.

We inquired and were freely told about the use of cadaver blood for transfusion. This is virtually confined to the Sklifosovski Hospital in Moscow, where it was introduced for human use by Yudin in 1932. Yudin's first patient, a suicide, is alive to-day. Blood is withdrawn up to six hours after death and stored for up to a month. This hospital uses more cadaver blood than blood from living donors, but there is still much objection to its use on the part of medical men generally, and most hospitals use blood from living donors supplied through the institutes of blood transfusion.

Undergraduate and Postgraduate Education

In learning about medical education in the U.S.S.R. we were somewhat handicapped by the fact that universities and medical schools were on vacation at the time of our visit. Medical delegations would in future be well advised to avoid the holiday month of August. In Moscow the medical schools were divorced from the university in 1930, and this separation has, I think, taken place in all the cities. The medical schools are under the direction and financial control of the Ministry of Health, as are many of the institutes of postgraduate education, though postgraduate education and training is conducted also in the institutes of medical research of the Academy of Medical Sciences. Great emphasis is laid on postgraduate medical education and each doctor must attend for three to six months at a postgraduate institute on the completion of his first three years' work after qualification, years spent under supervision. He is encouraged to specialize at this stage. If he does so his period of postgraduate work will be longer. If he does not specialize, or only in a broad field, he will take refresher courses after further periods of three, five, or seven years. Attendance at postgraduate courses does not entitle a doctor to an increase in salary, but it does facilitate appointment to higher posts. The pattern of postgraduate education is planned by the Central Postgraduate Institute in Moscow, with which the independent postgraduate institutes of the various constituent republics of the Union co-operate.

In Moscow the two undergraduate medical schools have an annual intake now of 500 students each, of whom 250 are in each of the two faculties of medicine and hygiene. The medical course is one of six years. About 10% of the students leave the school for one reason or another at

the end of the first year, but each school expects to graduate about 450 annually. Examinations are all oral, though "plenty of written case records are required." The Moscow hospitals seem to provide 1,400 beds for undergraduate medical teaching. About 65% of the 300,000 fully qualified medical practitioners throughout the Union are women, and the proportion amongst medical students is even higher and is rising.

Courteous and Hospitable Reception

The impressions gained in our capacity as guests were of the most pleasant. We were treated with the greatest possible courtesy, consideration, and respect. Everything possible was done to make our visit comfortable and profitable, and our own wishes were met whenever possible. We were received on the day after arrival by the Deputy Minister of Health, Professor Zhdanov, himself an associate member of the Academy of Medical Sciences, who gave in English a most concise and succinct account of the organization of medical services and education in the U.S.S.R., and who gave a cocktail party (at 2 p.m.) for us on the day before our departure. The opportunity of this latter occasion was taken to present to the Deputy Minister a small gift in the form of an old map of Russia of the time of Peter the Great. Our party were received at the Academy of Medical Sciences of the U.S.S.R. by the President, Professor Bakulev, and nine of his fellow-academicians, who, besides giving us an account of the structure and functions of the Academy and its associated institutes, entertained us to lunch when the official B.M.A. gift was presented—a chairman's hammer and block made from the wood of a mulberry tree which grew in the garden of Charles Dickens's house in Tavistock Square on the site of which B.M.A. House now stands. The gift evoked much interest and some amusement, but at the Deputy Minister's farewell cocktail party Professor Bakulev told me that in the interval he had already been able to quell a disputatious meeting of the Academy with its aid.

The meal with which we were regaled by our hosts at 11 a.m. on the Sunday morning of our arrival in Leningrad was probably the most extraordinary Sunday breakfast any of us has ever had. It was a five-course meal more allied to dinner than breakfast, with wine, vodka, and brandy, though we were expected to have the ordinary hotel lunch about two hours later. Throughout the visit, however, there were no formal evening banquets. We regarded this designed omission as a kindness on the part of our hosts, for we were thereby able to avoid much of the fatigue which this form of entertainment entails and which so exhausted the Soviet guests of the B.M.A. in 1955.

We were accommodated most comfortably in good hotels and our city journeys were all made in large limousines which were at our disposal at all times. We travelled from Moscow to Leningrad by first-class night sleeper train, and from Leningrad to Kiev, to Sochi on the Black Sea coast, and back to Moscow by scheduled air-line planes. We expressed great keenness to visit the Medico-Biological Research Station at Sukhumi in Georgia in order to see the experimental work on monkeys. In order to spare us a night in the moist heat of Sukhumi and a very tiring double journey over tortuous roads, a special plane was chartered for us. At Sochi we were given ample opportunity of basking in the hot sunshine and bathing in the warm sea. Sochi is a resort, one of many, with 59 "sanatoria," which are combinations of convalescent establishments and holiday hotels. They are medically staffed and equipped with provision for physiotherapy, etc., together with laboratories for clinical investigation. The laboratories did not seem to be very actively employed, though they were proudly displayed. We lived in privacy and luxury in the Metal Workers' Sanatorium, which could take 350 "patients." Many of the other sanatoria are of comparable size. The patients, apparently selected on the recommendation of the medical authorities at their homes, come from all parts of

the Union, and the normal stay is 28 days, during which time they become tanned to the colour of mahogany. The Soviet citizen is a great sun-worshipper.

A Few General Impressions

So much has been written recently about the tourist impressions of the U.S.S.R. that little fresh can be added. Moscow as a city did not attract me. Apart from the varied and, from some angles, breath-taking beauty of the buildings of the Kremlin and a few other handsome buildings of more modern construction, the general style is utilitarian. The main streets are enormously wide and the traffic is not yet dense enough to fill them. The traffic is sufficient, however, to make the crossing of these wide streets a considerable adventure. Taxis and private cars travel fast, and, as all use of horns was forbidden in Moscow from August 1, a sharp look-out was necessary. The usual metropolitan story was told that the only people knocked down in the streets are visitors from outside Moscow.

Leningrad, on the other hand, is a most handsome city. The many fine buildings of its two hundred years as a capital are preserved and cared for. The Nevski Prospect is one of the finest streets in the world, sign-posted by the beautiful golden needle spire of the Admiralty. The art galleries and museums in Moscow and Leningrad are full of priceless treasures on full display and are crowded with eager visitors of all ages.

The citizens' pride in their country and its "achievements" is evident on all sides. Streets and public places (but not lavatories) are kept scrupulously clean and free from litter by women street-cleaners using fan-shaped brooms which are often short-handled and require the user to bend double. The smoker does not tread his cigarette stub on to the pavement. Receptacles for litter are numerous and are assiduously used so that there is little or no trash to be swept up.

Back streets, however, tend to be narrow and mean, though also clean. The housing problem is still immense in spite of a vast amount of new domestic building in the form of blocks of workers' flats ranging in style from four- to six-story concrete masses to ornate multi-story towers. People still live in wooden shacks resembling hen-houses. Building, however, is going on everywhere we visited.

I have already been asked the question many times, "Are the people happy?" This, of course, is impossible to answer. The street crowds are not vivacious and the impression of stolid drabness is accentuated by the poor design of both men's and women's clothes and shoes. In spite of the very high place held by artists in the scale of values, and in spite of the magnificent and brilliant use of colour in public spectacles such as sports and physical culture displays, there is little evidence of interest in and use of colour in women's clothing. Conversation with ordinary people was free, animated, and serious, and we found no sign of fear on their part in talking to foreigners. We were all struck by the evident health and well-being of the children, who, however, were shy and unresponsive to our doubtless elephantine overtures. Since nearly all married women have jobs outside their homes their young children are of necessity cared for during the working-day from a very early age by strangers in crèches, where no doubt their appropriate education is begun. We saw no evidence of the supposedly harmful effects of separation of the infant from its parents, although admittedly we had no opportunity for a close study of the psychological balance of the children.

The overall impression remains of a courteous, hospitable, and very friendly reception by people, of all types, who were interested and active, devoted individually and collectively to peace and the development of their country and its life, avid for education, interested in the arts, proud of their technological and scientific progress, but withal slightly bemused by the complications of this age of technology.

The illustrations are from photographs taken by Dr. Alexander Duddington.



FIG. 3.—Members of the B.M.A. Party with a monk at the monastery of Pecherski Lavra at Kiev. Left to right: Mr. Ian Fraser, Dr. Mary Esslemont, Dr. J. G. M. Hamilton, Dr. Ralston Paterson, and Sir Geoffrey Jefferson.

POSTGRADUATE MEDICAL SCHOOL OF LONDON

EXTENSION APPEAL FOR FUNDS

The Postgraduate Medical School, the only medical school in the Commonwealth devoted wholly to the further education of doctors, is appealing for £750,000 to extend its accommodation. On this page we reproduce an architect's drawing of what is proposed. On the left of the picture can be seen part of the existing school building, in the centre a new block which is to contain laboratories, the library, and administrative offices, and on the right the new lecture theatres and common-rooms. The buildings are described more fully below in a note by the architects, Messrs. E. D. Lyons, L. Israel, and T. B. H. Ellis.

Urgent Need for More Space

The appeal is launched under the patronage of the Earl of Athlone, and is sponsored by Viscount Bruce of Melbourne, Viscount Malvern, Mr. R. G. Menzies, Sir Ernest Oppenheimer, Mrs. R. C. Pandit, Viscount Waverley, and H.H. the Aga Khan. The appeal committee, under the chairmanship of Mr. W. W. Watt, includes among its members Dr. Charles Newman, the dean of the Postgraduate Medical School, Professor Ian Aird, Professor J. H. Dible, Dr. Charles Fletcher, Professor E. J. King, Professor J. McMichael, and Professor Lord Stamp. An attractive brochure about the school and its present urgent need has been prepared for the appeal. The brochure contains these words:

"The school's accommodation was cramped in the beginning: it is many times more so now, with the expansion which increasing reputation and the growth of medical science have caused. Every shift and every plan that could be thought of and tried have been used to increase the accommodation required for students, for investigation, and for medical research; but there is a limit to what can be accomplished by makeshift measures, and that limit has now been reached, so that important work is held up and doctors from home and overseas wishing to work in the school have to be turned away.

"The school is therefore faced with a large programme of expansion to provide the lecture theatres and classrooms, laboratories and research rooms, library and common-rooms, which it requires to accommodate its students and the many research workers who, attracted by its reputation and facilities, wish to use it as a place of work.

"Unlike the famous undergraduate medical schools of ancient lineage, the Postgraduate Medical School—born into a period of rapidly changing values—has neither endowments nor subscribers. Its finance is derived almost wholly from a University grant which has to be spread over many claimants in different fields. This source, which provides nearly £200,000 each year for revenue requirements, cannot provide for a capital expenditure of the order now envisaged. It has therefore become necessary for the school to appeal to the wider public, which has at heart the advance of

medical science and the alleviation of suffering, for the funds which it requires to extend its work.

"Believing profoundly in its mission as a training ground for future specialists in the profession of medicine, and as a centre for postgraduate teaching and research paramount throughout Great Britain and the Commonwealth—and in the standard of its work challenging comparison with any medical centre in the world—the Postgraduate Medical School appeals to all who have these objects at heart to give generously and to do their utmost to promote this great ideal."

Contributions to the Appeal Fund should be made payable to the "Postgraduate Medical School Extension Fund," and sent to the Appeal Treasurer, Postgraduate Medical School, Ducane Road, London, W.12.

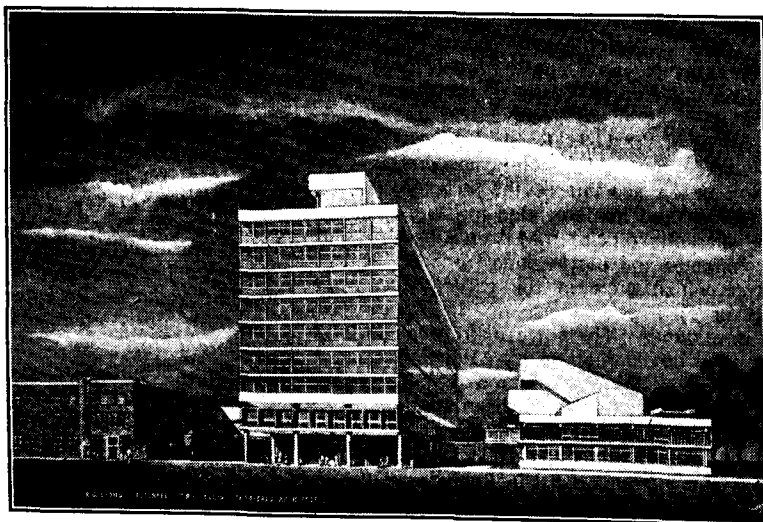
Architects' Note on the Buildings

The purpose of the new buildings is to provide space for the expansion of the existing school and to concentrate those departments at present dispersed in inadequate

accommodation; to provide an up-to-date core of laboratories and lecture theatres which later can be expanded in an organized way. To the architects the crux of the problem seems the need to separate those activities involving large bodies of people (e.g., postgraduate students and medical staff) from those involving small study and research groups. The former require large halls with uninterrupted spans, the latter a series of

smaller rooms with specialized equipment and services. To this end two separate buildings have been suggested: one of nine floors containing seven floors of laboratories, the other of two stories containing the lecture theatres and common-rooms for the staff and students. The first two floors of the larger building are planned to contain interdepartmental accommodation as well as a spacious two-story entrance hall with generous lavatory accommodation off it.

Since the site demands that the two new buildings should be placed on either side of a road, it is necessary to connect them by a bridge at first-floor level. This level thus becomes the main circulation level of the two buildings, and on it are located the library, the dean's suite of administrative offices, and the three lecture theatres. The bridge between the two buildings forms the key to the scheme and provides protection for the main entrance doors underneath it. On entering the double-height hall, the visitor will immediately be aware of a wide staircase leading up to the first floor and main level; and also of the lifts leading to the laboratories above; for one of the architects' main considerations has been to make the way to the various departments easy and clear from the moment of entry. The research laboratories begin from the second floor, and each level has been planned so far as possible as a self-contained department. Each floor has a service core containing lifts, staircases, lavatories (mechanically ventilated), service rooms, and ducts. The separate elements of this core form islands in a long rectangular circulation space round which are wrapped the laboratories. This arrangement allows for uninterrupted laboratory space which can be divided up as required by the various departments.



The second and third floors—i.e., the first two floors of laboratory accommodation—will consist of the departments of medicine (Professor J. McMichael) and chemical microbiology (Professor Lord Stamp). The second floor will also contain a new department of virology and the school's electron microscope. Both these floors will be linked by bridges to the existing buildings, where some of the work of the departments of medicine and bacteriology will still be done. Professor E. J. King's biochemistry department will occupy the fourth floor. The fifth and sixth floors will be largely occupied by Professor J. H. Dible's departments—clinical pathology, histochemistry, and the museum—but will also house the departments of haematology (Dr. J. V. Dacie) and biophysics (Mr. D. K. Hill). The two top floors are for the department of surgery (Professor Ian Aird) and the department of anaesthetics (Dr. J. P. Payne).

All supplies to the school will be brought down a ramp to the lower ground floor, where the school stores occupy the whole floor. The animal cages have been placed in the basement, and are isolated from the remainder of the building.

Lecture Theatre Block

The route over the bridge to the two-story building divides to form a foyer which goes round three sides of the group of lecture theatres. On the fourth side are the medical staff common-rooms and dining-room. The demonstration and lecture theatres will seat respectively 500, 150, and 80. Under the rake of the small lecture theatres is a staircase leading down to the common-rooms and canteen for the postgraduate students, technicians, and secretarial staff. Under this block are to be the school workshops and garages, the former being connected to the lower ground floor of the main building by a subway.

AMERICAN ACADEMY OF PEDIATRICS

ANNUAL MEETING IN NEW YORK

[FROM A SPECIAL CORRESPONDENT]

The 25th annual meeting of the American Academy of Pediatrics was held in New York, from October 8 to 11, under the chairmanship of its president, Dr. HARRY BAKWIN. The Academy is composed of paediatricians from all parts of the United States, of whom only a few are consulting, hospital, or academic paediatricians of the type found in Britain. By far the majority are more of the nature of the general practitioner, although their practice is confined to a particular and limited age group. In America the obstetrician usually relinquishes care of the baby at birth to the paediatrician, who thereafter looks after the child up to the age of about 16.

Conference Arrangements

Over 2,000 paediatricians from the States, together with many from Canada and other countries, attended the meeting. Most of them look on it as an opportunity to meet old friends and to refresh their knowledge, and they are less interested in detailed papers on recent research. Catering for this bias, a series of seminars, limited to 35-50 participants, are arranged for the two days preceding the general meeting. Each of these is on a single subject and lasts two days, and is given by one or several experts in the particular subject. In addition, during the meeting itself and concurrently with the general sessions, a series of round-table conferences are held, lasting two to three hours, at which an expert discusses a subject and answers questions. Both the seminars and round-table conferences attract full attendances, and might usefully be copied at similar meetings in Britain.

The papers read at the general sessions are similarly designed to meet the needs of the attending practitioners: the papers bring their knowledge up to date rather than

report the results of recent research. Most of the speakers sketched in the background of their subject before describing the results of new work, and in the panel discussions there was always a clinician as well as experts in specialized fields. The panel discussions consisted in fact of three or more speakers who gave short papers on different aspects of a problem, with a chairman, or moderator, who opened the subject and who sometimes commented on the points raised in any paper. The manner in which the speakers almost always completed their subject within the allotted time was remarkable.

Obesity and the Adenoviruses

The general sessions opened with a panel discussion on obesity, in which Professor BARTON CHILDS, of Johns Hopkins University, commented on the difficulty of defining obesity. He said also that, although some studies showed an increased amount of obesity among the children of obese parents, no study indicated that a single gene could be responsible in human beings. In animals, however, a single gene might be responsible for obesity in certain species, and in his opinion this was an indication of primary metabolic differences in different strains of these species. Professor JOHN BROBECK, of the University of Pennsylvania, discussed the role of the hypothalamus in controlling appetite and satiety, and suggested that there were two hypothalamic centres responsible—the lateral or appetite centre, which initiates appetite, and the medial or satiety centre, which inhibits appetite. He further suggested that the hypothalamus is affected by reflexes, either sensory or behavioural, and that the appetite is inhibited by reflexes initiated by increase in the body's production of heat, a full stomach, diminished gastric secretion, and hyperglycaemia, while it is whetted by the reflex effect of the converse factors.

Dr. ROBERT HUEBNER, National Institute of Health, Bethesda, Maryland, spoke on the adenoviruses (A.P.C. viruses) as a cause of ill-health in childhood. There were at least 12 distinct types, he said, of which types II and V occurred chiefly in early childhood. Type III occurred in both childhood and adult life, sporadically and in epidemics. These viruses produced enlargement of the regional lymph nodes and inflammation of the mucous membranes of the respiratory system and sometimes of the conjunctivae. Type III produced a febrile illness with conjunctivitis and pharyngitis, and formed a distinctive clinical entity which was now well recognized. Swimming in lakes and rivers, as well as in swimming-pools, seemed to increase the risk of infection by these viruses, but the manner in which it did so was not certain. Dr. Huebner added that the possibility of using prophylactic vaccines was being studied. Preliminary results suggested that a neutralizing antibody could be produced in susceptible persons.

Hereditary Diseases

An exceptionally interesting and well-delivered symposium was that on genetics and disease, in which Professor BARTON CHILDS acted as moderator. He paid a very generous tribute to the work of Sir Archibald Garrod, who was the first to suppose that there is some genetic control over all the chemical processes in the body. Dr. JAMES SIDBURY, of Johns Hopkins Hospital, emphasized that in effect genetic control means chemical control. He then gave a clear description of the way in which the genes were thought to act in controlling chemical processes within the cell, and gave examples of the way in which a piling up of metabolic products could produce toxic effects in diseases such as phenylketonuria and galactosaemia, as a result of the absence of an enzyme following genetic abnormality, and the consequent breakage in the chain of metabolic processes. Dr. LYTT I. GARDNER, State University of New York, discussed the difficult problem of genetic heterogeneity in endocrine disease. He explained that by this was meant a similar phenotype resulting from various types of genetic abnormality. Dr. EUGENE KAPLAN, Sinai Hospital, Baltimore, discussed various types of haemoglobin

and their genetic transmission, and showed how physico-chemical properties differed in various types and how this enabled a differentiation between hetero- and homo-zygosity to be made in sickle-celled anaemia, thalassaemia, and similar conditions. He finally emphasized that physico-chemical studies alone were inadequate to differentiate the various genetic patterns because of their complexity.

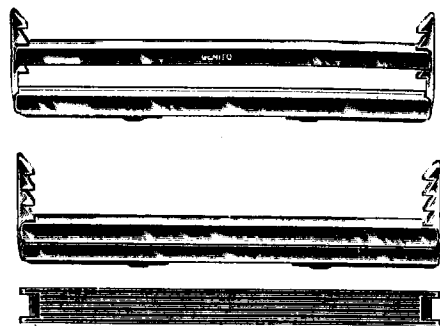
Dr. JAMES V. NEEL, Institute of Human Biology, Ann Arbor, Michigan, gave a description of the work of the Heredity Clinic at Ann Arbor. He said that it was now possible to give a considerable amount of help by advising those who suffered from an inheritable disease on the risks their offspring might run; and, in some cases, those who had found there was an inheritable condition in their own forebears of the risks they themselves ran. In many instances such information was a real help to these people in arranging their lives. He emphasized that the work of the clinic did not end at genetic prognosis. The help must be offered to the patient, or the parent coming for advice, in such a way that he could be assisted to adapt his life to the best advantage, or to live within the limits indicated. Dr. Neel thought that the value of the Heredity Clinic was being rapidly and increasingly appreciated by both doctors and their patients.

Visitors who gave papers included Professor ARGYZLO, University of Toronto, who discussed lupus erythematosus and the many conditions it might resemble; Dr. PAUL SWYER, the Hospital for Sick Children, Toronto, who discussed hiatus hernia and partial thoracic stomach; and Dr. SEYMOUR HEYMANN, Johannesburg, who reviewed the medical treatment of congenital pyloric stenosis. The growing interest in the United States concerning the physical and emotional problems of the adolescent was mirrored in the panel discussion on the "Emotional and Psychiatric Disturbances of Adolescence" and in a two-day seminar on "Problems of the Adolescent."

Preparations and Appliances

OCCLUSION CLAMP FOR INTRATHORACIC INTESTINAL ANASTOMOSES

Mr. KENNETH S. MULLARD, F.R.C.S.Ed., writes: The usual patterns of intestinal occlusion clamps are rarely of use in the performance of intrathoracic anastomoses of the oesophagus and stomach or jejunum, following operations such as resection of the oesophagus for carcinoma. The blades are too long to allow proper application of the instrument to structures lying in the mediastinum, and the handles lie awkwardly in the thoracotomy wound.



The Genito-Urinary Manufacturing Company have made for me the clamps illustrated, which overcome these difficulties. The clamps are 3 in. (7.5 cm.) in length, and the blades are entirely detachable from each other. There are no handles. The clamps are satisfactory in use on the oesophagus, stomach, or jejunum, and control both spillage of bowel contents and haemorrhage from the cut ends without trauma to the organs.

Correspondence

Because of heavy pressure on our space, correspondents are asked to keep their letters short.

Neostigmine-resistant Curarization

SIR,—I was interested to read the article by Dr. A. R. Hunter on neostigmine-resistant curarization (*Journal*, October 20, p. 919). Recently Drs. Hamer Hodges and Foldes¹ drew attention to the fact that the combination of large doses of depolarizing relaxants with normal doses of non-depolarizing relaxants administered during the same anaesthetic often led to prolonged apnoea. Later I stated² that in my experience small initial doses of succinylcholine chloride followed by normal doses of curare or "flaxedil" sometimes led to prolonged apnoea.

I note that all the cases reported in Dr. Hunter's article had been intubated with the aid of a depolarizing relaxant. Could this small initial dose combined with the normal dose of a non-depolarizing relaxant given later in the anaesthetic be the cause of the apnoea he reports?—I am, etc.,

London, W.1.

JOHN GORDON.

REFERENCES

- ¹ Hodges, R. J. H., and Foldes, F. F., *Lancet*, 1956, 2, 788.
- ² Gordon, J., *ibid.*, 1956, 2, 842.

SIR,—I read Dr. A. R. Hunter's article on neostigmine-resistant curarization (*Journal*, October 20, p. 919) with great interest, as I have also been collecting a similar series of cases. A full report of four cases will, I hope, appear elsewhere shortly.

These cases are of elderly patients with intestinal obstruction treated in a similar way to Dr. Hunter's cases and presenting the same syndrome.

The reason for the failure of neostigmine is, in my opinion, a depression of the cholinesterase acetylcholine system. A low level of cholinesterase has been shown in similar types of patients, and an anti-cholinesterase cannot be expected to have much effect in the absence of cholinesterase.

The important thing is, however, that if Dr. Hunter and myself can collect ten cases of patients dying through the irreversibility of curare, then very many more must have occurred in this country. Most of these cases are anaesthetized by resident anaesthetists and it is imperative that the existence of this syndrome is brought to their notice. Of equal importance, it must be the duty of all senior anaesthetists to instruct their juniors in alternative methods of anaesthesia. Unless they receive adequate instruction they will lack the confidence to use alternative methods and these tragedies will continue.—I am, etc.,

Leeds, 4.

GEOFFREY B. BURCHELL.

SIR,—Dr. A. R. Hunter (*Journal*, October 20, p. 919) has drawn attention to a disquieting complication following the use of competitive myoneural blocking agents. I was interested to note that in each of the cases quoted by him intubation was carried out with the aid of suxamethonium, and that after the onset of spontaneous respiration subsequent relaxation was obtained by the use of D-tubocurarine or gallamine triethiodide. May it be that, although respiration returned after the administration of suxamethonium, it would not have been adequate, but that, before this was apparent, relaxation and depression of respiration were produced by myoneural blocking agents acting by competitive inhibition?

At the end of each procedure some improvement in respiration followed the administration of neostigmine, which presumably reversed the competitive block produced by D-tubocurarine or gallamine triethiodide. It may be that the residual depression of respiration was due to a prolonged depolarization of myoneural junctions, produced

by the suxamethonium given in the early stages of each case. This depolarization would be prolonged by neostigmine.

Each patient was elderly and dilapidated, and may well have had a low plasma pseudo-cholinesterase level. The improvement in one patient following the transfusion of stored blood may have been due to its content of pseudo-cholinesterase rather than its potassium level. The effect of transfusing fresh blood, or the administration of concentrated human pseudo-cholinesterase, would have been of interest.

A variety of factors has been shown to influence conduction at the myoneural junction. The exhibition of two myoneural blocking agents, each acting in a different way, must unnecessarily complicate the problem. In the type of case described relaxation, both for intubation and operation, would be more simply obtained by the use of either D-tubocurarine or gallamine triethiodide, preceded in each case by a test dose of the drug.—I am, etc.,

St. Athan.

P. J. VERRILL.

SIR,—Dr. A. R. Hunter's article (*Journal*, October 20, p. 919) is of great interest and considerable importance to all anaesthetists.

The elderly toxic case forms a good proportion of emergency work. They are normally the province of the junior anaesthetist, a fair prognosis is given, but, as the facts show, should this syndrome develop, death is the rule. Although not previously described in the literature, one has the feeling that occasional cases of this type may not be as uncommon as would otherwise be anticipated. One feature of these cases, mentioned in passing but surprisingly not discussed in the article, must surely be given more prominence. I refer to the fact that suxamethonium was used in addition to curare during the course of the anaesthetic in all the cases. Although some spontaneous respiration may have recommenced before curare was given, the possibility that suxamethonium may in some as yet unexplained way be implicated in the resulting hypoventilation must be considered. Viewed in this light the syndrome may be apnoea following the use of a depolarizing and competitive inhibitor.

Indeed, many anaesthetists refuse to give such mixtures even to fit patients on general principles. Put more positively, can anyone cite a case similar to those described in which suxamethonium was not used at all? Such a case would be a true neostigmine-resistant curarization.

A case identical in all points to those described occurred in King's College Hospital recently, again following suxamethonium-curare sequence. Treatment followed Dr. Hunter's lines, the hypotensive episode being controlled by noradrenaline with the restoration of normal respiration and recovery in about eight hours. The serum electrolytes were normal. The practical point arising out of this surely would be not to ban curare in such cases but forfeit the convenience of suxamethonium for the original intubation.

—I am, etc.,

B. S. BEARDSWORTH.

London, S.E.5.

Cerebral Abscess and Tetralogy of Fallot

SIR—In connexion with correspondence published by your *Journal* on the subject of Fallot's tetralogy and abscesses of the brain, we would like to add some of our experiences, which we summarized in a paper read at the March session, 1955, of the Paediatric Society in Prague under the heading "Neurological Complications in Heart Diseases."

In the second children's clinic of the Charles University we have observed 21 children with neurological complications among the children hospitalized with heart diseases. Thirteen children suffered from a congenital heart disease. All but one died and had a post-mortem examination. Interstitial myocarditis was further diagnosed histologically in two children, and a child with myocarditis recovered and the neurological signs disappeared. In three children a diagnosis of bacterial endocarditis was established and one child

had a rheumatic pancarditis. The diagnosis of lupus erythematosus disseminatus with a Libmann-Sachs type of endocarditis was confirmed after post-mortem examination in a 12-year-old boy.

Among the affected children congenital heart diseases were prevalent. Except for a 14-year-old girl with coarctation of the aorta who is still alive, all the other children were suffering from a cyanotic malformation of the heart. Two children with Fallot's tetralogy reached an age of 12 years. This was at a time when preparations for surgery were in progress and the children were hospitalized in different departments. In all the deceased children the malformation was of the type with an inadequate blood flow to the lungs. We underline this observation, because from a far bigger number of children who died in infancy with transposition of the great vessels not a single one succumbed as a result of neurological complications.

Among the cyanotic malformations four children were mongoloids. Not a single one had a Fallot's tetralogy, although we have observed such a combination. If we compare the percentage of neurological complications in congenital heart diseases without mongolism with those where it is present, we find that central lesions occurred in mongoloids incomparably more often. Bacterial endocarditis was found in three children with cyanotic heart diseases, and in every case it led to the formation of an abscess of the brain. In all others we presumed thrombus formation in the cerebral vessels. The marked polyglobuly and increased viscosity of the blood may be considered as factors supporting the thrombus formation. For prevention of neurological complications in those children a good hydration and well-balanced way of life should be aimed at, and this should be maintained even after surgery has been performed. Postponement of surgery should be avoided.

The neurological symptomatology was quite evident clinically, but revealed very little of the pathological substrate of the lesion, although this is of great importance for therapy and the prognosis. In the first instance the basic cardiological diagnoses should be made and the evolution of the disease and the circumstances under which the neurological lesions developed established. The pathological findings reveal that the neurological complications arise basically from four different processes. It is necessary to decide whether it happens to be thrombosis, embolus, haemorrhage, or abscess in the brain tissue.

In cyanotic malformations thrombosis is in the first instance the underlying cause, followed in the second place by embolization of the cerebral vessels. In secondary bacterial endocarditis the existence of a brain abscess should be suspected first. The clinical picture according to our experiences depends rather on the extensiveness of the lesion than on its nature. The usual signs of a brain abscess—namely, elevated temperature, at least in some phase of the disease, leucocytosis with a shift to the left, and an increased erythrocyte sedimentation rate and slowly developing signs of intracranial hypertension—are usually absent. In some instances they may be due to the presence of another infectious process. The brain abscess usually manifests itself by progressively increasing neurological symptoms, which may be very bizarre, or, on the other hand, the abscess may be a surprise finding at necropsy.

Therapeutically massive doses of antibiotics should be given, and if the patient does not improve surgical intervention should be considered. Some authors even recommend early surgical intervention in congenital heart disease. The indications for a detailed examination are persistent headache and lethargy.

It remains undecided whether it would be appropriate to protect our patients with continuous small doses of anticoagulant drugs, especially those with cyanotic malformations of the heart, where the danger of thrombosis is most acute.—We are, etc.,

I. BOR.

K. BRACHFELD.

J. SVATY.

Prague.

Apomorphine Treatment for Alcoholism

SIR,—Dr. Denis Parr (*Journal*, October 13, p. 860) states that apomorphine treatment for alcoholism was introduced by Dent in 1934, but this is not so. The treatment was first described in the *Practitioners Encyclopaedia of Medical Treatment* in 1915,¹ a copy of which has been in my possession since that date. From that date until the present the treatment has been employed successfully by myself and others.—I am, etc.,

Belfast.

GEORGE G. LYTTLE.

REFERENCE

¹ *Practitioners Encyclopaedia of Medical Treatment*, 1915, edited by W. Langdon Brown and J. Keogh Murphy. Hodder and Stoughton.

Tests for Drunkenness

SIR,—With regard to Mr. G. F. Rowbotham's letter on medical examination for drunken driving (*Journal*, October 20, p. 941), I cannot agree that the verdict of the courts is substantially influenced by the medical evidence, and this is particularly so in trial by jury. Over 50% are found not guilty at quarter sessions, and the evidence of the doctor called by the police is very often the only medical evidence. Our present method of testing for co-ordination does not seem to carry the weight one might expect, and a more widespread use of the urine alcohol test is needed. This test could show a jury that a motorist is lying about the amount he has had to drink, but it will prove nothing else.

I do not think that examination in hospital by three doctors is the answer. Hospitals are not handy ways to the police station and disagreement by the panel would provide an absolute field day for defending counsel, and three doctors for the prosecution and perhaps one for the defence all giving evidence in court would certainly confuse the jury and not help them. Also would three doctors of senior status have the time to give to this? It is possible to spend a day or two in court before being asked to give evidence and then to spend half an hour or more in the witness box under close cross-examination.—I am, etc.,

Worsborough Dale, Yorks.

D. W. MAYMAN.

SIR,—Mr. G. F. Rowbotham's letter (*Journal*, October 20, p. 941) on the subject of the examination of persons suspected of being incapable of having proper control of a motor vehicle through the influence of drink will arouse interest without, one imagines, securing a wide measure of agreement. His final sentence conveys that even he has misgivings.

To try to set up and operate a sufficient number of "three wise men" panels throughout the country would be to raise a multitude of questions. What omniscient being is to nominate "medical men of senior status" to serve on these panels? What kind of area is each to cover? This is a facet of diagnosis in which experience is of prime importance; can many areas outside the larger cities muster a number of senior practitioners who have a considerable experience of this type of examination? Again, having secured a panel capable of being assembled at short notice at any hour of the 24, and they having drawn up their report, how is it to be put before the court? Presumably each member must give evidence and be cross-examined; the vision which this conjures up when there is a majority decision only is one of fine forensic confusion, and one doubts if the court would be enlightened by it.

Finally, why should this examination be carried out in hospital? The suspect is under police detention, suspected of a serious offence; what is to be gained by a pretence that it is entirely a medical matter, in which the police should be relegated to the background? Surely Mr. Rowbotham will not insist that a decision is never to be made in this field without the full battery of accessory diagnostic apparatus being brought to bear.

At present, the burden of decision falls squarely on the police surgeon, and the quality of his examination and deduction from it may vary, but these are capable of improvement. A uniform scheme of examination adopted

by all would be of advantage; many police surgeons have already discovered the value (and the limitations) of urine alcohol estimations. In the end it is the court which must make the decision, and the function of a court is to distinguish sound evidence from unsound; technical competence is recognizable even to the layman. The police surgeon would welcome some relief from the weight of his responsibility, but to turn him into a committee would not make individual responsibility less, and could well further complicate the matter for the court.—I am, etc.,

Wigan.

F. G. INCE.

SIR,—I quite agree with Mr. G. F. Rowbotham (*Journal*, October 20, p. 941) that the diagnosis of being "drunk in charge" is such a heavy responsibility that it is most important to have the examination placed in experienced hands. I cannot, however, agree with his conclusions, but consider his letter rather as a strong argument in favour of appointing regular police surgeons all over the country.

Mr. Rowbotham, excluding all arguments against practicability of his proposals, forbids detailed discussion of them. One point, however, remains for comment even so: the fact of holding a senior appointment at a hospital—usually the result of eminence in some special field—would not necessarily qualify to deal specially with these questions, while the particular studies and accumulating experience make the police surgeon a specialist in this and related fields.—I am, etc.,

Gillingham, Kent.

K. F. M. POLE.

Troublesome Staphylococci

SIR,—Your leading article (*Journal*, October 13, p. 867) records various views about the staphylococcus and the changing frequency of staphylococcal pneumonia. May I suggest that the significant word has been omitted in reference to the 122 cases of pneumonia treated in Reading? The word is "hospitals."

I cherish the remark of the physician whose beds were occupied by a considerable proportion of the cases which Drs. W. Hausmann and A. J. Karlish discuss (p. 845). He lamented that a general practitioner had filled one of his hospital beds with a straightforward case of pneumonia who could have been treated at home with a few shots of penicillin. The comment, even in its anonymity, should not be taken too literally, but it did indicate a changing attitude to certain infections. Perhaps the majority of general practitioners approach cases of pneumonia with sulphonamides and antibiotics, considering hospital admission only if resolution is delayed or another pathological process is present. Our scale of values has changed. The pneumococcus has ceased to be the killer and the staphylococcus has assumed considerable relative importance.

The present and future nuisance value of the staphylococcus is not to be minimized. It is probably public enemy No. 1, deployed to suppress any tendency to surgical abandon. But is it not so because other bacteria have been mastered while the same bolt has been loosed at staphylococci without producing much thinning in their ranks?—I am, etc.,

Henley-on-Thames.

HARLEY STEVENS.

SIR,—The pros and cons of antibiotic therapies will have a thorough airing in these columns. Will the protagonists pause to consider whether the bacteria cause the diseases with which they are associated? By a happy coincidence a prominent American professor of public health has confessed in this *Journal* recently that we do not know (Professor Walsh McDermott, "The Problem of Staphylococcal Infection," *Journal*, October 13, p. 837). He critically examines the staphylococci as an initiator of disease and concludes that only in such closed systems as blood-borne osteomyelitis and bacteraemia can we be fairly certain of its pathogenicity. He concludes with the advice that we should study the major problem of resistance in the host and search for the factors which cause it to vary.

Nov. 3, 1956

Professor R. Hare and Dr. C. G. A. Thomas (p. 840) report that nasal carriers of *Staphylococcus aureus* can freely disseminate organisms in the vicinity clothed or unclothed, and even when gowned, masked, and scrubbed up. In view of this it is surprising that modern aseptic techniques have been successful in preventing the spread of sepsis, either in hospital or within the waiting- and consulting-room of a doctor. According to Hare and Thomas such places must be knee-deep in pathogenic bacteria. It points to the conclusion that our relative immunity from staphylococcal disasters in widespread epidemics must be due to a superior host resistance and/or an inability of the staphylococcus to invade intact hosts. Indeed, it has never been proved that such an organism satisfies the postulates of Koch.

It is so easy to hammer the staphylococcus with powerful antibiotics in order to relieve the patient and thus save him the inconvenience and discomfort of an illness. But unless we know what caused his defensive system to fail we may be creating a more serious medical problem later—perhaps years later—which cannot be dealt with by capsules and syrupy suspensions. Professor McDermott has spoken with accuracy, honesty, and insight on this subject, and it is the writer's hope that others in the vanguard of medicine will follow his suggestion to study the major problem of host resistance instead of hurling wider and wider spectrum antibiotics at the ubiquitous staphylococci. Let us leave the laboratories and pharmacies and return to the bedside to learn by observation and reflection what makes a patient sick.—I am, etc.,

Hornchurch, Essex.

P. D. MULKERN.

SIR,—I was very interested to read your leading article (*Journal*, October 13, p. 867) on troublesome staphylococci, in which you stress the importance of the treatment of the in which you stress the importance of the treatment of the nasal carrier state. You mention that A. F. MacCabe and J. C. Gould¹ have cleared up two carriers with 1% "hibitane" cream. I have treated ten nasal carriers for two weeks with 1% hibi-tane cream. After seven days' treatment six were still carrying staphylococci, and on the fourteenth day of treatment staphylococci were isolated from the nasal swabs of eight of the ten. I should be interested to hear if others have had better results with this treatment.—I am, etc.,

London, N.19.

MARY C. SIMPSON.

REFERENCE

¹ MacCabe, A. F., and Gould, J. C., *Scot. med. J.*, 1956, 1, 223.

Anaesthetic Deaths

SIR,—May I seek to draw attention to your important leading article on this subject (*Journal*, October 13, p. 868)? You point out that inhalation of vomit is the commonest single cause of death in general anaesthesia. You go on to say, significantly, that in operative obstetrics anaesthesia *has now become* (the italics are mine) the commonest cause of maternal death. This indicates, correctly, that it is a new feature in the vital statistics of this country, and, of course, it is aspiration of vomit rather than the anaesthetic which is chiefly responsible for the deaths in forceps delivery.

There is clearly now a consensus of opinion that this shocking state of affairs is due almost entirely to two factors: (1) that for a whole generation students have been taught to use the lithotomy position for forceps delivery, which ensures that, if a patient vomits during anaesthesia, she will be exposed to a period of mortal peril; (2) grave suspicion exists that the modern anaesthetic machine may increase the risk of the patient as compared with the simple mask and drop bottle (R. B. Parker, *Journal*, July 7, p. 16).

Many a full-time anaesthetist in giving anaesthetics for experience considerable disquiet in the lithotomy position, forceps delivery with the patient in the lithotomy position, but he is expected to do so because many obstetricians nowadays will not, or cannot, use the lateral position.

Opinions differ somewhat as to the relative importance of the two factors mentioned above, but of one thing we

can, unfortunately, be quite certain—as long as the lithotomy position is taught and practised for forceps delivery under general anaesthesia, so long will there continue to be, here and there, fatalities from aspiration of vomit. On the other hand, in all probability the patient will survive the most up-to-date anaesthetic apparatus, provided she is delivered in the lateral position, in which inhalation of vomit is virtually impossible.—I am, etc.,

London, N.W.7.

A. H. MORLEY.

Abuse of Antibiotics

SIR,—May I add a short comment to the correspondence on the subject of abuse of antibiotics? I am a regimental medical officer in Cyprus and frequently have the opportunity of doing clinics in remote villages when a curfew is imposed. A doctor is seldom, if ever, seen in these villages. There is sometimes a nurse-cum-midwife who does what she can with very meagre medical supplies. I have been surprised to see in these supplies crystalline penicillin and the wherewithal to give it. On numerous occasions I have heard of this being given for uncomplicated coryza, osteoarthritis, headache of unknown origin, and many other miscellaneous complaints. And, as if this were not bad enough, I have seen it given in totally inadequate dosage—for example, 200,000 units on alternate days. The villagers here regard penicillin as a universal panacea, and it seems that some of their medical attendants share this view.—I am, etc.,

Cyprus.

T. M. TIBBETTS.

Medical Education

SIR,—Dr. H. Stewart Moore's patient (*Journal*, October 20, p. 940) must undergo hospitalization before he is laparotomized and never anaesthetized with both depolarizing and non-polarizing narcotizing agents. At the operation the peccant parts must be visualized. It helps if they can be exteriorized before being excised.—I am, etc.,

London, W.1.

ALECK BOURNE.

Medical Evidence at Inquests

SIR,—I am surprised that certain coroners are so sensitive in their reaction to the suggestion that some of their number may exercise economy when calling medical evidence, and that this economy tends to eliminate the clinician in favour of the pathologists. Dr. A. C. Sommerville (*Journal*, October 13, p. 886) prefers the pathologist, not from reasons of economy but because he considers his evidence more reliable. My point is that there are occasions when the pathologist's evidence would be still more valuable if it were reinforced by the clinical picture as supplied by the deceased person's doctor. This is seen in the case when no clearly defined cause of death is found at necropsy, or when two or three pathological processes are present, any one of which could be regarded as the cause of death.

Dr. Sommerville is "only too willing to hear the point of view of the general practitioner—that is, if he has something material to say." I think that few practitioners would be prepared to waste time and volunteer evidence when it is received in such a patronizing manner. Apparently, it is quite uncertain whether or not he will be paid for his trouble. As it happens they seldom have an opportunity, for their first notice of the inquest is usually the report published in the press.

The pathologist's difficulty is that, in this area at any rate, he is not informed of the name of the deceased person's doctor when he is asked by the coroner to perform the necropsy. It would surely be easy in most cases to supply this information if the coroner so instructed. Unfortunately, neither the coroner nor the pathologist seem to think they would obtain additional information of value in this way. This complacency, in my opinion, is the most disturbing factor.—I am, etc.,

Preston.

F. M. ROSE.

Diesel Fumes

SIR,—It is encouraging to read the balanced letter from Dr. F. G. Tomlins (*Journal*, October 20, p. 939). One cannot but heartily agree with all his statements. The report on toxicity of some atmospheric pollutants by Mr. R. E. Pattle and Dr. H. Cullumbine (p. 913) is also of very great importance.

Recently it has been my privilege to present a paper on this subject at the Annual Conference of the National Smoke Abatement Society at Southport (October 3, 1956). On the same day Dr. P. J. Lawther also presented a paper based on the report on smoke in a London diesel bus garage (*Journal*, September 29, p. 753). Following this, unfortunately, some of the press emphasized the fact that diesel fumes were proved harmless (*Bristol Evening Post*, October 3, and *Manchester Guardian*, October 4). This, of course, is an altogether misleading and erroneous finding. It must be stated in fair play that Dr. Lawther indicated his report to be a preliminary one. However, the conduct of these investigations seems to me to be invalid. One should not expect to find a rise in 3:4-benzpyrene or any appreciable concentration of other untoward pollutants to be emitted from 10% derated diesel engines in perfect mechanical condition and under no load.

Let us be sensible over this matter. We must put aside the question as to whether it be benzpyrene, sulphurous, nitrous fumes, aldehydes, or unburnt olefins; in fact, whether it be a question of one or a combination of several pollutants; or again whether it is a question of high concentration, with occasional exposure, or constant repetitive doses of low concentration. Whatever the answer, the proved conclusion of present research indicates that these fumes are pathologically dangerous. Therefore, without waiting for a final pin-pointing by research workers of what is or are the exact dangerous pollutants, it seems only reasonable that the engineers concerned, including oil combustion specialists, engine designers, and operatives, should get together urgently in an endeavour to rectify this menace. Surely this is now a problem for the engineers and not the medical profession, but it is high time the latter and the public pressed hard for them to achieve it. Meanwhile the conversion of electrically propelled public transport to oil-powered vehicles cannot be too harshly condemned.—I am, etc.,

Bristol, 8.

HANDLEY HOWELL.

Enzyme Test for Glycosuria

SIR,—Surely Dr. B. M. D. Rosten (*Journal*, October 20, p. 940) is in error over Benedict's excellent qualitative test for urine sugar. Its proper operation requires 5 c.cm. (or ml.), not 2.5 ml., for 8 drops of added urine.—I am, etc.,

London, W.1.

R. D. LAWRENCE.

Glycyrrhetic Acid

SIR,—Dr. F. Ray Bettley (*Journal*, October 13, p. 882) suggests that drugs should not be prescribed at public expense "before a single clinical trial has been published." Surely, the great majority of drugs in common use are accepted without published controlled trials. Even when extensive trials are made and published it does not follow that the drugs will be used wisely by some of our profession. For example, first, the adverse reports of the Joint Committee of the Medical Research Council on cortisone orally in comparison with aspirin did not prevent the continued use of cortisone in vast numbers of cases. Secondly, in spite of the excellent circular from manufacturers on the use of hydrocortisone topically, I am sure that Dr. Ray Bettley will have seen scores of cases sent to his out-patients' clinic who had the most unlikely skin conditions previously treated with hydrocortisone preparations without benefit.

In suitable cases I agree that hydrocortisone topically is "astonishing" in its effect. Dr. Brian Russell *et al.*,¹ in their excellently controlled trial, found a distinct or com-

plete relief in only 50 out of 132 cases. Dr. E. Colin-Jones (*Journal*, September 8, p. 604) out of 38 cases treated with glycyrrhetic acid ointment had only six failures. I have been using and assessing glycyrrhetic acid preparations since February, 1956, with, so far, many more than 20 cases, and I am continuing these trials, but at this stage I feel justified in saying that glycyrrhetic acid is a valuable anti-inflammatory agent, comparable with hydrocortisone at a fraction of the cost.—I am, etc.,

Herne Bay, Kent.

QUENTIN EVANS.

REFERENCE

¹ Russell, B., Pegum, J. S., Thorne, N. A., and Grange, R. V., *Lancet*, 1955, 1, 1038.

Twopenny-halfpenny Advertising

SIR,—While fully recognizing the tremendous amount of highly valuable work that is done by the great drug houses, I feel that many doctors must, like myself, get a bit irritated by their advertisement techniques. It has, it seems, become common practice for a considerable portion of their literature to go straight into the waste-paper basket unopened. Presumably in an effort to overcome this, a number of firms are now sending out literature carefully disguised as personal letters. I find this offensive. Again, while some travelling representatives are both helpful and courteous, others spare no efforts to plug their new products and even seek to lecture us on how to treat our cases. All this I believe to be unfortunate.

It is highly desirable that commerce should be kept out of medical practice. At the same time, it is right that the great drug houses should have a proper reward for their efforts and have a proper opportunity to present their new products to the profession. I would like, therefore, to put forward a suggestion. It is that the B.M.A. should set up a committee of experts who would be asked to report on new products sent to them by the manufacturers. The nature of the report might vary with the importance of the product, but would, I suggest, include such items as: (1) specific indications and/or general usefulness; (2) side-effects; (3) comparison with standard and accepted remedies and equivalents; and (4) price to N.H.S. when prescribed on E.C.10.

I believe all reputable drug houses would welcome such an independent assessment, and I believe they would gladly accept the cost of the service. I am sure it would be of great value (particularly) to general practitioners, who are at present befogged with the multiplicity of available alternatives and in consequence the more easily influenced by skilful advertisement.—I am, etc.,

Stratford-on-Avon.

E. O. EVANS.

Speech Therapy

SIR,—Miss J. H. van Thal (*Journal*, October 13, p. 884), in reading my letter (*Journal*, September 29, p. 768), jumped to conclusions—"comparative values" did not refer to the values of patients to speech therapists, but to the community. In my opinion to correct a lisp is not as valuable as to correct a stammer, especially in view of the number of lispers employed by the B.B.C., but Miss van Thal does not agree with me, so that what to me would be waste of public money, to her is money well spent. She goes on to write of the "misapprehensions of an old gentleman." I do not think my fifty years of experience and study of the voice, including my time at Guy's, is a disadvantage to my work, nor, I have reason to believe, does the medical profession, and surely most misapprehensions are due to too little study, not to too much.

Miss van Thal sounds an almost facetious note when she suggests that I have never heard of the speech defects on her list, nevertheless many of these are of more interest, in my opinion, to the speech therapist than to the community, which judges every profession by the value of its achievements and would be likely to set a higher value on the correction of a stammer in a boy of marked ability than on teaching a laryngectomized patient to convey his thoughts

through a succession of specialized belches. To show in a few minutes to a parent that an incorrect consonant can be formed correctly does not break the habit, it merely shows the parent that the correct sound is within the child's powers. Experienced teachers will agree with me that children should be taught to teach themselves rather than be spoon-fed indefinitely.

Miss Peggy Carter of the College of Speech Therapists (p. 884) informs me about difficulties of case selection at a clinic; I had been in charge of the clinic at Guy's for 21 years before the College was formed. She writes with great assurance when she states that the reluctance of a youth to take orders from a woman is due to "very faulty technique"; she is ignoring fundamentals; but perhaps she would like to see our boys' schools staffed by mistresses. Miss Carter accuses me of generalizing, whereas every case of stammering is individual. Measles involves different ages, sexes, and personalities, but that does not prevent generalizations about the illness. Surely, after fifty years' experience, it is my duty to generalize, since it is only those with long experience who can do so. She also states that men will not become speech therapists because they are not paid enough; she has forgotten that Cortlandt MacMahon at Bart's and I at Guy's worked without any salary and depended on our results for our patients at hospital and in private practice.

Dr. R. Macdonald Ladell and Miss R. Bennett (*Journal*, October 27, p. 1000) both rightly stress the importance of the psychological factor, without which correction of stammering would be too easy to be interesting. Both these writers quote faulty enunciation as the faulty physical factor. This is such an important point that I must correct it at once; the physical fault is in phonation, as is proved conclusively by the stammerer's ability to sing. Enunciation is identical in speech and song; it is in phonation that the contrast lies; in song phonation is controlled, but not in normal speech, and it is lack of control that makes the stammer possible physically. Solution of the psychological problems involved is easier at hospital than in private practice, but in the last analysis it is the work of the speech therapist to show the stammerer how to overcome his defect in spite of difficulties in the home, office, or school.

Dr. Ladell agrees about the need for male speech therapists, but to bring them back into the profession is not as easy as it sounds. Men would have to be included in the organization which Mr. MacMahon joined and left three times, nor was he ever given the fellowship, and when I offered to join I was ordered to send copies of all my books (seven at the time), and I was warned not to assume that I should be successful in fulfilling their requirements—this after contributing to the *Index of Treatment* for nearly twenty years.

One other matter needs ventilation. Until the National Health Service came into being no visiting specialist was allowed to attend more than one teaching hospital; as a result I had the speech cases from three teaching hospitals referred to me at Guy's. This was the rule when very few speech therapists were available; to-day there are about a hundred in the London area, but these appointments are held in plurality. The old rule was better, if only to give more people a chance to show what they could do and to set up healthy competition. Thanks to the pioneer work of Cortlandt MacMahon, speech therapy is recognized by the medical profession and it has great possibilities, but at present a small group is responsible for organization, training, and examining, and holds all the key posts; as a result it has become a closed shop.—I am, etc.,

London, N.W.1.

H. ST. JOHN RUMSEY.

Arteriosclerosis and the McNaughton Rules

SIR,—I am interested in your report in the case of Kemp before Mr. Justice Devlin at the Bristol Assizes (*Journal*, October 20, p. 947). In a similar case of Chapman before Mr. Justice Diplock at the Hertfordshire Assizes it was decided by the defence that the wiser procedure was to plead guilty to the assault charge and not invoke the McNaughton rules, because these rules would inevitably result in the patient being detained at the Queen's pleasure. The legal approach to this type of problem is that a charge must be brought, in order to avoid a negligence counter charge on the part of the Crown in the event of a repetition of the event. The case of Chapman illustrates

two types of problems on which the law requires medical help: first, the duration and degree of the disease process and thus the prognosis of the disease and the possibility of a recurrence; secondly, perhaps more important at present, any accentuating factors to the confusional state, such as inadequate doses of hypnotics, particularly barbiturates or hypotensive agents such as reserpine, which itself causes water retention and maniacal confusional states, apart from the arteriosclerosis. In effect the therapy (normally designed to relieve the mental symptoms of cerebral arteriosclerosis) may stimulate a period of clouding of consciousness, with the typical unfortunate nocturnal episode of violence, and thus commit the patient to Her Majesty's pleasure within the present legal framework. Surely we must ask for a revision of the law in this matter.—I am, etc.,

St. Albans.

JOHN H. PRICE.

Children Handicapped by Maternal Rubella

SIR,—I think your readers would like to know of the existence of a group which was formed in 1955 to assist parents with the upbringing and education of children affected by rubella in pregnancy, particularly those with two or more handicaps. For children who are only deaf or blind, a great deal is already being done; but for those who are doubly affected, deaf and blind with perhaps a cardiac lesion as well, the opportunities for schooling are very limited indeed. While the primary object of the group is educational, the collective records and experience being gained have also a research value. For example, little if anything is known about the number, age, or geographical distribution of these children.

The organizer and secretary of the group, Mrs. Peggy Freeman, of "Rowland Lodge," 33, Parrock Road, Gravesend, Kent, would be grateful if as many parents as possible from all over the country, especially those with doubly handicapped children, would get in touch with her. A newsletter is published within the group, by which contact is maintained and information and progress reports are exchanged.—I am, etc.,

Peaslake, Surrey.

G. I. WATSON.

Clinical Psychologist in the Mental Hospital

SIR,—With reference to my letter (*Journal*, October 6, p. 826), it has been pointed out to me that the official instrument (report of a working party of the Committee of Professional Psychologists (Mental Health) which deals with the functions, policy, etc., of clinical psychologists within the N.H.S.) I was referring to is, unfortunately, not fully printed in the P.T.A. Circular No. 27. This report, however, is fully published in the *Bulletin of the British Psychological Society*.¹ I apologize for overlooking this point in my previous letter.—I am, etc.,

Chester.

LEON J. DRASPA.

REFERENCE

¹ *Bull. Brit. psychol. Soc.*, 1955, 25, 1.

History of Medicine in Medical Education

SIR,—There has been much correspondence on the subject of medical education, mainly criticizing its suitability for general practice. I wonder how many family doctors are dissatisfied with the training they received? To my mind, training does not end with the finals but must include medical and surgical house jobs, together with midwifery, to say nothing of a course of lifemanship outside medical circles to be taken before qualification.

The letter from Dr. A. P. Cawadias (*Journal*, October 13, p. 883) advocates the history of medicine as a tutor, and I must write to support this. In my teaching hospital, from the beginning of the introductory course to the end of one's stay, the emphasis was always on the patient's history—"Listen to him, he's telling you the diagnosis" is a proved adage. The history of medicine, too, was all important, and any who had the good fortune to listen to Dr. Donald Hunter will never forget the lineage, say, of Turnbull or the homely discovery of digitalis.

Obituary

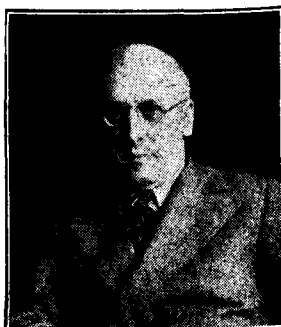
A. E. BARNES, M.B., F.R.C.P.

The death occurred on October 23 at Helensburgh, Dunbartonshire, of Dr. A. E. Barnes, formerly professor of medicine in the University of Sheffield. He was 75 years of age.

Alfred Edward Barnes was born in Sheffield on June 3, 1881, the eldest son of a solicitor's clerk. From the Sheffield Grammar School he entered University College, Sheffield, in 1897 with an entrance scholarship and graduated M.B., B.S. (London) in 1903. Later, after the charter of a university had been granted to University College in 1905, he proceeded to the M.B., Ch.B. of Sheffield University. After graduation he was house-physician at the Royal Infirmary from 1905 to 1907, and was then appointed its first medical registrar. He took the M.R.C.P. in 1907 and was elected F.R.C.P. in 1921. At the Royal Infirmary he became honorary physician in 1911 and senior physician in 1920, holding that position for many years.

Although his early professional years were fully occupied in hospital routine and in widening his experience in clinical medicine, Dr. Barnes was always interested in and realized the importance of clinical research, in which he took an active part. He held a B.M.A. research scholarship in his early years. In the University of Sheffield he was in turn tutor in medicine, lecturer in therapeutics, lecturer in medicine, and, finally, from 1936 to 1946, professor of medicine. During the first world war he was on the staff of the 3rd Northern General Hospital and later in charge of the medical division of the 37th General Hospital in Salonika. He remained on the staff of the Royal Infirmary all his professional life. As a consultant he was a tower of strength to practitioners over a wide area in and around Sheffield. He was a valued and prominent member of the B.M.A., being honorary secretary of the Yorkshire Branch from 1922 to 1928, and he also served on a number of central committees, including the Pharmacopoeia and Joint Formulary Committees.

A man of great energy and strong character and convictions, he could not fail to play a prominent part in shaping the course of medicine in Sheffield. Inspired with the idea of clinical science, and ahead of his time in this respect, he was largely responsible together with friends for the establishment at the Royal Infirmary of a unit of the department of pharmacology, with Professor Edward Mellanby (later Sir Edward Mellanby) at its head—the prototype of many similar departments throughout the country. Indeed, he was willing to sacrifice some of his own beds for the purpose in the conviction that the combination of clinical and laboratory medicine was of paramount importance. His wisdom and foresight in this as in many other things earned him the gratitude of a growing university and of its teachers and students. Professors of preclinical



The type of training at the London was directed all along the line towards general practice, and as students we were frequently told of the differences in hospital and general practice. We were encouraged to go and spend a day with a family doctor as part of our training, but obviously there are not enough doctors to cater for all the students. A local G.P. I remember gave lectures to us in a packed theatre—a popular item, no doubt. After three very enjoyable years in general practice I can only uphold the training which aimed at producing the frame of mind to inquire, examine, diagnose, and treat. May I therefore respectfully suggest that those who decry our training might do well to peruse the methods of education which, to my mind, in the hands of Professor Clifford Wilson functions so admirably?—I am, etc.,

Cradley Heath, Staffs.

G. A. AMES.

Gorleston Holiday Camp for the Physically Handicapped

SIR,—Once again I should like to thank the many doctors whose patients came to our fourth annual holiday camp at Gorleston between September 15 and 29 for the medical and nursing details they kindly sent me. This information was invaluable to the camp medical and nursing staff and enabled us to make special provision in advance for those who needed it.

The camp itself was a great success and 400 disabled people, some very helpless indeed, had a very happy week's holiday. Everyone played their part well, even the clerk of the weather, who gave us the two best weeks of the summer with plenty of warm sunshine. The only difficulty I had was in reading some of my colleagues' writing. Some signatures were quite undecipherable, and, alas, some certificates were unsigned. Apart from these minor points I was again struck by the great admiration so many doctors have for their handicapped patients, and, now that I have seen them, I am not surprised. They were really magnificent and always anxious to lend a hand to those a little more helpless than themselves. Again, most of the nursing assistance came from voluntary workers, both resident and part-time, and the ordinary camp entertainments were augmented by organized outings suitable to our special type of guests.

Our only regret is that we are still the only association doing this work. We sincerely trust that other camps will see their way to providing similar holidays, because the demand for Gorleston is now so great that very many deserving people have to be disappointed. I should be glad to hear comments on, or criticisms of, our arrangements this year, so that we can be guided in our preparations for 1957.—I am, etc.,

Norwich.

IRENE B. M. GREEN,
Vice-chairman,
Norfolk Voluntary Association for
the Welfare of the Physically Handicapped.

Books for Christian Medical College

SIR,—While in this country on a brief furlough I am writing to ask the courtesy of your columns in the interests of the Christian Medical College, Ludhiana, Punjab, India, of which I am principal.

The Christian Medical College, founded in 1894 as the first medical school for women in India, now trains men and women medical students, who come to us from all parts of India and further afield. We are building up a good medical library, and I would like to ask, through these columns, authors and publishers of medical books whether they would send a copy of each book published to Ludhiana. American authors are very kindly doing this for us, and I am anxious that British medical thought should be well represented. We should be very grateful indeed for any such volumes donated.

These may be sent to the College direct, or to the Secretary, Ludhiana British Fellowship, 12, Queen Anne's Gate, London, S.W.1, who will acknowledge and forward them.—I am, etc.,

London, S.W.1.

EILEEN R. BARTER SNOW,
Principal.

subjects, surprised and delighted at his enthusiasm, constantly sought his help and advice. As an ally in a somewhat poor and very young university he was invaluable in obtaining financial and other assistance, and enabled many who later became famous in older universities to initiate and pursue important research.

Dr. Barnes wrote little, but as a clinician and teacher he was unsurpassed. His boundless energy and enthusiasm could not fail to communicate itself to the students, house-physicians, and registrars. His scrupulously recorded histories, careful examinations, and balanced judgment set a standard difficult to emulate. Perhaps the most important characteristic he was able to convey was the spirit of adventure which he always sought in medicine. A voracious reader and with a mind scintillating with the newest ideas to the end of his days, he led his juniors in one bold clinical experiment after another, though never losing sight of the patient as a human being.

Unsparring to himself, as a colleague he was sometimes critical and, with his fearless mind, often controversial, but always loyal and devoted to his profession, his hospital, and his university, and utterly honest. He was particularly kind and helpful to the struggling youngster, and many a junior colleague will remember with gratitude his support in the first difficult years of consultant life. It was characteristic of him that on his retirement, determined to give his younger colleagues more scope, he left with regret his many friends and his home town. It is pleasant to know that his last years were spent in happiness and contentment in his beloved garden in Scotland.

Dr. Barnes married Miss Jessie Morrison in 1911 and there were two sons of the marriage, one of whom is Dr. J. M. Barnes, director of the Medical Research Council's Toxicology Research Unit.—H. P. B.

J. C. CRUICKSHANK, M.D., D.T.M.

We record with regret the death on October 30 of Professor J. C. Cruickshank, who held the chair of bacteriology as applied to hygiene at the London School of Hygiene and Tropical Medicine. He was 57 years of age.

John Cecil Cruickshank was born on October 14, 1899, and educated at George Watson's College, Edinburgh. Before going on to Edinburgh University to study medicine he served for over a year with the Gordon Highlanders at the end of the first world war. In spite of this interruption in his studies he graduated M.B., Ch.B. just after his 22nd birthday, and thereafter held the posts of house-surgeon at Sheffield Royal Infirmary and house-physician at Chesterfield Royal Hospital. After taking the Diploma in Tropical Medicine in 1923 at Liverpool, where he gained the Alan H. Milne Memorial Medal, he was appointed a member of the West African Medical Staff in the Gambia, where he remained until 1930.

On his return to Britain Dr. Cruickshank went into general practice near Glasgow for a year or two, but by this time he had decided on a career as a bacteriologist, and after taking the Diploma in Bacteriology of London University he was appointed demonstrator of bacteriology at the London School of Hygiene and Tropical Medicine. He was promoted lecturer in 1937, reader in 1945, and professor of bacteriology as applied to hygiene in 1947. During the second world war he served in the Emergency Public Health Laboratory

Service, being director of laboratories first at Horsham and later at Exeter. In 1952 he proceeded to the M.D. of the University of Edinburgh, being awarded a gold medal for his thesis.

During his early years at the London School of Hygiene Professor Cruickshank was one of a team investigating the immunizing fractions isolated from bacteria by chemical means, and with G. G. Freeman he was successful in obtaining fractions from the whooping-cough bacillus effective in the prophylaxis of infections in mice. He had also investigated the antigenic components of salmonellae and the chemotherapy of experimental pertussis, anthrax, and brucella infections. After the second world war he published a useful paper on the value of Vi-phage typing in the investigation of typhoid fever in a rural area. He obtained the material for this paper while he was in charge of the public health laboratories at Exeter, where he will be remembered for his excellent work during the war. Several of the epidemiological and bacteriological investigations he carried out in those years were published in this *Journal*.

As a teacher Professor Cruickshank was quiet and thorough. He took great pains to clear up the perplexities of his students, and earned the respect and affection of all those who passed through his department.

He married Miss Mabel Margaret Elizabeth Harvey in 1928, and had two sons and one daughter.

Sir WILBERFORCE NEWTON, M.D., F.R.A.C.P.

Sir Wilberforce Newton, consulting physician to the Royal Australian Navy, died at Melbourne on October 4 at the age of 65.

Wilberforce Stephen Newton was born on December 27, 1890, and was educated at Haileybury College, Melbourne, and at Melbourne University, where he graduated M.B., B.S. in 1915. He proceeded to the M.D. in 1920, and in 1937 was elected a foundation Fellow of the Royal Australasian College of Physicians. Soon after graduation he entered the R.A.M.C. for service in the first world war. After the war he held the post of medical superintendent of the Alfred Hospital, Melbourne, in 1918–19, and thereafter held a succession of appointments at the hospital. He was medical clinical assistant to out-patients in 1920–1, honorary physician to out-patients from 1923 to 1933, and honorary physician to in-patients from 1933 to 1948, when he was appointed to the honorary consulting staff. Since 1937 he had been a member of the board of management of the hospital. From 1935 to 1944 and again in 1945–6 he was Stewart lecturer in medicine in Melbourne University. A member of the council of the Royal Australasian College of Physicians from 1944 to 1954, he held office as a vice-president of the College from 1950 to 1952. He was a member of the Faculty of Medicine of Melbourne University from 1932 to 1948.

In his later years Newton became consulting physician to the Royal Australian Navy. He was also a member of the Consultative Council on Tuberculosis of Victoria and, for a time, a member of the executive committee of the Anti-Cancer Council of Victoria. During the second world war he was a member of the final medical board of the Southern Command. From 1947 to 1953 he was chairman of the Melbourne Permanent Postgraduate Committee. He received a knighthood in the 1950 Birthday Honours for public services in the State of Victoria. He married Margaret, daughter of the late

Dr. William Macansh, and had four sons. His elder brother, the late Sir Alan Newton, who died in 1949, was one of Australia's leading surgeons.

The tragic death on September 21 of Dr. D. R. EDWARDS, of Bath, came as a great shock to all who knew him. Appointed only three months previously to a vacant practice in Bath, he was shot dead while conducting his surgery. Dennis Raymond Edwards, although born in England on March 2, 1926, spent his youth in Kirkmaiden, Wigtownshire. He had a fine record at Stranraer High School, where he was dux, at St. Andrews University, where he graduated M.B., Ch.B. in 1948, as a houseman at Arbroath Infirmary, and in the R.A.M.C., with which he served in Malaya in 1950-1. Before going to Bath he had been for three years a partner with Dr. H. S. Kent in Darlington, where he was also deputy police surgeon, and honorary secretary of the Darlington Division of the British Medical Association in 1955-6. While a student he gained the premier award at Perth Festival for his tenor voice, and his singing was only one of the gifts with which he enriched the community in which he lived. On moving to Bath in July he made his mark immediately in the medical life of the city, and his professional skill was quickly recognized by patients and consultants alike.

A. S. writes: Although young in years, Raymond Edwards showed by his kindness, humanity, and devotion to work that the National Health Service can produce the kind of family doctor that in the past has been the glory of British medicine. The local medical committee at Bath, knowing of his fine work for the B.M.A. in Darlington, elected him to a vacancy on the committee, and here also the loss of a man with his integrity, ability, and industry is a serious one to the profession. His radiant and lovable personality was the expression of a life dedicated to his work and to the Master whom he humbly and consistently served. Struck down at the threshold of a life full of high hope and promise, these lines of R.L.S. might well be said of him:

"Doomed to know not Winter, only Spring, a being
Trod the flowery April blithely for a while,
Took his fill of music, joy of thought, and seeing
Came and stayed and went, nor ever ceased to smile."

He leaves a widow and a son of three years, and to them and to his widowed mother has gone out the sympathy of a whole city and of many far afield.

H. S. K. writes: Raymond Edwards came to Darlington five years ago to assist me in general practice. He was recommended to me by a medical colleague with whom he had been acting as a trainee assistant in Harrogate, and it was evident at once that he had already reached a high standard of efficiency as a doctor. He very soon became endeared to us all, and possessed all the attributes of a successful and most respected professional man. He was a sound and most painstaking clinician, and by his kind and sympathetic approach to, and in the treatment of, his patients there was no wonder that he gained the popularity and respect which he richly deserved. He was equally popular with his medical colleagues, and latterly undertook the secretaryship of the Darlington Division of the B.M.A. He immediately infused fresh enthusiasm among our members, as he did in fact with all his undertakings. He was a gifted lecturer, mainly on medical subjects, and was ever ready to lecture and examine in first aid. He was a man with strong religious principles, and from the first became attached to St. George's Presbyterian Church, where he took an active part in arranging the forum and its rota of speakers. As deputy police surgeon he was most respected and was known for his fairness in judgment and exactness in detail. He often was asked to lead in debates between doctors and the clergy to improve the relationship between the two professions, for the physical and spiritual betterment of patients. It was a great loss to me as his partner and to the practice when he was offered a practice at Bath, but we all felt that it was going to be in his best interests

to accept the position, for which he was so admirably equipped. This terrible tragedy has stunned all of us who loved and respected him so much, and our thoughts are very deep for his wife, his young son, and his mother in their irreparable loss. Raymond Edwards's character, which was of the highest order, reflected the perfect happiness of his family life, and enriched the lives of us all.

Dr. J. M. A. WILLOX writes: Having been a close friend for nearly twenty years, I would like to pay a personal tribute to the late Dr. D. R. Edwards. The full tragedy of his death and of the loss of his outstanding personality is felt by all who knew him. My earliest recollection of him is of a boy who seemed older than he really was, then of a friend at whose home in the picturesque village of Drummore I spent many happy days, often also in the company of the charming girl who was later to become his wife. I remember particularly the happiness in the home of his ever-welcoming parents, and I recall that wherever he went he was always greeted with pleasure and affection. Raymond Edwards was the most brilliant pupil of his school. The principal prize-winner in every year, he was also a keen sportsman, and possessed a very fine tenor voice which later earned him a soloist medal at the Perth Music Festival. As a boy and as a man he was brilliant, modest, and always popular. A well-integrated personality, he had also a rare gift which inspired complete trust and confidence in all who knew him, whether as patients, friends, or colleagues. His approach to all problems, whether professional or personal, was always constructive, never complaining or critical, and in all he did he showed tremendous enthusiasm and vitality coupled with a very genuine love for his fellow man. His death has deprived the medical profession of a truly outstanding practitioner. For those who loved him there are no words to describe adequately how great is their loss.

Dr. R. H. TITCOMBE, who practised at Disley, near Stockport, died on October 3 at the age of 73. Roland Hereward Titcombe was born on March 12, 1883, in the Cotswolds. He was the son of a solicitor, who later practised in Colne, Lancashire, and it was in this district that he received his early education at the local grammar school. His mind turned to medicine, and he became a student at the medical school of the University of Manchester, graduating M.B., Ch.B. in 1909. He was then appointed house-surgeon at Ancoats Hospital, and later became the resident surgical officer. Later he joined the pathological department of the Christie Cancer Hospital, where he came under the influence of Professor R. B. Wild, Professor James Lorrain Smith, and Dr. C. Powell White. In 1911 he wrote his M.D. thesis on the relation of the anterior pituitary gland and other ductless glands to cancer. This was an advanced thesis, for which he was awarded the gold medal for the best thesis of the year. In the same year he passed the examination for the D.P.H. Thus was laid an excellent and unusual foundation for the life of a general practitioner. In 1913 he moved to Disley, in Cheshire, to become the partner of the late Dr. Alan Boyle, and quickly gained a fine reputation as a doctor. He was kindly and sympathetic—one of the old school—and well versed in the art of general practice. He was recognized by his consultant friends as a man who had a wide knowledge, not only of medicine, but of life in general. A man of culture, he was widely read, with a great interest in music. In his early days he was a church organist and he also played the harp. Ecclesiastical architecture was one of his interests. In the first world war he served in Mesopotamia, in the 33rd British General Hospital. On his return to practice he entered fully into the activities of his district, becoming president of the Disley branch of the British Legion. He was for many years medical officer of health of the New Mills Urban District Council. In 1952 he was elected chairman of the Stockport Division of the British Medical Association, and in 1954 president of the General Practice Section of the Manchester Medical Society. At the time of his death he was a member

of the Cheshire Local Medical Committee. He was keenly interested in the training of young doctors, and his trainees had a high opinion of his sage advice. Roland Titcombe will be sadly missed by his wide circle of friends. He leaves a wife and two sons, who are both doctors.—W. R. D.

By the death of Dr. G. DRU DRURY on October 12 Corfe Castle and the Isle of Purbeck have lost a well-loved general practitioner, who had lived for fifty years under the shadow of the old castle. He was 76 years of age. Godfrey Dru Drury was born on March 16, 1880, and was educated at Monkton Combe School and at St. Bartholomew's Hospital, qualifying M.R.C.S., L.R.C.P. in 1904. After holding the appointments of house-surgeon and house-physician at the Seamen's Hospital, Greenwich, he settled in practice at Corfe Castle. There he became a well-known and much-loved figure, and his work as a general practitioner took him all over the Isle of Purbeck. For many years he was on the staff of the Cottage Hospital at Swanage and the Children's Hospital. A Fellow of the Society of Antiquaries for twenty-eight years, he also served at one time as president of the Dorset Natural History and Archaeological Society. An expert on the history of Corfe Castle, he was always keen and willing to impart his knowledge to others at medical meetings and to groups of ordinary sightseers. In his younger days he led the Corfe Castle cricket team. He had been chairman of the Salisbury Diocesan Advisory Committee and was also a member of the Dorset Church Building and Restoration Committee. He was a churchwarden for twenty-five years in the parish church, and was entirely responsible for the tidiness of the churchyard. The church of St. Edward, Corfe Castle, was crowded for the memorial service, at which the address was given by the Bishop of Sherborne. He leaves a daughter and a son.

Dr. H. S. BAKER died in London on October 13 after a long illness and many years of poor health. He was 63 years of age. Henry Searle Baker was born at Lewisham on January 25, 1893. Educated at Colfe's Grammar School, Lewisham, he then went to St. Bartholomew's Hospital, where he enjoyed life to the full. He excelled at cricket and also enjoyed playing Rugby football. The outbreak of the first world war found him just ending his fourth year, and by much hard work he qualified L.M.S.S.A. in 1914 at the age of 21. He joined the R.A.M.C. and was posted to the Royal Sussex Regiment, and while in France was severely wounded in the abdomen and was thought to be dying. His fiancée, then a nursing sister in the Q.A.I.M.N.S., travelled to the forward clearing station and nursed him back to health. This wound was a cause of much ill-health in later life. After the war he went back to his studies and took the London Conjoint diploma in 1920. He settled in Camden Town and soon acquired a name as a skilled practitioner. All his patients were personal friends, and he worked untiringly in their interests. From 1930 to 1935 he devoted much time to research and had several papers published on the treatment of cancer by connective-tissue extracts. He also became deputy medical officer to Holloway Prison. He remained in general practice until soon after the outbreak of the second world war, when he joined the R.A.F. For most of the war he was stationed at aerodromes in England and Ulster, but also spent much time in the *Queen Elizabeth* and the *Scythia* in convoys. On demobilization he returned to general practice, but ill-health eventually forced his retirement from active work. Journalism had always been his other love, and from time to time many articles of his had appeared in the lay press. He now devoted all his energy to both journalism and medical boards. He became a close friend of a large number of Fleet Street personalities, wrote for many newspapers, and felt especially honoured by his election to the Press Club. He became chairman and deputy chairman respectively of Ministry of Pensions and Ministry of Labour medical boards. In 1950 he underwent his first operation, and immediately realized his ultimate prognosis, but neither courage nor wit

deserted him over the next six years. He lived his life to the full, enjoying every minute and giving much. He leaves a widow and two sons, one a doctor. The sympathy of his many friends is extended to his family in their great loss.

Dr. H. J. A. POLLARD died suddenly at his home at Eastbourne on October 17 in his 62nd year. He had been in apparent good health, and his sudden death came as a great shock not only to his family but also to many others, both in his own profession and among his friends. The son of Sir George Pollard, doctor, barrister, and M.P., Harold James Alexander Pollard was born at Southport on January 18, 1894. Educated at Harrow, Clare College, Cambridge, and at St. Bartholomew's Hospital, he qualified M.R.C.S., L.R.C.P. in 1920. After holding the appointment of house-physician at St. Bartholomew's Hospital and at the David Lewis Northern Hospital, Liverpool, he went into practice at Eastbourne in 1923. Then began what was to be a long connexion with the local hospitals. He was a member of the staff of the Leaf Hospital from his early days at Eastbourne and was intimately associated with the management of the hospital until it was taken over under the National Health Service Act in 1948. He was appointed anaesthetist to the Eastbourne Hospital Group in that year and medical officer to the Merlynn Convalescent Home. He was a hard-working, conscientious family doctor, whose sense of humour and invariable good nature endeared him to patients and friends alike. His recreations were golf, bridge, and photography, but in recent years he had found less and less time to devote to them. "Alec" Pollard will be sorely missed by his friends, and the sympathy of these friends goes to his widow and daughter, for above all he loved his family and his home.—D. A. C.

Medical Notes in Parliament

NEW CHARGES ON PRESCRIPTIONS

An explosion about Health Service charges marked the resumption of the Parliamentary session when on October 25 the CHANCELLOR OF THE EXCHEQUER announced the second instalment of his efforts to find £100m. savings in Government expenditure.* These amounted to £17,500,000, and he confined his comments to two of the individual items which made up the total.

First, he said, it was proposed to alter, as from December 1, 1956, the method of charging for National Health Service prescriptions, the cost of which was running at nearly 5s. an item. From that date the charge would be 1s. per item instead of 1s. per form. Existing arrangements for refunds would be continued. The saving would be £4m. this year and £5m. in a full year.

Secondly, it was proposed to make a seasonal increase, from 7½d. to 8d. a pint, in the retail price of milk as from January 1, 1957, for the remainder of the winter. The net saving this year would be £4,500,000. The charge for welfare milk would not be affected by this change.

*The B.M.A. issued to the press the following statement: The B.M.A. is not concerned with the politics of charges within the National Health Service. It is, however, vitally concerned with the effect on patients. We are just as anxious as the Government to get the size of the drug bill reduced, but we think that the decision to charge a shilling for every item of medicine is bound to have medical repercussions. It discriminates unfairly between different classes of patient. One patient requires only one bottle of medicine: another must have drugs in several different forms. Take diabetes. Sufferers from diabetes require not only insulin but syringes, needles, spirit, and all these at regular intervals for the rest of their lives. A varicose ulcer needs dressings of various sorts, and again for a considerable period. Worst of all, patients dying of ulcerating carcinoma requiring large amounts of dressings and sedatives will have to pay five or six shillings a time for their prescriptions. Doctors will be concerned about the medical repercussions of this decision.

The other savings included a further £9m. on defence, but—as his statement appeared to anticipate—these were the items which roused the Opposition to noisy wrath. He was assailed with cries of "Scrooge," "Cheap," "Brute," "Shame," and a mounting chorus of "Resign." Mr. HAROLD WILSON (Huyten, Lab.), who was the chief Opposition spokesman, demanded to know why the economies always fell on those least able to afford them, in this case the sick, and how the increases could be reconciled with all the preaching about "a plateau of price stability." Mr. MACMILLAN told him that the effect of the seasonal change in the price of milk on the cost-of-living index was estimated to amount to 0.22, which was negligible. As for the prescriptions change, the Government had to thank the former Labour Government in 1949 for providing the powers in the National Health Service (Amendment) Act. He recalled the claim of the then Government, in introducing that Bill, that not merely was economy the reason but also the need "to reduce excessive and unnecessary resort to doctors and chemists"—and added that this had led to some difficulties between Mr. Gaitskell and Mr. Aneurin Bevan.

Dr. EDITH SUMMERSKILL (Warrington, Lab.) asked if the Chancellor had fully considered what his proposal would mean in the next few months to the five million old-age pensioners, who must of necessity have recourse to doctors. It was customary to prescribe on one form for medicine, lotion, and liniment, but in future the pensioners would have to pay 2s. or 3s. Mr. MACMILLAN explained that the arrangements for reimbursement covered all war pensioners requiring treatment, all persons in receipt of National Assistance, and all old-age pensioners and others who could not meet the charges without hardship. Miss M. HERBISON (Lanarkshire, North, Lab.), who charged him with a "despicable attack" on the sick and disabled, was also told that the reimbursement arrangements, which the Chancellor thought to be satisfactory, would continue. Dame IRENE WARD (Wallsend, Con.) asked for an assurance that this would be made clear in the notices in chemists' shops, and Mr. MACMILLAN promised to consult the Minister of Health to see that this was done. In answer to another question by Mr. JAMES GRIFFITHS (Llanelli, Lab.) he included among those who could claim reimbursement "those drawing industrial injury benefits." Dr. SUMMERSKILL pressed him to say how a poor person having recourse to a doctor could prove inability to afford the charges. Mr. MACMILLAN: Exactly in the same way as hitherto.

Epileptics in Prison

Mrs. E. BRADDOCK (Liverpool, Exchange, Lab.) questioned the Home Secretary on October 25 about the numbers of epileptic prisoners, the numbers of specially equipped cells in prisons, and the arrangements made to attend to epileptic prisoners and prevent them from injuring themselves. Major G. LLOYD-GEORGE told her that the most recent available annual total figures showed that 192 epileptics were received into custody in 1954 and that a further 209 prisoners were recorded as possibly having epilepsy. With two exceptions, in prisons where prisoners with severe epilepsy were detained the number of specially equipped cells for their use ranged from one to seven. In the two such prisons where there was no permanent provision special *ad hoc* arrangements were made as necessary. Prisoners suffering from epilepsy received anticonvulsant drugs and other medicinal treatment; where necessary they were lodged in cells equipped to reduce the likelihood of injury.

Mr. SOMERVILLE HASTINGS (Barking, Lab.) asked him to consider permitting epileptic prisoners to be detained only in prisons which had all the facilities necessary for dealing with them, including what amounted to a padded cell. Major LLOYD-GEORGE said that in many cases where a padded cell was provided it was hardly ever used, but he would look into the matter.

Poliomyelitis This Year

Mr. S. P. VIANI (Willesden, West, Lab.) asked the Minister of Health how many of the 2,538 cases of poliomyelitis recorded this year occurred in the age classes 2 and 9 years; how many of them and at what ages occurred after April 30; in which areas the 2,538 cases were notified; in how many of the 2,538 cases the diagnosis of poliomyelitis was confirmed; how many of the cases developed paralysis, and at what ages; and how many proved fatal, and at what ages. Mr. R. TURTON, replying on October 26, said that figures of corrected notifications, ages, and deaths for the September quarter were not yet available. In the first six months of the year the uncorrected notifications numbered 848 (paralytic 536, non-paralytic 312), while statistics for corrected notifications were as follows:

Age	Corrected Notifications			Registered Deaths*	
	Total	Paralytic	Non-paralytic	Age	Deaths
0	12	11	1	0	4
1	25	20	5	1	1
2	37	31	6	2	1
3	36	24	12	3	0
4	59	35	24	4	0
5	196	106	90	5	4
10	80	46	34	10	6
15	91	65	26	15	2
25+	106	82	24	20	2
				25	8
				30	6
				35	3
				40	2
				45	1
				50-4	2
Total	642	420	222		42

* Number of deaths registered where the interval between onset of the disease and death was less than twelve months.

Mr. HECTOR HUGHES (Aberdeen, North, Lab.) asked the Secretary of State for Scotland for a comprehensive statement on the incidence in Scotland of poliomyelitis, indicating age groups and areas, and on the results which had followed the tests and application of the new anti-poliomyelitis vaccine recommended by the Department of Health for Scotland, to the latest convenient date.

Mr. J. STUART stated on October 24 that in the four weeks to October 13 there were 57 provisional notifications of poliomyelitis. About 34,000 children were vaccinated during May and June, but it was too early to assess the results of these vaccinations. A detailed assessment was being made by the Medical Research Council, and the results would be made known in due course.

Drug Sales Investigation

Mr. DAVID LLEWELLYN (Cardiff, North, Con.) asked the Home Secretary on October 25 about the sale by some Cardiff chemists of a certain drug without the signature of a dental surgeon, and if he was aware that the drug was being sold as confidence pills without purchasers signing the poisons book or producing a doctor's or dentist's prescription. Major LLOYD-GEORGE replied that his attention had been drawn to recent allegations about the indiscriminate sale of a drug which was added to the Poisons List from August 15. He understood that the matter was being investigated by the Pharmaceutical Society, which was responsible for the enforcement of the Pharmacy and Poisons Act.

Reports in Progress

The MINISTER OF HEALTH informed Mr. N. DODDS (Erith and Crayford, Lab.) on October 25 that since it last received evidence in public on July 27, 1955, the Royal Commission on Mental Laws had been pursuing inquiries and preparing its report. He did not know when this work would be completed.

He told Mr. B. JANNER (Leicester, North-west, Lab.) that he was studying the report of the McNair Committee on the recruitment of dentists, with a view to discussion with the profession and others concerned.

The HOME SECRETARY stated in answer to Mr. K. ROBINSON (St. Pancras, North, Lab.) that the Wolfenden Committee on homosexuality and prostitution was engaged in drafting its report. It was aware of his anxiety that this should be presented as soon as possible, and, while he could not give any firm date, he was hoping that the committee would complete its work early in the new year.

Hospital Doctors' Emoluments

Mr. ERIC JOHNSON (Manchester, Blackley, Con.) asked the Minister of Health on October 29 if he was aware that in many hospitals the new scale in emolument charges would result in a substantial reduction in the net salaries of resident doctors; and if he would give instructions that these charges should not be implemented in retrospect or until the negotiations in regard to the standard of accommodation, which were in progress, had been completed. He also said there was still a shortage of junior hospital medical staff; and asked if the Minister would ameliorate this situation by abolishing emolument charges for those who were compelled to reside in hospital, by improving the standard of accommodation for doctors, and by providing married quarters.

Mr. R. H. TURTON replied that, while the charges payable by house officers, who were the most numerous class of resident doctors, were not altered, he was aware that for many doctors in the more senior grades the new charges were higher than those previously paid. They took effect on August 1 in accordance with a Whitley agreement, and he saw no justification for suspending the operation of that agreement, much less for abolishing charges altogether. He answered the other points by reference to a 1954 circular on residential accommodation issued to hospital authorities (Supplement, January 15, 1955, p. 16).

Mr. JOHNSON.—Is the Minister aware that resident doctors have to sign contracts which do not state the amount of the emoluments charged; that they have no redress if they are increased; and that they have to pay income tax on their gross salary before the charges are deducted? Is he also aware that the standard of accommodation in some hospitals is still extremely poor? Is it not wrong that doctors, who might have to get up in the middle of the night to perform difficult operations, should have only a bedroom and no sitting-room at their disposal, even after six or seven years' service? Mr. TURTON.—These charges were agreed under the Whitley agreement, and I think the matter must be left there. I am sure the hospital authorities are as anxious as I am to see that the accommodation provided for resident staff is as satisfactory as possible.

Mrs. LENA JEGGER (Holborn and St. Pancras, South, Lab.) asked whether the Minister had been able to give any special consideration to married doctors required to be resident. Mr. TURTON.—All these factors were taken into account by the Whitley committee.

Junior Medical Staff

Mr. ERIC JOHNSON asked the Minister if he was aware that junior hospital medical staff had no direct access to, nor negotiating powers with, his department; and if he would arrange for them to be represented on the Joint Negotiating Committee. Mr. TURTON.—There is a joint negotiating body for all grades of hospital medical staff. The composition of the staff side of this body is a matter for the profession itself. Mr. JOHNSON invited him to agree that it was grossly unfair that this group of doctors, who represented more than 50% of the hospital service and probably did the bulk of the work, should not be represented on the committee, and their voice could not be heard. Mr. TURTON said it would be most improper if he were to interfere with the composition of the staff side.

Practice Expenses

Mr. W. W. HAMILTON (Fife, West, Lab.) asked the Minister of Health what was the latest date on which doctors' practice expenses were reassessed; what was the

total increase resulting from that reassessment; and how much it represented per doctor per year. Mr. TURTON.—The latest year for which doctors' practice expenses have been reassessed is that ending on March 31, 1955, when for Great Britain they are estimated to have been £23,549,227, or £1,114 per doctor, an increase of £2,891,797, or £114 per doctor, over the preceding year.

P.P.S.

The Minister of Health, Mr. R. H. TURTON, has appointed Mr. JOHN ARBUTHNOT (Dover, Con.) as his Parliamentary Private Secretary.

Vital Statistics

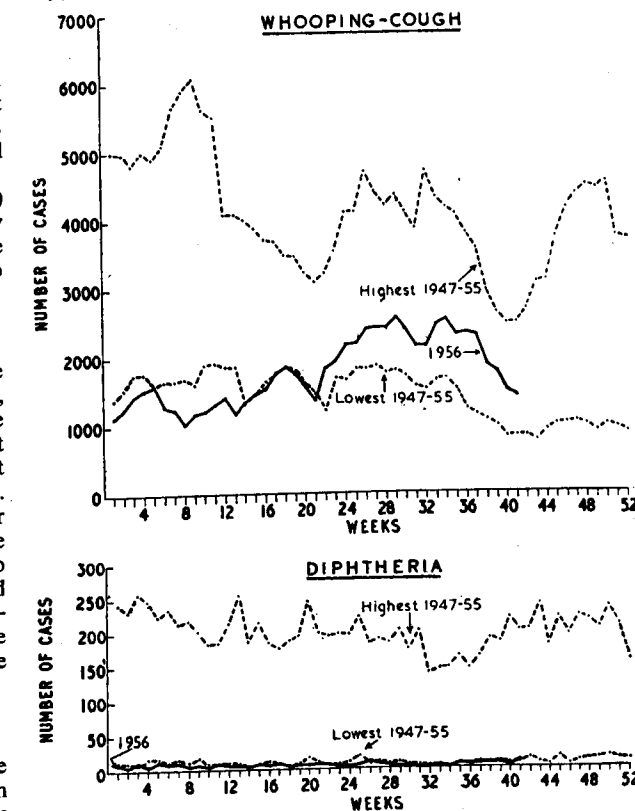
Industrial Accidents and Diseases

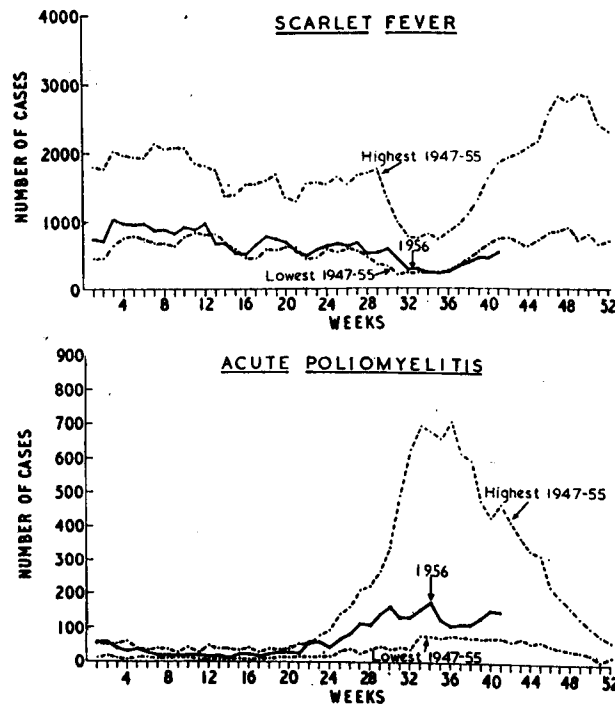
The number of workpeople (other than seamen) in the United Kingdom whose deaths from accidents in the course of their employment were reported in September was 93, compared with 86 in the previous month and 136 in September, 1955.

The numbers of cases of industrial diseases in the United Kingdom reported during September, 1956, were as follows: lead poisoning 7, aniline poisoning 5, epitheliomatous ulceration 23, chrome ulceration 14; total 51. There was one death from epitheliomatous ulceration due to pitch and tar.—*Ministry of Labour Gazette*, October, 1956.

Graphs of Infectious Diseases

The graphs below show the uncorrected numbers of cases of certain diseases notified weekly in England and Wales. Highest and lowest figures reported in each week during the nine years 1947-55 are shown thus -----, the figures for 1956 thus ———. Except for the curves showing notifications in 1956, the graphs were prepared at the Department of Medical Statistics and Epidemiology, London School of Hygiene and Tropical Medicine.





Infectious Diseases

The largest rises in the notifications of infectious diseases in England and Wales during the week ending October 13 were 178 for measles, from 1,968 to 2,146, 103 for dysentery, from 421 to 524, and 74 for scarlet fever, from 458 to 532; the only large fall was 94 for whooping-cough, from 1,487 to 1,393.

The largest rises in the incidence of measles were 48 in Middlesex, from 65 to 113, 45 in Lancashire, from 455 to 500, and 43 in Northumberland, from 73 to 116; the only large fall was 43 in Derbyshire, from 75 to 32. The only rise of any size in the notifications of scarlet fever was 27 in Lancashire, from 54 to 81. The largest fluctuation in the returns of whooping-cough was a fall of 26 in Surrey, from 41 to 15. 10 cases of diphtheria were notified, being 8 more than in the preceding week and the largest total for 36 weeks. The multiple cases of diphtheria were Warwickshire 4 (Birmingham C.B. 3), Lancashire 2, and London 2.

150 cases of acute poliomyelitis were notified. The number of paralytic cases was the same as in the preceding week and the non-paralytic cases were 5 fewer. The largest returns were Lancashire 32 (Manchester C.B. 12, Liverpool C.B. 8, Blackpool C.B. 2, Urmston U.D. 2), Cheshire 21 (Stockport C.B. 12, Wirral U.D. 3, Sale M.B. 2), Hertfordshire 9 (Elstree R.D. 7, Watford M.B. 2), London 8 (Lambeth 2, St. Pancras 2), Durham 8 (West Hartlepool C.B. 3, Sunderland C.B. 2, Hartlepool M.B. 2).

The rise in the incidence of dysentery was mainly contributed by rises of 55 in Yorkshire West Riding and 24 in Lancashire. The largest returns were Yorkshire West Riding 149 (Leeds C.B. 29, Thorne R.D. 23, Colne Valley U.D. 19, Tadcaster R.D. 15, Sheffield C.B. 11), Lancashire 103 (Liverpool C.B. 31, Rawtenstall M.B. 18, Blackpool C.B. 11), London 50 (Southwark 8), Warwickshire 37 (Coventry C.B. 29, Birmingham C.B. 8), Durham 27 (South Shields C.B. 12, Stanley U.D. 9), Yorkshire East Riding 18 (Haltemprice U.D. 10, Kingston-upon-Hull C.B. 8).

Week Ending October 20

The notifications of infectious diseases in England and Wales during the week included: scarlet fever 600, whooping-cough 1,469, diphtheria 6, measles 2,790, acute pneumonia 284, acute poliomyelitis 140, dysentery 636, paratyphoid fever 7, and typhoid fever 1.

INFECTIOUS DISEASES AND VITAL STATISTICS
Summary for British Isles for week ending October 13 (No. 41) and corresponding week 1955.

Figures of cases are for the countries shown and London administrative county. Figures of deaths and births are for the 160 great towns in England and Wales (London included), London administrative county, the 17 principal towns in Scotland, the 10 principal towns in Northern Ireland, and the 14 principal towns in Eire.

A blank space denotes disease not notifiable or no return available.

The table is based on information supplied by the Registrars-General of England and Wales, Scotland, N. Ireland, and Eire, the Ministry of Health and Local Government of N. Ireland, and the Department of Health of Eire.

CASES In Countries and London	1956					1955				
	Eng. & Wales	Land.	Scot.	N. Ire.	Eire	Eng. & Wales	Land.	Scot.	N. Ire.	Eire
Diphtheria ..	10	2	1	0		8	2	3	6	2
Dysentery ..	524	50	201	22	2	577	87	218	21	4
Encephalitis, acute	9	0		0		6	0		0	
Enteric fever: Typhoid ..	8	1	0	0	1	3	0	0	0	1
Paratyphoid ..	4	0	1 (B)	0		26	4	0	8	1 (B)
Food-poisoning ..	282	43	15	0		356	19		0	
Infective enteritis or diarrhoea under 2 years ..				15	25				23	50
Measles* ..	2,146	146	160	59	61	1,750	41	22	46	35
Meningococcal in- fection ..	24	0	13	1	1	16	0	17	2	1
Ophthalmia neona- torum ..	32	2	7	1		25	3	6	0	
Pneumonia† ..	261	10	117	2	1	310	17	144	2	
Poliomyelitis, acute: Paralytic ..	64	3		1	30	189	22	48	1	6
Non-paralytic ..	86	5				177	41			
Puerperal fever§ ..	229	30	13	1		278	38	14	0	
Scarlet fever ..	532	51	86	31	19	729	55	104	27	35
Tuberculosis: Respiratory ..	522	61	95	23	0	663	66	109	27	4
Non-respiratory ..	80	3	14	0		72	3	17		
Whooping-cough..	1,393	90	222	9	31	817	52	47	49	76

DEATHS In Great Towns	1956					1955				
	Eng. & Wales	Land.	Scot.	N. Ire.	Eire	Eng. & Wales	Land.	Scot.	N. Ire.	Eire
Diphtheria ..	0	0	0	0	2	0	0	0	0	0
Dysentery ..	0	0		0		0	0		0	
Encephalitis, acute		0			0		0			0
Enteric fever ..	0	0	0	0		0	0	0	0	
Infective enteritis or diarrhoea under 2 years ..	1	0	0	1	2	8	0	2	2	1
Influenza ..	4	0	0	0	0	7	2	0	0	0
Measles ..		0	0	0	0		0	0	0	0
Meningococcal in- fection ..		0	0				0	0		
Pneumonia ..	192	41	111	4	10	171	25	13	7	4
Poliomyelitis, acute	4	0			0	5	1			0
Scarlet fever ..		0	0	0	0		0	0	0	0
Tuberculosis: Respiratory ..	48	3	8	0	3	59	8	6	2	2
Non-respiratory ..		0	0	0	0		1	1	0	1
Whooping-cough..	0	0	0	0	0	0	0	0	0	0
Deaths 0-1 year ..	192	22	30	7	14	196	25	29	9	12
Deaths (excluding stillbirths) ..	4,873	707	546	97	149	4,787	713	546	105	137
LIVE BIRTHS ..	7,760	1116	947	195	372	7,607	1141	975	198	422
STILLBIRTHS ..	201	24	18			197	21	21		

* Measles not notifiable in Scotland, whence returns are approximate.
† Includes primary and influenzal pneumonia.
§ Includes puerperal pyrexia.

Medical News

Professor Charles Singer, 80.—Dr. Charles Singer professor emeritus of the history of medicine in the University of London, celebrated his 80th birthday on November 2. For many years he has held a pre-eminent place among medical historians. His contributions to the literature of his subject number more than 500, among them being his *Studies in the History and Method of Science* (1917 and 1921) and *A Short History of Medicine* (1928), and more recently he has been editing *A History of Technology*, the second volume of which is soon to appear. Though confined to his house at Par, Cornwall, by illness during part of the summer, Professor Singer is out and about again now and fully occupied with the preparation of the later volumes of the history of technology. Many who have been led by his writing and teaching to a permanent interest in medical history will be anxious to add their good wishes to those which Professor Singer will have received on his birthday.

Welsh National School of Medicine.—Mr. L. P. THOMAS has been appointed senior lecturer in surgery, and Dr. H. E. F. DAVIES lecturer in medicine. Mr. Thomas graduated in science and medicine at Cardiff. After resident appointments at the Cardiff Royal Infirmary he held a research fellowship in surgery at Harvard University and was assistant in surgery at the Peter Bent Brigham Hospital, Boston. Dr. Davies was formerly medical registrar at the miners' chest diseases treatment centre and pneumoconiosis research unit, Llandough Hospital.

British Medical Help for the Argentine.—Following an invitation from the Argentine Government and a request from the British Foreign Office, Mr. H. J. SEDDON, clinical director of the Royal National Orthopaedic Hospital, will visit Buenos Aires later this month. He will advise on the treatment and rehabilitation of those incapacitated in the serious outbreak of poliomyelitis which occurred in the Argentine earlier this year. Since June five British physiotherapists and one occupational therapist have been working in Buenos Aires under the rehabilitation commission.

Mercury in Teething Powders.—The council of the Pharmaceutical Society states that teething powders containing mercury or mercury compounds are still being sold. It therefore draws attention to the danger of such preparations, and strongly urges that they should not be supplied (*Pharmaceutical Journal*, October 27, p. 335).

Board of Control for Scotland.—Dr. PATRICIA O'KANE has been appointed a deputy commissioner of the General Board of Control for Scotland.

Postgraduate Travelling Fellowships.—Details of the travelling fellowships offered by the British Postgraduate Medical Federation to medical and dental practitioners in training as specialists at schools or institutes of London University are to be found at p. 48 of our advertisement columns this week. The fellowships are tenable for one year.

Cardiovascular Research in Australasia.—The Life Insurance Medical Research Fund of Australia and New Zealand announces grants in aid of research on diseases of the heart and blood vessels to the value of £25,000 for the current year. Grants have been awarded to the departments of pharmacology and physiology at Sydney University; the cardiac department of the Royal Melbourne Hospital; and the clinical research unit, Alfred Hospital, Melbourne; and the department of medicine, Otago University. A senior research fellowship has also been renewed. The Fund's address is 13, Bond Street, Sydney, New South Wales.

Bequests of Bodies and Eyes.—A pamphlet describing the procedure for those who wish to leave their bodies for dissection or their eyes for corneal grafting is available from the section or their eyes for corneal grafting is available from the B.M.A.'s public relations department. Copies are obtainable on request.

Royal College of Physicians of London.—At the quarterly comitia on October 25 Dr. D. H. BRINTON, Dr. R. M. B. MACKENNA, Dr. K. ROBSON, and Professor J. McMICAL were elected councillors. Dr. S. R. F. WHITTAKER was elected to the Standing Joint Committee of the three Royal Colleges, and Sir RUSSELL BRAIN, P.R.C.P., Sir HAROLD BOLDEO, Professor W. G. BARNARD, and Sir ALLEN DALEY were re-elected to it. The president and the president of the Royal Society (Sir CYRIL HINSHELWOOD) presented the Conway Evans Prize to Lord ADRIAN. A message of greeting was sent to the College of Physicians and Surgeons of South Africa on the occasion of its inauguration. Dr. CICYLY D. WILLIAMS has been appointed Milroy Lecturer for 1958.

U.N.I.C.E.F. Greetings Cards.—The United Nations Children's Fund offers sets of Christmas cards of new design this year, as well as the earlier set "Holiday Bound" designed by Edy Legrand. The three new sets on sale are "Festive Times in Many Lands" designed by Joseph Low (10 cards assorted, 2 each of 5 designs), "Indian Cards" by Jamini Roy (10 cards: 5 each of 2 designs), and "Bridge to Peace" by Saul Steinberg (10 cards, all the same design). The cards are supplied with or without a greeting in the five official languages of the United Nations, and each set of 10 cards with envelopes, costing 7s. 6d., may be obtained from U.N.I.C.E.F. Greeting Card Fund, 14/15, Stratford Place, London, W.1. The profit made from the sale of these cards enables U.N.I.C.E.F. to carry on its work of raising the standard of health and welfare of children throughout the world.

Grenfell Association's Christmas Cards.—The Grenfell Association's Christmas cards this year are to raise funds for the building of a nursing station in Northern Labrador, which is ice-bound for more than half the year. Here many of the Eskimos suffer from tuberculosis and extreme poverty. An illustrated leaflet of the Grenfell cards may be obtained, on receipt of 2d., from the Grenfell Association, 66, Victoria Street, London, S.W.1.

Association of Clinical Biochemists.—At the annual general meeting on October 6 the following officers were elected: President, Professor E. J. KING; chairman, Dr. R. GADDIE; treasurer, Dr. I. MACINTYRE; and secretary, Dr. A. L. TARNOKY, Royal Berkshire Hospital, Reading.

"Physics in Medicine and Biology."—The Hospital Physicists' Association has launched a journal called *Physics in Medicine and Biology*, under the editorship of Professor J. E. ROBERTS, of the Middlesex Hospital Medical School. It will record original research on the physical properties and constitution of living matter, and on the application of physical techniques to medical, biological, and physiological problems. From time to time review articles will be published. The journal includes a section devoted to abstracts of relevant papers appearing in the medical and scientific literature of the world. *Physics in Medicine and Biology* will appear quarterly, at an annual subscription of £3 10s. (\$10.50) and is obtainable from Taylor and Francis, Ltd., Red Lion Court, Fleet Street, London, E.C.4.

Prize for Registrars in Anaesthetics.—The Section of Anaesthetics of the Royal Society of Medicine offers a £30 prize for the best paper on a subject connected with anaesthesia by an N.H.S. registrar (or senior registrar) in anaesthetics. Details from the hon. secretary of the Section, 1, Wimpole Street, London, W.1.

Reading Pathological Society.—The annual oration of this, the oldest pathological society in Britain, was given at the Royal Berkshire Hospital in Reading on October 25 by Mr. A. DICKSON WRIGHT on diseases of blood vessels. Before the oration the outgoing president of the Society, Mr. S. F. LOGAN DAHNE, invested the new President, Dr. H. R. FOSBERY, with the insignia of his office. At the annual dinner on the same evening the health of the Society was proposed by Sir JOHN WOLFENDEN, vice-chancellor of the University of Reading.

COMING EVENTS

Institute of Dermatology.—Second semi-permanent exhibition, November 5–26. Dr. A. TICKNER: "Protein in Relation to Dermatology."

Training of Mental Defectives.—A meeting to discuss the training of mental defectives will be held at the Fountain Hospital, Tooting Grove, London, S.W.17, on November 7 at 5.30 p.m. All interested are invited.

Occupational Dermatitis.—The Joint Advisory Council for Occupational Health is holding a conference on the "Prevention of Occupational Dermatitis" at 3 p.m. on November 7 at the Royal Pavilion, Brighton. Admission by ticket (2s. 6d., including tea). Details from the hon. secretary of the council, Health Department, Royal York Buildings, Brighton, 1.

Fellowship for Freedom in Medicine.—Annual meeting will be held at Caxton Hall, Westminster, November 10 at 2 p.m. Details from the honorary secretary, 45, Nottingham Place, London, W.1.

London Medical Orchestra.—A concert will be given at B.M.A. House on November 24 at 8 p.m. in aid of the Cancer Relief Fund. Tickets (10s., 7s. 6d., and 5s.) from the hon. secretary, 6, Oxford Court, London, W.3, or at the door.

Research Defence Society.—Professor A. A. MILES will deliver the Stephen Paget memorial lecture on November 27 at 5.30 p.m. at the physiology lecture theatre, University College, London. His subject will be "Resistance to Infection: The Experimental Approach." The annual meeting of the society will be held after the lecture.

Bethlem Royal Hospital and the Maudsley Hospital.—The biennial ball for past and present medical staff will be held on November 30 at the Connaught Rooms, Great Queen Street, London, W.C.2. Tickets from Dr. BRIAN ACKNER, the Maudsley Hospital, London, S.E.5.

Radioisotope Techniques.—Four-week courses on radioisotopes and their uses will begin on January 14, 1957, at the Sir John Cass College, London, E.C.3. Details will be found in our advertisement columns (p. 3 of cover).

SOCIETIES AND LECTURES

A fee is charged or a ticket is required for attending lectures marked ●. Application should be made first to the institution concerned.

Monday, November 5

DENTAL AND MEDICAL SOCIETY FOR THE STUDY OF HYPNOSIS.—At Medical Society of London, 8 p.m., Mr. L. Becker: Hypnosis and the Psychosomatic Approach in Dentistry.
MARLBOROUGH DAY HOSPITAL.—8.15 p.m., Dr. O. W. S. Fitz-Gerald: A Few New Ideas in Mental Hospital Administration.
POSTGRADUATE MEDICAL SCHOOL OF LONDON.—4 p.m., Dr. H. S. Banks: Recent Advances in Infectious Fevers.

Tuesday, November 6

BRITISH POSTGRADUATE MEDICAL FEDERATION.—At London School of Hygiene and Tropical Medicine, 5.30 p.m., Mr. W. J. Dempster: Homotransplantation of Organs.
INSTITUTE OF DERMATOLOGY.—5.30 p.m., Dr. J. A. Dudgeon: Role of Viruses in Dermatology.
ROYAL ARMY MEDICAL COLLEGE.—5 p.m., Dr. R. F. Tredgold: Preventive Psychiatry.
ROYAL COLLEGE OF SURGEONS OF ENGLAND.—3.45 p.m., Arnott Demonstration by Professor R. J. Last: Form and Function in Muscles.
ST. MARY'S HOSPITAL MEDICAL SCHOOL.—At Wright-Fleming Institute Theatre, 5 p.m., Mr. D. H. MacLeod: Differential Diagnosis in Gynaecology.
WEST END HOSPITAL FOR NEUROLOGY AND NEUROSURGERY.—5.30 p.m., Dr. C. C. Edwards: neurological demonstration.

Wednesday, November 7

INSTITUTE OF DERMATOLOGY.—5.30 p.m., Dr. J. A. Dudgeon: Role of Viruses in Dermatology.
INSTITUTE OF DISEASES OF THE CHEST.—5 p.m., Dr. I. S. Longmuir: Application of Polarographic Analysis to the Study of Cellular Respiration.
INSTITUTE OF UROLOGY.—4.30 for 5 p.m., Dr. W. N. Mascall: Gonococcal Urethritis.
MANCHESTER MEDICAL SOCIETY: SECTION OF PATHOLOGY.—At Large Anatomy Medical School, Manchester University, 4.30 p.m., Dr. E. L. Peel: Plasma Cells and Plasma Proteins.
MIDLAND MEDICAL SOCIETY.—At General Hospital, Birmingham, 8.15 p.m., clinical meeting.
POSTGRADUATE MEDICAL SCHOOL OF LONDON.—2 p.m., Professor G. M. Bull: Quantitative Assessment of Renal Function.
ROYAL COLLEGE OF SURGEONS OF EDINBURGH.—3.30 p.m., Professor W. E. Adams: Some Hazards and Corresponding Safety Measures in Thoracic Surgery for Elderly People.
ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE.—3.30 p.m., Dr. Frank Wokes, Ph.D.: Human Vitamin Needs and Sources (illustrated).

Thursday, November 8

ALFRED APTER MEDICAL SOCIETY.—At 11, Chandos Street, W., 8 p.m., Mr. P. Rom: Vaihinger's Fictionalism and Individual Psychology.
BRITISH POSTGRADUATE MEDICAL FEDERATION.—At London School of Hygiene and Tropical Medicine, 5.30 p.m., Professor C. G. Rob: Arterial Substitutes.
HONYMAN GILLESPIE LECTURES.—At University New Buildings, Teviot Place, Edinburgh, 5 p.m., Professor G. A. Smart: The Nephrotic Syndrome.
INSTITUTE OF DERMATOLOGY.—5.30 p.m., Dr. R. W. Riddell: Role of Fungi in Skin Disease.
LIVERPOOL MEDICAL INSTITUTION.—At Sefton General Hospital, 2.30 p.m., afternoon clinical demonstration.
MANCHESTER MEDICAL SOCIETY.—At Large Anatomy Theatre, Medical School, Manchester University, 4.30 p.m., University Lecture on the History of Medicine by Dr. A. Morgan Jones: Dogma and Experiment in Harvey's Time.
NUFFIELD ORTHOPAEDIC CENTRE.—At Wingfield-Morris Orthopaedic Hospital, 8.30 p.m., Mr. J. Charnley: Arthrodesis of the Hip in Three Weeks.
ROYAL COLLEGE OF PHYSICIANS OF LONDON.—5 p.m., Bradshaw Lecture by Dr. W. Phillips: Disintegrative Action of the Nervous System.
ROYAL COLLEGE OF SURGEONS OF ENGLAND.—5 p.m., Robert Jones Lecture by Mr. S. A. S. Malkin: Conquest of Disability.
ROYAL EYE HOSPITAL.—5.15 p.m., Dr. T. H. Whittington: Aspects of Refraction Work—(5) Myopia, and Myopic Patients.
ROYAL MEDICAL SOCIETY, EDINBURGH.—At Royal College of Surgeons of Edinburgh, 7.15 for 7.30 p.m., presidents' annual dinner.
ST. ANDREWS UNIVERSITY.—At Physiology Department, Queen's College, Dundee, 5 p.m., Dr. Joan Taylor: Infective Bacterial Diarrhoea of Infants.
ST. GEORGE'S HOSPITAL MEDICAL SCHOOL.—5 p.m., Sir Paul Mallinson: psychiatry demonstration.
SOCIETY OF APOTHECARIES OF LONDON.—5 p.m., Dr. G. S. Wilson: B.C.G. Vaccination; 6.15 p.m., Dr. W. R. S. Doll: Present Knowledge of Causation of Cancer of the Lung.

Friday, November 9

●INSTITUTE OF DERMATOLOGY.—5.30 p.m., Dr. G. B. Mitchell-Heags: clinical demonstration.
INSTITUTE OF DISEASES OF THE CHEST.—5 p.m., Dr. J. N. Pattinson: radiological demonstration.
INSTITUTE OF LARYNGOLOGY AND OTOLGY.—3.30 p.m., clinical meeting for general practitioners. Dr. C. H. Edwards: Neuralgias and Headaches.
POSTGRADUATE MEDICAL SCHOOL OF LONDON.—10 a.m., Mr. I. E. A. O'Connell: Surgery of Intractable Pain; 9 a.m., Professor G. M. Bull: How to Pass Examinations Without Actually Cheating.
ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH.—5 p.m., John Matheson Shaw Lecture by Dr. W. Ferguson Anderson: Care of the Elderly Sick in General Practice.
●ROYAL INSTITUTION.—9 p.m., Sir Charles Dodds, F.R.S.: Chemical Substances Influencing Mental and Physical Development.
ROYAL MEDICAL SOCIETY, EDINBURGH.—8 p.m., dissertation by Mr. T. R. McCall: medical education.
SOCIETY OF CHEMICAL INDUSTRY: FINE CHEMICALS GROUP.—At Chemistry Lecture Theatre, King's College, W.C., 7 p.m., Dr. F. Sanger: Chemistry of Insulin.
UNIVERSITY COLLEGE HOSPITAL MEDICAL SCHOOL.—At No. 1 Lecture Theatre, 5.30 p.m., contraceptive technique. Lecture and film demonstration for final-year students from London Medical Schools.
WEST KENT MEDICO-CHIRURGICAL SOCIETY.—At Miller General Hospital, Greenwich, 8.30 p.m., Dr. B. A. Young: The New Diabetic Treatments.

Saturday, November 10

●SOCIALIST MEDICAL ASSOCIATION.—At Conway Hall, Red Lion Square, W.C., 2 p.m. to 5 p.m., London Delegate Conference on Air Pollution. Smog—or Clean Air? Speakers include Dr. H. Joules, Dr. H. Price, and Dr. B. Stross.

BIRTHS, MARRIAGES, AND DEATHS

BIRTHS

Herriott.—On October 15, 1956, to Mary, wife of Dr. T. Dunn Herriott, of 2, Maidstone Road, London, N., a daughter, Janice Claire.
Menzies.—On October 8, 1956, at Vancouver, B.C., Canada, to Dr. Nanette Menzies (formerly Braster), wife of Dr. Albert Menzies, a sister for Heather and Anthea—Michele Margaret.
Oldham.—On October 21, 1956, at the Carmarthen Maternity Unit, to Valerie (formerly Williams), wife of Dr. William Oldham, a sister for Catherine and Robert.

DEATHS

Baker.—On October 13, 1956, at the King Edward VII Hospital for Officers, Henry Searle Baker, M.R.C.S., L.R.C.P., of 75, Lyttelton Road, London, N.
Cairns.—On October 15, 1956, at Albury House, Berwick-on-Tweed, Alexander Cairns, M.B., Ch.B.
Christie.—On October 10, 1956, at 15, Hill View Road, Cheltenham, Glos, Anaple Frances Mary Christie, M.B., B.S.
Drury.—On October 12, 1956, Godfrey Dru Drury, M.R.C.S., L.R.C.P., of Corfe Castle, Dorset, aged 76.
Langmead.—On October 8, 1956, at the Lido Wing, St. Mary's Hospital, London, W., Olive Gertrude Mary Langmead, M.B., B.S.
Monroe.—On October 18, 1956, at The Elms, Davyhulme Road, Davyhulme, Lancs, James Monroe, M.B., Ch.B.
Pollard.—On October 17, 1956, at his home, Milner Down, Selwyn Road, Eastbourne, Sussex, Harold James Alexander Pollard, M.R.C.S., L.R.C.P.
Rushbrook.—On October 19, 1956, at Redruth, Cornwall, Henry Martin Rushbrook, M.B., B.S.
Thoseby.—On October 18, 1956, at Kirkley, Crantock, Newquay, Cornwall, John Norman Lonsdale Thoseby, M.B., Ch.B.
White.—On September 26, 1956, at Queen Alexandra's Military Hospital, Millbank, London, S.W., Michael White, M.C., M.B., B.Ch., Lieutenant-Colonel, R.A.M.C., retired, of 17, Clarendon Road, Jersey, Channel Islands.
Whitehead.—On October 3, 1956, in hospital, Eleanor Murrian Whitehead, M.B., Ch.B., of "Moorrate," Oxford Road, Gomersal, Leeds.
Wooler.—On October 3, 1956, in hospital, Ernest William Nowell Wooler, M.B., Ch.B., of Linden Lea, Plane Tree Road, Hale, Cheshire, formerly of Cleckheaton, Yorks.

Any Questions?

We publish below a selection of those questions and answers which seem of general interest. It is regretted that it is not possible to supply answers to all questions submitted.

Belated Completion of Polio Vaccination

Q.—My daughter, aged 9, was one of the last children chosen for poliomyelitis vaccination last May. After she had received her first injection, the supply of vaccine ran out and the appointment for her second injection was cancelled. We were told that such children would receive priority when vaccination begins again. Is the long interval between the injections—probably six months—likely to affect the immunity conferred or predispose to reactions?

A.—An interval of approximately six months is not a contraindication to further immunization: in fact, the antibody response to the second injection at six months may be even better than with an interval of three to six weeks. Reactions are unlikely.

Malignant Disease in the Foetus

Q.—Does malignant disease ever occur in the human foetus? If so, what varieties have been reported?

A.—Malignant disease does occur in the human foetus, but fortunately only rarely in the ordinary sense of an evident tumour. A number of neoplasms are, however, foetal in origin and therefore present from an early stage of development, although they may not become obvious until much later in life. The teratomata are foetal tumours which are of embryonic origin and are occasionally malignant. Retinoblastoma occurs in the foetus and seems to be the only foetal tumour in which heredity plays a large part in causation. Environmental influences, such as foetal irradiation with x rays and radium, are occasionally responsible for congenital sarcoma, and are suspected to be a causative factor in leukaemia appearing in later infancy. Congenital leukaemia has also been reported. Direct transmission of malignant disease from mother to foetus is very rare, but has been proved in malignant melanoma, lymphosarcoma, and perhaps in a few cases of carcinoma. Chorion epithelioma may also be considered a prenatal foetal tumour.

The largest group of foetal tumours are sarcomata of all types. Neuroblastomata come next, and Wilms's tumours of the kidney third.

Alkalis and the Kidneys

Q.—Is there any danger of prolonged and quite heavy dosage with magnesium hydroxide for the relief of constipation damaging the kidneys? A patient has been taking 20–50 gr. (1.3–3.3 g.) of magnesium hydroxide nightly for the last ten years.

A.—Although it has been shown that very high doses of soluble alkali can be taken without harm, there is equally no doubt that renal calcification with progressive damage to function has often occurred in patients who have taken large amounts of milk and alkalis over a number of years. This "milk-alkali syndrome" is apparently commoner in America, but definite cases have been found in this country; the Americans are more prone to drinking large amounts of milk than adult Britons. These cases have mainly involved the consumers of soluble alkalis (MacLean's powder and the like). One would expect the danger of renal damage to be less with magnesium hydroxide, which is not indeed insoluble, but is much more poorly absorbed than sodium bicarbonate. I do not think anyone would be prepared to rule out

"danger," but my view would be that there was very little danger of renal damage. If renal damage should occur from this cause, it would be expected to be associated with calcification of the renal substance, possibly detectable by plain x-ray films; but not with calculus formation. If tests of renal excretory function should show impairment, it would be worth stopping the alkali intake, and keeping the bowels regular by other means. It would be hard to prove the complicity in causing renal damage of an amount of magnesium hydroxide which must be consumed by many patients with peptic ulcer.

Alternating Nasal Obstruction

Q.—Why is it that during an attack of rhinitis first one nostril and then the other commonly becomes blocked?

A.—Obstruction of the nasal airway which alternates from side to side is a common symptom in rhinitis, including that due to a non-specific hypersensitivity—for example, vasomotor rhinitis. The obstruction results from engorgement of the inferior turbinates.

Position is one of the factors which influences the side of the obstruction. When recumbent on one side it is often found that the lower nasal airway becomes occluded, but on turning over to the opposite side the previously obstructed nasal airway becomes patent and the one previously patent becomes occluded. The swelling of the turbinate is dependent on engorgement of the venous lakes in the erectile tissue of the inferior turbinate. This vascular tissue appears to be reflexly controlled, but the exact nature of its reflex response to changes in position has not been clearly demonstrated.

Depilation

Q.—What treatment is advised for removing a few hairs on a young woman's chin? She has been unsuccessful with a home electrolysis outfit, which in her hands causes only "pain and some pit marks," but no loosening of the hairs. Are abrasives or chemical depilatories satisfactory, and is endocrine therapy advised?

A.—Presumably the failure of electrolysis is due to the lack of skill of the operator. In carrying out electrolysis it is essential for the needle to be carefully and accurately placed into the hair follicle and for the operator to avoid undue force which would lead to the needle entering the tissues; otherwise the treatment will cause slight scarring without affecting the hair. Properly carried out, electrolysis is probably the best treatment if the hairs are sufficiently well developed for the follicle to be seen and exactly entered by the needle.

Abrasive material no doubt refers to sandpaper or pumice stone. In the writer's opinion this kind of treatment is more suited to the limbs than to the face, but an ordinary pumice stone may be found suitable for the chin. Chemical depilatories are sold in most chemists' shops. It is impossible to avoid some tendency to irritation to the skin, but in practice it seems very uncommon for any serious trouble to arise: it is very unusual in dermatological clinics to see ill effects arising from the use of chemical depilatories. No particular brand is recommended. They are simply applied to the skin and washed off after a suitable interval according to the makers' instructions.

It is rational to suppose that hirsuties in women is the result of endocrine upset. If this is so, then treatment to rectify such an abnormality is the rational treatment. In practice, however, it most often happens that women with hirsuties show no endocrine abnormality even after the most searching clinical and biochemical examination. For this reason a rational endocrine treatment cannot be chosen, and in fact treatment of this nature is seldom successful. The writer believes that endocrine investigation should be made when possible and that if abnormalities are found they should be corrected; otherwise endocrine treatment is not indicated.

Agonal Twitching

Q.—What is the explanation of the momentary generalized spasms sometimes observed just before death when respiration and the circulation have ceased?

A.—Asphyxial convulsions are well-studied phenomena in experimental animals. It is also well known that death of body tissues is not simultaneous. When the circulation has stopped, some central nervous system activity may continue for a few more minutes, and this commonly gives rise to twitching or spasms as described.

Protective Value of Washing the Hands

Q.—How effective is ordinary "social" washing in removing bacteria from the hands and reducing the risk of transmitting infections by this route?

A.—It is easy to study the effect of washing on the "transient" flora of the hands by heavily contaminating them with a readily recognizable organism such as *Chromobacterium prodigiosum* and taking cultures from them before and after washing. It is advisable to include such tests in practical instruction in bacteriology and hygiene for nurses, and in my experience scrubbing for about one minute always removes the organism completely: simple washing with soap and water reduces the numbers recovered from thousands in the first culture to a few scattered colonies in the second. Organisms which have only just been picked up by the skin are very easily removed mechanically, and soap assists the process both by its cleansing action and by its capacity actually to kill bacteria. Simple social washing, therefore, has a substantial value, reducing the risk of transmitting infection by the hands by at least 99%. Thorough scrubbing—and, it may be added, other precautions—should be undertaken by anyone who knows or suspects that his hands are contaminated by specific pathogenic organisms, whether after defaecation or in other ways.

Schools for Mentally Backward Children

Q.—Where may information about schools for mentally backward children be obtained?

A.—Schools for educationally subnormal (E.S.N.) children are run by the local education authorities. Information about these may be obtained from the education officer of the appropriate county council. It is usually best, however, for the doctor concerned with a case to consult with the school medical officer or county medical officer. Most of the accommodation available is for the day pupils, but there are some residential schools. There is a long waiting-list in many cases for such schools, particularly for the residential ones. A great many children are waiting either in ordinary schools or at home for admission to E.S.N. schools.

In addition to the schools for children of E.S.N. level there are also day occupation centres which are run by the medical officer of health for children of lower mental levels, that is to say, for imbeciles who are deemed ineducable. Information about these may be obtained from the county health department. In addition to this the mental deficiency hospitals, about which information can be obtained from the respective regional hospital boards, make provision for occupation centres for children residing in these hospitals. The regional psychiatrist may be consulted about such cases or a direct approach may be made to the mental deficiency hospital in the area.

Some ordinary small private schools are willing to keep backward children, though this will vary with the school and with the particular teacher concerned. It will also depend on the degree of defect. Very few private schools are willing to retain imbeciles, although they may be able to cope with children of E.S.N. level. Some provision for short-stay accommodation for children of imbecile level is made by the National Society for Mentally Handicapped

Children. Information about this and some other types of provision for mentally handicapped children may be obtained either from that society at 162a, Strand, London, W.C.2, or from the National Association for Mental Health, 39, Queen Anne Street, London, W.1.

NOTES AND COMMENTS

Pica in a Child.—Dr. J. H. C. WALKER (Maidstone) writes: Your answer ("Any Questions?" October 13, p. 893) says "perverted appetites very commonly symbolize a need for love." Time marches on! When I was a small boy I used to eat garden soil. My mother took me to a very sensible old G.P. who suggested that I had a need for salt. This was added to my diet and I then stopped eating soil.

Dr. IAN G. WICKES (Ballards Croft, Stock, Essex) writes: In the query about pica, I strongly suspect that the practitioner and respondent have overlooked the possibility that this is an inherited familial disorder. I am beginning to collect family trees in which several members show pica in infancy and childhood, and I would be most grateful for information about any such families.

Nocturnal Angina.—Dr. A. PINEY (London, W.1) writes: In reply to the question, "What are the possible causes of nocturnal precordial angina?" ("Any Questions?" October 13, p. 894) nothing is said about prevention. There appears to be no doubt that hyperlipaemia may precipitate an attack of precordial pain in persons with coronary atheroma; and Barritt,¹ among others, has shown that post-prandial lipaemia is greater and more prolonged in males with coronary infarction than in normal males of the same age group. Further, it is well known that a heavy meal before retiring is likely to precipitate an attack in predisposed people. Emphasis on the prophylactic value of taking only a very light meal in the evening and, in many cases, the administration of substances tending to diminish post-prandial hyperlipaemia would be of great practical use.

REFERENCE

¹ Barritt, D. W., *British Medical Journal*, 1956, 2, 640.

Severe Reaction to Penicillin.—Dr. E. M. COCHRANE (Omagh) writes: Your correspondent described dry gangrene of the feet in an infant of 10 months following the injection of 900,000 units of procaine penicillin for bronchopneumonia ("Any Questions?" September 22, p. 722). This dose of penicillin appears to be rather large and might have aggravated a reaction in so small a child. Gaisford and Lightwood recommend 150,000–300,000 units of penicillin for this complaint combined with a sulphonamide if necessary.

OUR EXPERT replies: While I agree with Dr. Cochrane that the dose in this case was large for a child of 10 months, I do not think the size of the dose conditions in any way the intensity of these sensitivity responses. Death has occurred within a few minutes of ordinary doses of intramuscular procaine penicillin when the amount of penicillin circulating in the blood could have been only minimal.

Preparation of Benzocaine and Urethane Solution.—In a reply to a question ("Any Questions?" October 20, p. 951) it was stated that this preparation did not seem to be on the market in Great Britain. We have since been informed that this is incorrect. At least two pharmaceutical houses provide it.

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BRITISH MEDICAL JOURNAL

LONDON SATURDAY NOVEMBER 10 1956

LUNG CANCER AND OTHER CAUSES OF DEATH IN RELATION TO SMOKING

A SECOND REPORT ON THE MORTALITY OF BRITISH DOCTORS

BY

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AND

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On October 31, 1951, we sent a simple questionnaire to all members of the medical profession in the United Kingdom. In addition to giving their name, address, and age, they were asked to classify themselves into one of three groups—namely, (a) whether they were, at that time, smokers of tobacco; (b) whether they had smoked but had given up; or (c) whether they had never smoked regularly (which we defined as having never smoked as much as one cigarette a day, or its equivalent in pipe tobacco or cigars, for as long as one year). All smokers and ex-smokers were asked additional questions. The smokers were asked the ages at which they had started smoking and the amount of tobacco that they were smoking, and the method of smoking it, at the time of replying to the questionnaire. The ex-smokers were asked similar questions but relating to the time at which they had last given up smoking.

On the basis of their replies to the questionnaire, we classified the doctors in a few broad groups according to their sex and age, the amount of tobacco they smoked, to their method of smoking, and whether smoking had been continued or abandoned. Subsequently we have recorded the deaths occurring in each of these groups. To ensure a high proportion of replies we intentionally made the questionnaire extremely short and simple. In particular, we did not ask for a life-history of smoking habits, although in studying the incidence of lung cancer, with a long induction period, we realized that the habits of early adult life might be more relevant than the most recent habits. In addition, we have made no further inquiry into any change of habits that may have taken place since October, 1951. In short, we have related the deaths of doctors that have occurred since October, 1951, to the non-smoking, present smoking, and ex-smoking groups as constituted at that date.

It follows that, while we can make an accurate comparison between life-long non-smokers and all smokers past or present, any gradient of mortality that we may observe in relation to the amount of smoking will be an understatement of the true relationship. We shall, for instance, have included in the group of "light" smokers persons who had previously smoked "heavily" but at November 1, 1951, had reduced their consumption. Similarly, a "heavy" smoker at November 1, 1951, may

previously have been a light smoker or may since then have given up smoking altogether; we shall have continued to count him, or her, as a heavy smoker. If there is a differential death rate with smoking, we must by such errors tend to inflate the mortality among the light smokers and to reduce the mortality among the heavy smokers. In other words, the gradients we present in this paper may be understatements but (apart from sampling errors due to the play of chance) cannot be overstatements.

In 1954 we published a preliminary report on the results of this inquiry (Doll and Hill, 1954a). The number of deaths from lung cancer was then small (36) and standing alone they would not have justified a firm conclusion. In showing a steadily rising mortality from lung cancer as the amount of smoking increased, they were, however, in close conformity with the figures we had previously found in our extensive retrospective inquiries into the smoking histories of patients with cancer of the lung and other diseases. With the passage of another two years we are now able to present from this prospective inquiry a considerably increased body of data, and, in consequence, a more exhaustive analysis. The four main questions to which we have sought answers are: (1) What are the relative risks of lung cancer associated with the smoking of different amounts of tobacco by different methods? (2) Is there a reduction in the risk if smoking is given up? (3) What is the most likely explanation of the observed association? (4) Is there a relationship between smoking and any other cause of death?

The Exposed to Risk

The questionnaire was sent out to 59,600 men and women on the *Medical Register*. Of the 41,024 replies received 40,701 were sufficiently complete to be utilized; 34,494 of these were received from men and 6,207 from women.* For the purposes of the present report the doctors concerned have been followed until March 31, 1956—that is, for four years and five months. No new additions have been made to the population and the total

*These numbers are slightly different from those given in our preliminary report, as a re-examination of the forms enabled an additional 137 to be utilized, while in a few cases it was found that the age group had been allocated incorrectly.

number of survivors exposed to risk at the beginning of each new period of twelve months has therefore steadily diminished. At the same time each of the survivors has grown older and mortality has, of course, fallen more heavily on the older age groups; as a result, the age distribution of the population has altered. These changes are shown for men in Table I as well as the total numbers of years of exposure in each age group during

TABLE I.—Number of Men Living in Each Age Group at the Beginning of Each Year of the Study and the Total Number of Years of Exposure

Age in Years	No. of Men Living at:						Total No. of Years of Exposure
	1/11/51	1/11/52	1/11/53	1/11/54	1/11/55	1/4/56	
Under 35	10,140	9,145	8,232	7,389	6,281	5,779	35,489
35-44	8,886	9,149	9,287	9,414	9,710	9,796	41,211
45-54	7,117	7,257	7,381	7,351	7,215	7,191	32,156
55-64	4,094	4,212	4,375	4,601	5,057	5,243	19,909
65-74	2,694	2,754	2,823	2,873	2,902	2,928	12,462
75-84	1,382	1,433	1,457	1,485	1,483	1,513	6,431
85 and over	181	200	223	256	278	296	1,028
All ages	34,494	34,150	33,778	33,369	32,926	32,746	148,686

the course of the study. The total number of years for all age groups is 148,686 for men and 27,187 for women. (These figures have been obtained by taking the average of the numbers of survivors at the beginning and at the end of each year and summing for the four years and five months of the study. For example, the number of male doctors aged 45-54 was 7,117 on November 1, 1951, and 7,257 on November 1, 1952; on average, therefore, there were 7,187 male doctors alive in that age group throughout that year. Similarly there were 7,319 male doctors alive in the same age group throughout the second year, 7,366 throughout the third year, 7,283 throughout the fourth year, and 7,203 throughout the first five months of the fifth year. The total number of years lived by male doctors in that age group is therefore calculated to be $7,187 + 7,319 + 7,366 + 7,283 + 5/12$ of 7,203, or 32,156 years.)

Figures for the number of years of exposure of men and women with different smoking habits have been obtained in the same way. Table II shows the figures

TABLE II.—Total Number of Man-Years of Exposure by Non-smokers and Smokers of Different Amounts of Tobacco; Men Only, Divided by Age

Age in Years	Non-Smokers*	All Smokers	Men Smoking a Daily Average of:		
			1-14 g.†	15-24 g.	25 g. or More
Under 35	10,143	25,346	12,548	10,002	2,796
35-44	7,130	34,081	13,625	13,380	7,076
45-54	4,136	28,020	9,477	10,371	8,172
55-64	1,907	18,002	6,333	6,514	5,155
65-74	1,078	11,384	5,201	3,893	2,290
75-84	720	5,711	3,334	1,701	676
85 and over	136	892	616	230	46
All ages	25,250	123,436	51,134	46,091	26,211

* A non-smoker is defined as a person who has never consistently smoked as much as 1 g. of tobacco a day for as long as one year.
† 1 cigarette is equivalent to 1 g. of tobacco.

for men, divided according to the daily amount of tobacco stated to have been smoked at the time of the inquiry in 1951, or immediately before smoking had last been given up. It will be seen that the distribution of smoking habits varies considerably from one age group to another, and it will therefore be necessary to use death rates at specific ages, or a rate standardized for age, in comparing the mortality experiences of men in the different smoking categories.

The Deaths

Through the courtesy of the Registrars-General in the United Kingdom a form showing particulars of the cause of death has been provided, since the questionnaire was sent out, for every death identified as referring to a medically qualified person. Lists of the deaths of doctors notified to them since October 31, 1951, have also been obtained from the General Medical Council and the British Medical Association. These extra sources of information have proved necessary since it is not always possible for the Registrars-General to determine at registration of death that the deceased person was, in fact, a doctor. For example, occasionally the occupation of a doctor who had served in the Army, or who had held a university appointment, may be described at the time of death merely as "Colonel (retired)" or "University teacher." Similarly with a married woman who has ceased to practise medicine there may well be no reference at registration of death to the fact that she possessed a medical qualification. It must also be noted that the deaths of civilians occurring abroad do not form part of the records of the Registrars-General. It has therefore been necessary to seek information about them, and their cause of death, from other sources—from the records of the Service departments, from the Registrars' offices of Commonwealth countries, and, in a few instances, from relatives. For all deaths occurring in the United Kingdom, irrespective of the source of our information, we have ascertained the certified cause of death.

In the 53 months covered by the present study (November, 1951, to March, 1956) 1,854 deaths have been reported. Table III, in which they are set out by age and sex, shows that

TABLE III.—Number of Deaths of Doctors Reported as Occurring Between November 1, 1951, and March 31, 1956, Inclusive

Age in Years	Males	Females
Under 35	34	3
35-44	68	10
45-54	189	8
55-64	311	26
65-74	417	24
75-84	543	23
85 and over	186	12
All ages	1,748	106

their numbers are small for women and for men under 35 years of age. Our principal analyses in this paper have therefore been confined to the mortality experience of men aged 35 years and above, involving 1,714 deaths from all causes.

We first classified these 1,714 deaths according to the underlying cause as certified. The eight cases in which we obtained the cause of death only from the other sources mentioned above we classified according to the reported cause; in a further 12 cases we have not yet obtained any statement of cause. Of the total 1,714 deaths among men aged 35 years or more, 82 were certified as due to lung cancer, while in three others lung cancer was mentioned as having contributed to death without being the primary cause. No deaths from lung cancer were reported in men under the age of 35 years and only three such deaths at all ages have been reported among women.

For every one of these 88 deaths we sought confirmation of the diagnosis by writing to the doctor who certified the death and also, when necessary, to the hospital or consultant to whom the patient had been referred. Additional information on the nature of the evidence was thus obtained in every case and is summarized in Table IV. In two cases, one male and one female, we have not accepted the cause of death as established. With the man, histological examination of the operation specimen had failed to confirm the presence of a carcinoma. With the woman, the histological report was "sarcoma of lung." In 7 of the remaining 86 cases the site of the primary growth had been diagnosed by

TABLE IV.—Criteria on Which Diagnosis of Primary Lung Cancer was Based

Diagnostic Criteria	Male Cases		Female Cases
	No.	% of Total	
I. Necropsy evidence, with or without histological examination; or histological evidence plus evidence of the site of the primary tumour from operation, bronchoscopy, or radiological examination	39*	46	1†
II. Evidence of the site of the primary tumour from operation and/or bronchoscopy and/or radiological examination, but without histological evidence	38	45	1
III. Evidence from clinical examination only	7	8	0
All cases, diagnosis accepted	84	99	2
Diagnosis not regarded as established	1	—	1

* 16 squamous-cell carcinoma, 16 oat-cell or anaplastic carcinoma, 3 adenocarcinoma, 3 cell-type undetermined, and 1 not examined histologically.
† Squamous-cell carcinoma.

clinical examination only. In 79 the site of the primary growth had been confirmed at necropsy or by operation, bronchoscopy, or radiological examination. Clearly the diagnosis may have been incorrect in some of the cases, but the evidence suggests that it is not likely to have been wrong in more than a small proportion. In making comparisons between the mortality of different groups within the investigation, we have therefore used the 84 male cases in which the additional information did not throw doubt upon the diagnosis of lung cancer.

RESULTS

The Amount Smoked

The complete data for the present 53 months of the follow-up have been used, and the death rates per annum from all causes of death and from five groups of diseases have been calculated for four categories of men—namely, non-smokers and smokers of small, moderate, or large amounts of tobacco. These rates have been standardized for age (by the direct method), using the total male population of the United Kingdom aged 35 years or above on December 31, 1951, as the standard population.† The results are shown in Table V and in the Figure.

If all causes of death are taken first, it will be seen that the mortality is highest among men who smoked 25 g. or more of tobacco a day (18.84 per 1,000), and that the rates for light smokers (14.92 per 1,000) and moderate smokers (14.49 per 1,000) are 10 to 13% above the rate for non-smokers (13.25 per 1,000). Of the five groups of diseases separately considered, lung cancer is the only one to show a marked and steady increase with the amount smoked. Its death rate rises from 0.07 per 1,000 among non-smokers to 1.66 per 1,000 among heavy smokers—that is, an increase of approximately twentyfold. Other respiratory diseases and coronary thrombosis also show some increase with rising tobacco consumption, particularly the former. But in both instances the difference between the extreme rates is, compared with lung cancer, relatively small. For other respiratory diseases the rate for heavy smokers (1.41) is 74% above the rate of non-smokers (0.81), while for coronary thrombosis the corresponding figure is 42% (5.99 to 4.22). The equality of non-smokers and smokers in cancer of other sites is striking and no trend with the amount of smoking is apparent. (These death rates from diseases other than cancer of the lung are considered in more detail in a later section.)

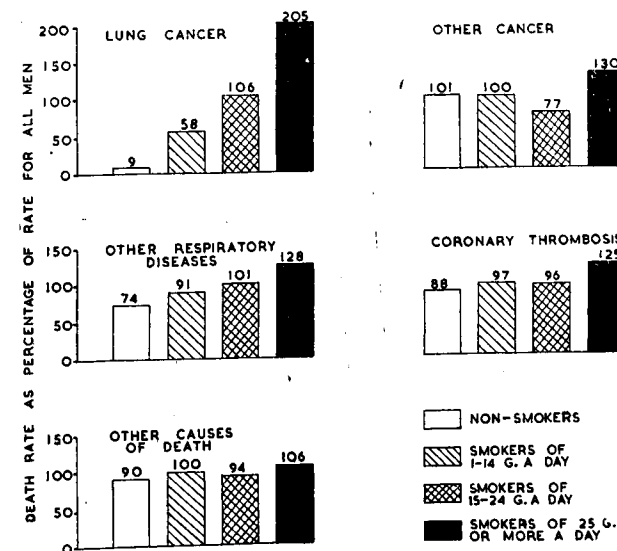
† Thus death rates for each cause of death were calculated separately for each age group for each of the smoking categories shown in Table II. These age rates for a smoking category were then applied to the corresponding U.K. populations in 1951 to obtain the death rate at all ages that would have prevailed in the U.K. population if it had experienced the rates at specific ages of the particular smoking group.

TABLE V.—Standardized Death Rates Per Year Per 1,000 Men Aged 35 Years or More, in Relation to the Most Recent Amount Smoked*

Cause of Death	No. of Deaths	Death Rate Among:					
		All Men	Non-smokers	All Smokers	Men Smoking a Daily Average of		
					1-14 g.	15-24 g.	25 g. or More
Lung cancer ..	84†	0.81	0.07	0.90	0.47	0.86	1.66
Other cancer ..	220	2.02	2.04	2.02	2.01	1.56	2.63
Other respiratory diseases ..	126	1.10	0.81	1.13	1.00	1.11	1.41
Coronary thrombosis ..	508	4.78	4.22	4.87	4.64	4.60	5.99
Other causes ..	779	6.79	6.11	6.89	6.82	6.38	7.10
All causes ..	1,714	15.48	13.25	15.78	14.92	14.49	18.84

* That is, at November 1, 1951, for those smoking at that time and at the date of giving up for those who had given up at November 1, 1951.

† The three cases in which lung cancer was recorded as a contributory but not a direct cause of death are included under both lung cancer and the cause to which death was assigned by the Registrar-General.



Relationship between death rate, expressed as a percentage of the rate for all men, and the amount smoked, for five disease groups.

The statistical significance of the differences in the death rates is best assessed from the actual numbers of deaths recorded—that is, by comparing them with the numbers which would have been expected to occur in each smoking category if smoking were unrelated to the cause of death under inquiry. For example, 31 men aged 65-74 died with lung cancer. The man-years of exposure in this age group of men who had always been non-smokers (at the time the questionnaire was completed) formed 8.65% of the total exposure of all men (Table II). If the mortality from lung cancer is quite unrelated to smoking, then the proportion of non-smokers among the 31 lung cancer deaths should also be 8.65%. A similar calculation has been made for the numbers of men dying with lung cancer in the other age groups—namely, 1 at ages 35-44, 9 at ages 45-54, 24 at ages 55-64, 16 at ages 75-84, and 3 at ages 85 and above. The total number of deaths expected among non-smokers of all ages was then obtained by adding the numbers for the separate age groups. Corresponding calculations were made to obtain the number of deaths which would be expected to have occurred in men who smoked small, moderate, or large amounts, and likewise for the other principal disease groups of Table V. The results are shown in Table VI.

If non-smokers are compared with smokers it is found that for all causes of death the observed difference is not quite statistically significant ($P=0.06$). Division by cause shows that it is highly significant for lung cancer ($P<0.01$) but not significant for any of the other four diseases or

TABLE VI.—Observed Deaths From All Causes, and From Particular Causes, in Non-smokers and Smokers Compared With the Number of Deaths that Would Have Been Expected to Occur in Each Such Group if There Were No Association Whatever Between Smoking and Mortality

	Non-smokers	All Smokers	Test of Significance* P	Men Smoking a Daily Average of:			Test of Significance† P
				1-14 g.	15-24 g.	25 g. or More	
All causes: Observed deaths	163	1,551	0.06	727	468	356	Less than 0.01
Expected deaths	187.4	1,526.6		751.2	510.2	289.6	
Lung cancer: Observed deaths	1	83	Less than 0.01	22	27	34	Less than 0.001
Expected deaths	8.5	75.5		36.9	28.3	17.9	
Other cancer: Observed deaths	25	195	Between 0.8 and 0.9	95	51	49	Between 0.3 and 0.5
Expected deaths	23.9	196.1		92.8	64.9	37.3	
Other respiratory diseases: Observed deaths	11	115	Between 0.3 and 0.5	55	36	24	Between 0.2 and 0.3
Expected deaths	13.8	112.2		59.8	36.5	18.7	
Coronary thrombosis: Observed deaths	44	464	Between 0.1 and 0.2	200	148	116	0.06
Expected deaths	53.9	454.1		211.2	156.7	96.1	
Other diseases: Observed deaths	82	697	Between 0.5 and 0.7	356	207	134	Between 0.7 and 0.8
Expected deaths	87.6	691.4		351.9	224.9	120.2	

* Based on χ^2 test with $n=1$.† Based on χ^2 test applied to the trend with $n=1$.

groups of diseases. (The numbers of deaths of non-smokers are still small in some of these groups and it is quite possible that significant differences may be obtained with more extensive data.)

When comparisons are made between the different grades of smokers, it is proper to take account not only of the actual extent of the differences but also of the order in which they occur. The statistical test which has been applied to the results is therefore a test of the significance of the trend of the differences between the observed and expected numbers of deaths as the amount smoked increases (Armitage, 1955). It is thus found that there is a significant trend, with an excess of deaths among heavy smokers, for all causes of death ($P<0.01$) and a highly significant trend for cancer of the lung ($P<0.001$). Other forms of cancer and other diseases reveal no significant change with smoking, and the observed rise in other respiratory diseases and in coronary thrombosis is not, on present numbers, more than might quite easily be due to chance. (With the latter the rise is significant if the non-smokers are brought into the test of gradient along with the smokers of different amounts.)

TABLE VII.—Mortality From Lung Cancer in Relation to the Amount Smoked at Different Ages Above 35 Years: Annual Rates Per 1,000 Men

Age in Years	No. of Deaths	Death Rate Among:			
		Non-smokers	Men Smoking a Daily Average of:		
			1-14 g.	15-24 g.	25 g. or More
35-54 ..	10	0.00	0.09	0.17	0.26
55-64 ..	24	0.00	0.32	0.52	3.10
65-74 ..	31	0.00	1.35	3.34	4.81
75 and over	19	0.70	2.78	2.07	4.16
All ages ..	84	0.07	0.47	0.86	1.66

We may also note, at this point, that a finer analysis of the lung cancer data has shown a marked gradient at each stage of life. The mortality rates for four age groups above 35 years are shown in Table VII.

Method of Smoking

For classifying our population into cigarette smokers, pipe smokers, or smokers by both methods our data are certainly faulty. As pointed out above, the questionnaire asked for smoking habits at a particular point of time (November 1, 1951) and not for a life-history. In a covering letter we invited doctors to add any information on their smoking habits or histories which they thought might be of interest to us, and a number of them did so. In those instances we have, of course, used all the information given. For example, if a man stated that in November, 1951, he was smoking 2 ounces of tobacco weekly in a pipe but added in a footnote that previously he had, in addition, smoked 20 cigarettes a day, we classified him as a "mixed" smoker. But we can be sure that some, and perhaps many, men who had changed their habits did not volunteer this extra information. It follows that some whom we have classified as "pure" cigarette smokers or as "pure" pipe smokers really belong to the mixed class. The rates we give in Table VIII cannot therefore indicate the full extent of

TABLE VIII.—Standardized Death Rates Per Year Per 1,000 Men Aged 35 Years or More, in Relation to the Method of Smoking

Cause of Death	No. of Deaths Among Smokers	Death Rate Among Men Smoking:			Test of Significance† P
		Pipes	Pipes and Cigarettes*	Cigarettes	
Lung cancer	83†	0.38	0.68	1.25	Less than 0.001
Other cancer	195	2.37	1.57	2.15	Over 0.95
Other respiratory diseases	115	0.79	0.62	1.52	Less than 0.01
Coronary thrombosis	464	4.22	4.37	5.17	Between 0.1 and 0.2
Other causes	697	5.75	5.79	7.70	0.02
All causes	1,551	13.52	13.03	17.71	Less than 0.001

* Including men who smoked cigars.

† Based on χ^2 test applied to the trend from pipes to cigarettes; $n=1$.

‡ See second footnote to Table V.

the difference in risk associated with the two methods of smoking; the difference must be blurred by this inclusion in each "pure" group of men who belong to the "mixed" group. (In the mixed group we have included the few men who smoked cigars.)

However, in spite of this blurring of the picture, we find an excess mortality among cigarette smokers compared with pipe smokers for all causes of death and for three of the specific groups. For all causes of death the trend of the differences is highly significant ($P<0.001$) though the mortality of the "mixed" group is not in step. For lung cancer the trend is continuous and also highly significant ($P<0.001$); the death rate among the cigarette smokers is over three times as great as the rate among the pipe smokers. The death rate among cigarette smokers is also higher than that among pipe smokers for other respiratory diseases, coronary thrombosis, and the miscellaneous group of other diseases. The excess is less marked than for lung cancer, but it is sufficiently great for the trend to be statistically significant for other respiratory diseases and for the miscellaneous group. The mortality from these diseases among mixed cigarette and pipe smokers is, however, either lower or inappreciably higher than that among pipe smokers. For cancer of other sites no relationship is apparent.

The pronounced differences of Table VIII for persons dying of lung cancer can be explained, to some extent, by the fact that pipe smokers use, on the average, less tobacco than cigarette smokers (in the present study the average was 12 g. a day for pipe smokers against 20 g. a day for cigarette

smokers). This difference in consumption can be allowed for by calculating at each different level the distribution of the observed deaths that would have been expected to occur if the method of smoking bore no relationship at all to the rate of mortality. The resulting figures still show a significant difference between the categories ($P<0.01$). The same conclusion can also be reached by calculating separately, for each level of smoking, the standardized death rate for pipe smokers and cigarette smokers. It is then found that the death rate of pipe smokers is less than that of cigarette smokers at each level. We may repeat, too, that the contrasts obtained must almost certainly be an understatement of the true difference.

Effects of Giving up Smoking

To measure any effects that might follow the giving up of smoking, we divided the doctors into three groups: (1) those who, on replying to the questionnaire, reported that they had given up smoking for at least 10 years; (2) those who reported that they had given up within the previous 10 years; and (3) those who, at November 1, 1951, reported that they were then smokers. We know nothing of any subsequent changes in habits, so again any contrasts we find between these groups will be minimal. The mortality rates for the three groups are shown in Table IX. It will be

TABLE IX.—Standardized Death Rates Per Year Per 1,000 Men Aged 35 Years or More, in Relation to Giving Up of Smoking

Cause of Death	Total No. of Deaths Among Smokers and Ex-smokers	Death Rate Among:			Test of Significance* P
		Ex-smokers, who had given up 10 Years or More at 1/11/51	Ex-smokers, who had given up Less than 10 Years at 1/11/51	Smokers at 1/11/51	
Lung cancer	83†	0.35	0.59†	1.03	0.02
Other cancer	195	1.31	1.79	2.15	Between 0.1 and 0.2
Other respiratory diseases	115	1.17	1.28	1.11	Between 0.9 and 0.95
Coronary thrombosis	464	3.98	5.23	4.88	Between 0.3 and 0.5
Other causes	697	7.24	7.22	6.71	Between 0.2 and 0.3
All causes	1,551	14.04	16.11	15.84	Between 0.5 and 0.7

* Based on χ^2 test applied to the trend, $n=1$.

† See second footnote to Table V.

seen that only for cancer of the lung is there a progressive and statistically significant reduction in mortality with the increase in the length of time over which smoking has been given up. Cancer of all other sites shows the same trend, but the observed differences are relatively small, and, with the numbers involved, might be due to chance. On the other hand, for cancer of the lung the mortality among the present smokers at November 1, 1951, has been three times as great as that among men who at that date had stopped smoking for 10 years or more, and 76% greater than the rate for men who had given up within the previous 10 years.

These differences cannot be accounted for by differences between the three groups in the amount smoked or in the method of smoking. The average amount smoked (at November 1, 1951, for the smokers and at the date of giving up for the ex-smokers) was practically the same—namely, men who had given up for 10 years or more, 18 g. a day; men who had given up within the previous 10 years, 19 g. a day; men who were still smoking, 18 g. a day. In regard to method, the proportion of "pure" cigarette smokers was also almost the same amongst those who had given up and amongst the continuing smokers—88% in men who had given up for 10 years or more; 87% in men who had given up within the previous 10 years; 84% in men who were still smoking.

We may also note at this point that the average age at which men had given up smoking was 44 years for those

who had given up within the last 10 years and 42 years for those who had given up for 10 years or longer.

In spite of these equalities the three groups are, of course, self-selected, and it seems not unlikely that selective factors may play some part in the contrasts of mortality between continuing smokers and ex-smokers of different durations. Thus, amongst those who have more recently given up smoking there are likely to be some who have given up on grounds of ill-health. Such persons are likely to have a higher-than-average mortality in the ensuing years. There is in the figures for all causes of death given in Table IX a slight suggestion of such an effect—the death rate is 16.11 per 1,000, compared with 15.84 per 1,000 for those who were continuing to smoke. On the other hand, we would not expect such a selective influence to be very pronounced in our data, since many seriously ill persons would not have returned our questionnaire at all. In the course of time those with a higher-than-average mortality will have been eliminated and the death rate among the group of persons who gave up smoking many years ago may be expected to fall—the actual figure is 14.04.

While such selective factors might, we think, contribute to the observed trend of mortality from all causes (and from coronary thrombosis in particular), they will not explain the continuous trend of the lung cancer mortality to its highest point in those who were continuing to smoke.

Mortality Among Present Cigarette Smokers

Since the mortality from lung cancer has been shown to be greater (a) among cigarette smokers than among pipe smokers, and (b) among present smokers than among past smokers, it is clear that the highest rates of mortality must have been recorded among those doctors who were continuing to smoke cigarettes at the time of the inquiry (November 1, 1951). In fact, the mortalities among men in this group are substantially higher than the corresponding mortalities among all smokers—past and present, pipe, cigarette, and mixed (as shown in Table V). Thus, for men aged 35 years and over who at November 1, 1951, smoked 1-14 g. a day in cigarettes the subsequent annual mortality from lung cancer has been 0.95 per 1,000; for those similarly smoking 15-24 g. a day it has been 1.67 per 1,000; and for those similarly smoking 25 g. or more a day it has been 2.76 per 1,000. The corresponding rates for all smokers are 0.47, 0.86, and 1.66. In other words, the rates for the continuing cigarette smokers have been 102%, 67%, and 66% higher than the corresponding rates for all smokers, past or present. While remembering that the numbers involved are small, we may note that the rate for men who were continuing to smoke 25 or more cigarettes a day at the time of the inquiry (2.76 per 1,000) was almost 40 times the rate observed among non-smokers (0.07 per 1,000).

Histological Type

There is now evidence to suggest that the relationship holds only for epidermoid and anaplastic cancers (including oat-cell cancer) and that it applies to a less marked degree (if it applies at all) to adenocarcinoma (Wynder and Graham, 1950; Wynder, 1954; Kreyberg, 1955). In the present study only three of the histologically proved cases were diagnosed as adenocarcinoma. This is too few for rates to be calculated for different smoking categories, but it may, perhaps, be noted that the amount smoked by the three patients (3 cigarettes a day, 20 cigarettes a day, and 14 g. daily in a pipe) was, on average, somewhat less than the amount smoked by men of the same ages (12.3 against 16.3 g. a day), whereas the average amount smoked by men dying of epidermoid or anaplastic cancer was substantially greater (23.6 against 16.4 g. a day).

Mortality Among Women

The total number of deaths recorded among women (106) is still too small for reliable estimates to be made of the mortality from different causes among different categories of

smokers. Two deaths were attributed to carcinoma of the lung—one of a woman of 66 years who smoked 15 cigarettes a day at November 1, 1951, and the other of a woman of 55 years who smoked 30 cigarettes a day. A third woman, aged 44, was certified as having died of sarcoma of the lung; she had started smoking at the age of 27 years, and smoked 30 cigarettes daily.

The total mortality from all causes of death recorded among women aged 35 years and over has been much less than that recorded among men. Thus their standardized death rate is 7.82 per 1,000 for non-smokers, 7.87 per 1,000 for all smokers, and 16.90 per 1,000 for smokers of 25 or more cigarettes a day (a small group). The corresponding figures for men are 13.25, 15.78, and 18.84 per 1,000. It is very probable that these lower rates for women are not wholly due to a lower actual mortality but partly to a less complete recording. Deaths in women are likely to be certified according to the married name, whereas a number of the women are recorded in our series only under the name that they used professionally and which they entered upon our questionnaire. This has created considerable difficulty in identifying the women doctors who replied to the questionnaire and who have subsequently died. A number of deaths have certainly been missed. A more complete identification is in progress and the further analysis of female mortality in relation to smoking habits is therefore postponed to a subsequent report.

QUESTIONS OF BIAS

Diagnosis of Cause of Death

It might perhaps be argued that doctors have more readily diagnosed lung cancer in heavy smokers than in light smokers or in non-smokers, and have thus produced the gradient of mortality recorded here. As one means of investigating this possibility we wrote in the last two years of the inquiry to all the doctors who signed the death certificates referring to cancer of the lung. We asked them whether they knew the patient's smoking habits when they diagnosed the cause of death, and, if so, whether they thought their diagnosis was influenced by that knowledge. Of the 47 doctors involved, 40 replied that they had some knowledge of their patients' smoking habits and seven that they were ignorant of them. Of the 40 with some knowledge, 36 did not believe that it had in any way influenced their judgment, one thought that it had (the patient was a man of 68 years who smoked 18 cigarettes a day), another that it might have done so subconsciously (the patient was a man of 68 years who smoked 15 cigarettes a day), and two did not express an opinion.

A second, and perhaps more convincing, test of this possible bias can be made by comparing the mortality gradient with smoking for those cases in which the diagnosis was firmly established (category I in Table IV) with that observed for the cases in which the diagnosis contains a

TABLE X.—Standardized Death Rates From Lung Cancer in Relation to the Amount Smoked, Divided According to the Basis of the Diagnosis

Basis of Diagnosis		Standardized Death Rate per 1,000 Men Aged 35 Years and Above per Year			
		Non-smokers	Men Smoking a Daily Average of:		
			1-14 g.	15-24 g.	25 g. or More
Category I.* Firm diagnosis based on necropsy, histological evidence, etc. (39 cases)	Rate as % of rate for all men	0.00	0.22	0.31	0.94
		0	58	80	244
Categories II and III.* Less well established diagnosis lacking histological confirmation (45 cases)	Rate as % of rate for all men	0.07	0.24	0.55	0.71
		18	56	129	166

* For full definitions see Table IV.

greater element of doubt (categories II and III in Table IV). The figures are given in Table X, from which it will be seen that with the firmly established cases the trend of mortality with smoking is certainly no less steep, and possibly steeper, than that shown by the remaining deaths.

In view of these results it seems to us most improbable that the relationship we have observed between smoking and lung cancer can be attributed merely to a biased attitude among the medical profession.

The Population at Risk

In our preliminary report on this inquiry (Doll and Hill, 1954a) we pointed out that the mortality we had recorded amongst doctors in the 29 months of follow-up was considerably less than that which we would have expected to occur at the death rates of the general population. We suggested that the main reason for this—and one which would apply to all causes of death and not only to lung cancer—was that doctors who were already ill of a disease, likely to prove fatal within a foreseeable space of time, would have been disinclined, or indeed unable, to answer our questionnaire. In other words, we should learn of their deaths but we would have no corresponding completed questionnaire on our files. The question we had to consider was whether such a bias in the population at risk would differentially affect the mortality of the non-smoking and smoking groups. Could it have artificially produced the gradient with smoking that we had observed with cancer of the lung whilst not producing any such gradient with other causes of death (excepting, possibly, coronary thrombosis)? Not only did that seem to us very unlikely on general grounds, but we noted two specific pieces of evidence in support of our view: (a) although the number of deaths from cancer of the lung was small we had not seen any obvious change in its gradient with smoking over the 29 months of inquiry; (b) the gradient we had observed in this prospective inquiry closely resembled that which we had already obtained in our earlier retrospective inquiry.

The preliminary results of the large-scale inquiry conducted by the American Cancer Society (Hammond and Horn, 1954) showed the same characteristic—namely, a low death rate from all causes in the subjects of the inquiry compared with that of the general population. Further, contrary to our own observations, Hammond and Horn reported an appreciably heavier mortality in smokers than in non-smokers for every disease group examined—for cancer of other sites, for coronary thrombosis, and for other diseases—though the gradient with lung cancer, we may note, was very much sharper than that shown by the other causes.

These results led Berkson (1955) to suggest that not only is the total population in these studies biased, by the absence of the seriously ill at the time of initial inquiry into smoking habits, but that the component smoking and non-smoking groups may be differentially biased to the advantage of the latter in the subsequent mortality experience. He points out that this would be the effect if non-smokers in good health came more readily into the study than smokers in good health—for example, because answering the questionnaire is a simpler task for the non-smoker—whereas the chances of inclusion in the study were low for men seriously ill and unrelated to the smoking habits. In such circumstances the already seriously ill component would be artificially low, but still representative of the parent population; the component in good health would be large but unrepresentative. It would contain proportionately too many healthy non-smokers. It follows that the total mortality would be lower than that anticipated from general population rates, and the mortality among non-smokers would be less than that amongst smokers—and for all causes of death.

The final test of Berkson's thesis lies with the passage of time. For as time passes it becomes progressively less likely that the shadow of death could have been foreseen at the start of the inquiry, less likely that such pre-knowledge could have influenced response to our questionnaire. As

stated in our preliminary report, and quoted above, we had seen over the first 29 months no signs of a change in the gradient of lung cancer mortality to suggest an initial selective bias. We are now able to analyse the observations over four complete years. The figures are given in Table XI.

TABLE XI.—Standardized Death Rates From Lung Cancer in Each Year of the Inquiry by Amount Smoked

Year of Inquiry (and No. of Deaths)	Standardized Death Rate per 1,000 Men Aged 35 Years and Above per Year				
	Non-smokers	Men Smoking a Daily Average of:			All Men
		1-14 g.	15-24 g.	25 g. or More	
1st (12) ..	0.00	0.29	0.60	0.86	0.53
2nd (14) ..	0.00	0.26	0.43	1.80	0.57
3rd (31) ..	0.33	0.82	1.51	2.44	1.31
4th (21) ..	0.00	0.54	0.98	1.67	0.92
As percentages of rate for all men					
1st ..	0	54	112	161	100
2nd ..	0	45	75	315	100
3rd ..	25	62	115	187	100
4th ..	0	59	107	182	100

and show, as expected, death rates in the third and fourth years of the inquiry substantially greater than those of the first and second years. (With the relatively small population at risk we think the steep rise in the third year and the fall in the fourth year are no more than chance fluctuations.) On the other hand, the gradient of mortality in relation to amount smoked has been remarkably constant in the first, third, and fourth years—that is, irrespective of the absolute levels of mortality. The second year shows a much steeper gradient, but with only 14 deaths involved we think no emphasis can be placed upon this. In short, it would seem that the association between death rate and amount smoked has shown very little change between the beginning of the inquiry and the later years. It certainly has not become any less pronounced with more representative death rates. The observations do not seem to us to support Berkson's thesis.

As regards the total mortality of our population of doctors we can also make a check as to how far it has been unrepresentative of the rate for all doctors. For this purpose we have accumulated details of the mortality that has occurred year by year amongst a 10% sample (randomly drawn) of all the doctors who did not reply to our questionnaire. This population of "non-answers" was not obtained until several months after the start of the inquiry, when the names of doctors who had died in the first few months had already been erased. We cannot, therefore, reconstruct the total population nor measure the first year's mortality among those who did not reply. In the subsequent years, however, we can estimate the mortality rate of all doctors by combining the figures for those who did reply to the questionnaire with the figures for those who did not reply (multiplying the sample by ten). In the second year of the inquiry we thus reach a standardized death rate at all ages of 20.4 per 1,000 for all doctors, compared with a rate of 14.7 for those who replied to us. The latter is only 72% of the former, revealing, as we previously recognized, the initial effects of selection through the absence of the seriously ill. In the third year of observation the rate for all doctors is calculated to be 18.6 per 1,000; for those who replied it was 16.1; the ratio is 87%. In the fourth year the rates are respectively 18.4 and 17.0 per 1,000, and the ratio is 92%.

We see, therefore, that though the effect of self-selection initially present may still not have entirely worn off, it is certainly no longer large. Conceivably it may be rather larger than 92% suggests, since it is possible that we are able to trace the deaths of those who replied to us more fully than the deaths of those who did not reply. But we have no evidence to that effect. On the other hand, the difference may never wholly vanish. If non-smokers answered us proportionately more frequently than did smokers, then our population will always contain a higher

proportion of the persons who suffer a relatively low mortality rate. In other words, we should always have a population which—in total—has a relatively favourable mortality experience. But it does not follow that its components (smokers and non-smokers) cannot be validly contrasted. That very marked contrast is not, as we have shown above, diminishing with the passage of years.

In this analysis we have compared the mortality observed amongst the doctors who answered us with our estimate of the mortality of all doctors whether they answered us or not. This latter figure is, in our view, the proper standard of comparison, to reveal how far our group is representative of the total. If, however, we compare our rate for all doctors with the corresponding figure for the general population of the whole country, we find that the doctors' rate in the last two years of the inquiry has been 83% of the national mortality. We cannot from this result deduce that the deaths of doctors have been incompletely recorded in our inquiry. It may well be that in these years the medical profession was experiencing lower death rates than the general population of all social classes. Unfortunately, in the absence of the national occupational mortality analysis since 1930-2 there is no evidence available.

ASSOCIATION, DIRECT OR INDIRECT

Site of Growth

In relation to the observed association between lung cancer and smoking it has been suggested that smoking does not produce cancer in a person in whom cancer would not otherwise have occurred at all, but merely determines the primary site of a growth that is destined to appear in some part of the body (Fairweather, 1954; Goodhart, 1956). In short, a man predestined to have cancer increases his chance of having it in the lung if he smokes and increases his chances of having it elsewhere in the body if he does not smoke. If he is not predestined to have cancer, smoking and other environmental factors obviously have no relevance. This hypothesis is in line with the general theory discussed by Cramer (1934) that cancer susceptibility is pre-determined by heredity, that the effect of environmental stimuli is merely to elicit the response in particular tissues, and that, as a result, the total cancer incidence in a given population is a fixed sum uninfluenced by changes in the stimulus. The primary sites may change, the total does not. The final test of the theory will require accurate observations of cancer morbidity, but several recent studies of cancer mortality seem to us to provide strong evidence that the theory is untrue.

Thus Case (1954) has shown that among certain chemical workers exposed to β -naphthylamine mortality from bladder cancer has been almost double that expected for cancer of all sites; the excess in the particular site is certainly not balanced by a reduction in other sites. Similarly Doll (1952, 1955) has shown that the raised death rate from lung cancer among gas workers and asbestos workers is not compensated for by a reduction in mortality from other types of cancer, and Brinton, Frasier, and Koven (1952) have made a similar observation among chromate workers. Case and Lea (1955) have obtained a similar result in another field. They studied 1914-18 war pensioners with chronic bronchitis and found a substantial excess of cancer of the lung, while the mortality from cancer of other sites was normal and unreduced.

Specific to the present issue, Doll and Hill (1954b), in their retrospective study of patients' smoking habits, found no evidence that tobacco produced an effect by the mechanism postulated. While a large excess of heavy smokers was a feature of their lung-cancer group there was no deficit of heavy smokers in patients with cancer in other sites—that is, in comparison with patients with other diseases. The data from the present investigation are also inconsistent with the theory. If tobacco merely determines the site of the cancer without affecting the total incidence of the disease, then the mortality from all forms of cancer should be similar among non-smokers and smokers and

among the different grades of smokers. In fact it is seen from Table V that the annual death rate from all cancer rose from 2.11 per 1,000 among non-smokers to 2.91 per 1,000 among smokers.* The rise in lung cancer from 0.07 to 0.90 is not balanced by a reduction in cancer of other sites, the rates for which are almost identical—2.04 and 2.02 per 1,000 in non-smokers and smokers respectively. In the smoking grades the total cancer rates are almost the same in the 1-14 g. and 15-24 g. groups—namely, 2.48 and 2.42—but the substantial rise in lung cancer in the heavy smoking group (1.66) is certainly not balanced by any fall in cancer of other sites. The total incidence of 4.25 per 1,000 is significantly higher than that of the other two groups of smokers and of the non-smokers.* In short, our data, both retrospective and prospective, indicate a total incidence of cancer in the smoking groups in excess of the incidence that would have prevailed in the absence of smoking.

Constitutional Type

The observed association between the mortality from lung cancer and the amount of smoking could conceivably be explained in terms of some common factor which produced lung cancer and was also associated (directly or indirectly) with cigarette smoking. For example, it has been suggested that constitutional and psychological factors might have such an effect—that is, that persons of a certain "make-up" are peculiarly liable to lung cancer and to smoke. We know of no published evidence to this effect. It is difficult, too, to see how such an indirect association could explain the rise in lung cancer mortality of recent years.

Atmospheric Pollution

It has been argued that, since cigarette smoking is, in general, more prevalent in towns than in country districts, the comparison of different smoking groups is, in part, merely a comparison of urban and rural residents, the former being exposed to an atmospheric pollution which the latter escape. On the other hand, if the difference between the smoking habits of town and country were somewhat greater 20 to 30 years ago than it is to-day, there may be no reason at all to invoke atmospheric pollution as the explanation of the higher mortality from lung cancer in urban areas. Cigarette smoking could, in that event, be the answer. However that may be, atmospheric pollution could not account for the pronounced gradient in mortality that we record here. For example, the national figures record that the lung-cancer death rate among men in Greater London is about twice that among men in rural districts. Our data, prospective and retrospective (Doll and Hill, 1952) give a mortality among the heavy smokers more than twenty times the mortality among non-smokers. Further, the association with smoking has been shown to persist when the observations are limited to men living within a particular type of area. We ourselves found it for male patients resident in Greater London (Doll and Hill, 1952); Stocks and Campbell (1955) have reported a most marked gradient within two wholly rural counties of North Wales and a slighter gradient in the City of Liverpool; Hammond and Horn (1955) have found consistently higher death rates for smokers compared with non-smokers within specific types of areas in the U.S.A.

Finally, in this present study we have analysed the smoking habits of doctors resident in different types of areas (using a 10% sample randomly drawn from the questionnaires returned by doctors aged 35 years and over). The results show (Table XII) that within this occupationally relatively homogeneous population there is remarkably little difference between the smoking habits of the residents in the specified areas. The tendency is for more non-smokers and fewer heavy smokers to be found in the large urban communities.

*The death rates for all cancer shown for smokers (2.91 per 1,000) and for heavy smokers (4.25 per 1,000) are slightly lower than the sum of the rates for lung cancer and for other cancer, since one doctor suffered from primary cancer in both lung and larynx and his death was included in both categories in Table V.

TABLE XII.—Numbers of Doctors Aged 35 Years or Over Smoking Different Amounts of Tobacco (Most Recent Amount Smoked) According to Place of Residence at November 1, 1951

Amount Smoked Daily	Percentage Smoking given Amount in:			
	Greater London (525 Doctors)	Large Towns in the U.K.* (716 Doctors)	Elsewhere in the U.K. (1,147 Doctors)	Abroad or Unspecified Place (46 Doctors)
Nil	16	13	11	13
1-14 g.	31	32	35	35
15-24 g.	34	38	31	33
25 g. or more	19	17	23	19
Total	100	100	100	100

* County boroughs in England and Wales together with Belfast, Edinburgh, and Glasgow.

It follows that the contrasts in lung cancer mortality that we have observed between smokers and non-smokers, and between light, medium, and heavy smokers, cannot be explained in terms of a differential exposure to atmospheric pollution which happens to be associated with smoking habits.

SMOKING IN RELATION TO DISEASES OTHER THAN LUNG CANCER

For the large number of deaths attributed to other causes further information was not specially sought from the certifying doctors, and these deaths have therefore been classified according to the cause of death as certified (or by the informant in the few cases where no such information was available). In the main the Registrar-General's rules for the classification of causes of death have been followed, but occasionally some other classification seemed more appropriate and was adopted. The observed death rates for individual diseases other than lung cancer are not, therefore, strictly comparable with the national rates.

Cancer of Other Sites

Deaths attributed to cancer of sites other than the lung are shown in Table XIII. In none of the groups is the difference between smokers and non-smokers significant, and

TABLE XIII.—Standardized Death Rate Per 1,000 Men Aged 35 Years and Over Per Year, for Cancer of Sites Other than the Lung

Site of Primary Cancer	No. of Deaths	Death Rate Among:					
		All Men	Non-smokers	All Smokers	Men Smoking a Daily Average of:		
					1-14 g.	15-24 g.	25 g. or More
Upper respiratory and upper digestive tracts	13	0.12	0.00	0.14	0.13	0.09	0.21
Stomach	32	0.29	0.41	0.28	0.36	0.10	0.31
Colon and rectum	57	0.52	0.44	0.53	0.54	0.37	0.74
Prostate	30	0.28	0.55	0.25	0.26	0.22	0.34
Other sites (excluding lung)*	88	0.81	0.64	0.83	0.72	0.76	1.02
All cancer, other than cancer of the lung	220	2.02	2.04	2.02	2.01	1.56	2.63

* Including 7 of unspecified primary site.

in none is there a steady—or significant—increase in death rate with the amount smoked. One group consists of deaths attributed to cancer of the upper respiratory or upper digestive tracts, types of cancer which, it has been suggested, may also be related to smoking. It will be seen that no death occurred among non-smokers and the highest death rate occurred among heavy smokers, but the total number of cases is at present too small to give reliable results. The 13 deaths include one from cancer of the buccal cavity, eight from cancer of the oesophagus, and four from cancer of the larynx; the average amount smoked by these men was 17.3 g. a day, against an average of 15.1 g. for all men of corresponding ages in the inquiry.

Coronary Thrombosis

The data for deaths from coronary thrombosis have already been given in Tables V, VI, VIII, and IX, and in the Figure. The increase in mortality with the amount smoked (from 4.22 per 1,000 non-smokers to 4.64 for men smoking 1-14 g., 4.60 for men smoking 15-24 g. a day, and to 5.99 per 1,000 men smoking 25 or more g. a day) is consistent with the existence of a slight relationship, and this, as noted previously, is not very likely to be due to chance ($P = 0.02$). To test whether this result might, however, be due to a selective bias on the part of the doctors replying to the questionnaire (as previously discussed) the data obtained in the first two and a half years of the inquiry have been compared with those obtained in the subsequent 23 months. Table XIV shows that in the second period the increase

TABLE XIV.—Death Rates From Coronary Thrombosis in Relation to the Amount Smoked, Recorded During the Earlier and Later Parts of the Inquiry

Period	Rate as % of rate for all men	Standardized Death Rate per 1,000 Men Aged 35 Years and Above per Year			
		Non-smokers	Men Smoking a Daily Average of:		
			1-14 g.	15-24 g.	25 g. or More
First 30 months (278 cases)	89	4.20	4.46	4.83	5.59
Subsequent 23 months (230 cases)	89	4.32	4.85	4.33	6.37

in mortality is certainly less regular than that observed in the first period, though in both periods the highest rate falls on heavy smokers. It does not seem likely that the trend is entirely due to bias arising from the method of investigation.

Our findings agree broadly with those of Hammond and Horn (1954), in that both sets of data show an increase in mortality with smoking. But in our experience the increase is distinctly less marked. These different results might, we thought, be due to the difference in the age of the subjects, our population of doctors being of all ages over 35 and our population of doctors being limited to 50-69 years. Hammond and Horn's men being limited to 50-69 years. Analysis of our death rates from coronary thrombosis by age, however, reveals an even greater discrepancy. We find a distinct gradient of mortality with amount of smoking at ages under 55 and a rather less distinct gradient at ages 75 and above. We observe none at ages 55-74 (see Table XV).

TABLE XV.—Relationship at Different Ages Between Mortality From Coronary Thrombosis and Most Recent Amount Smoked: Standardized Death Rates Per Year Per 1,000 Men Aged 35 Years or More

Age in Years	No. of Deaths	Death Rate Among:			
		Non-smokers	Men Smoking a Daily Average of:		
			1-14 g.	15-24 g.	25 g. or More
35-54	90	0.44	0.95	1.47	1.84
55-64	122	7.34	6.79	4.45	6.98
65-74	143	11.13	10.77	10.53	14.85
75 and over	153	15.18	20.00	22.27	24.95
All ages 35 and over	508	4.22	4.64	4.60	5.99

A possible explanation of this paradox may lie in the fact that we have classified men as dying of coronary thrombosis solely on the basis of the certified cause. It is, perhaps, reasonable to suppose that, for this group of deaths, the diagnosis is most likely to be accurate at the youngest ages.

Other Causes of Death

The results for other causes of death are shown in Table XVI. They reveal a steady increase in mortality from non-smokers to heavy smokers in three instances—pulmonary tuberculosis, chronic bronchitis, and peptic ulcer.

TABLE XVI.—Standardized Death Rates Per Year Per 1,000 Men Aged 35 Years or More, in Relation to the Most Recent Amount Smoked: Diseases Other than Cancer and Coronary Thrombosis

Cause of Death	No. of Deaths	Death Rate Among:					
		All Men	Non-smokers	All Smokers	Men Smoking a Daily Average of:		
					1-14 g.	15-24 g.	25 g. or More
Pulmonary tuberculosis	19	0.18	0.00	0.20	0.16	0.18	0.29
Chronic bronchitis	42	0.37	0.12	0.39	0.29	0.39	0.72
Other respiratory diseases	65	0.56	0.69	0.54	0.55	0.54	0.40
Cardiovascular diseases other than coronary thrombosis	279	2.36	2.23	2.37	2.15	2.47	2.25
Cerebral haemorrhage or thrombosis	227	2.03	2.01	2.02	1.94	1.86	2.33
Peptic ulcer	18*	0.17	0.00	0.19	0.14	0.16	0.22
Violence	77	0.68	0.42	0.73	0.82	0.45	0.90
Other diseases (including 12 of unspecified nature)	183	1.60	1.45	1.63	1.81	1.47	1.57

* Including 5 cases in which peptic ulcer was referred to as a contributory cause, but not the direct cause of death.

For chronic bronchitis the increase is sixfold (from 0.12 per 1,000 among non-smokers to 0.72 per 1,000 among smokers of 25 g. or more a day) and the trend is statistically significant ($P < 0.01$). Further analysis shows that the death rate is higher among cigarette smokers (0.61 per 1,000) than among mixed pipe and cigarette smokers (0.21 per 1,000) or pure pipe smokers (0.21 per 1,000), and these differences are significant ($P < 0.01$). With such a chronic disease it is obvious that the disease itself may influence the amount smoked and thus obscure any relationship. It may also be that the presence of a "smoker's cough" may influence the physician to attribute death to chronic bronchitis when, in its absence, he would have diagnosed some other respiratory (or cardiovascular) condition. Table XVI does, in fact, show some fall in the mortality from "other respiratory diseases" as smoking increases, suggesting a transference from one label to another. But this fall does not wholly compensate for the rise in chronic bronchitis mortality.

The differences observed between the various categories of smokers dying with pulmonary tuberculosis or peptic ulcer are not statistically significant; but the numbers of deaths are so small that strong relationships with smoking might exist, without significant results being obtained. The average amount smoked by the 19 men who died of pulmonary tuberculosis was 19.5 g. a day, against an average of 15.2 g. for all men in the inquiry of corresponding ages; for the 18 men who died with a peptic ulcer the average was 18.8 g. a day, against an expected average of 15.3 g.

Possibly Related and Unrelated Causes

In the causes of death that we have analysed there are six which have from time to time been regarded as possibly related to smoking—namely, cancer of the lung, cancer of the upper respiratory and upper digestive tract, coronary thrombosis, chronic bronchitis, peptic ulcer, and, recently (Lowe, 1956), pulmonary tuberculosis. In the present study 676 doctors died of these causes—nearly 40% of all the deaths in the doctors aged 35 years and over. We have set out the death rates from these causes in Table XVII. Alongside them we give the rates derived from all other causes of death. The relative stability of these other rates (based upon over 1,000 deaths) is, we think, striking. They provide, we suggest, a further answer to the question of selective bias.

TABLE XVII.—Standardized Death Rates Per Year Per 1,000 Men Aged 35 Years or More in Relation to Amount Smoked; a Summation of Groups of Causes of Death

Causes of Death	No. of Deaths	Death Rate Among:			
		Non-smokers	Men Smoking a Daily Average of:		
			1-14 g.	15-24 g.	25 g. or More
Lung cancer					
Cancer of upper respiratory and upper digestive tracts	168	0.19	1.13	1.62	2.99
Pulmonary tuberculosis					
Chronic bronchitis					
Peptic ulcer					
Coronary thrombosis	508	4.22	4.64	4.60	5.99
Diseases possibly related to smoking	676	4.41	5.77	6.22	8.98
All other diseases	1,038	8.84	9.15	8.26	9.87

* The figures given are lower than those obtained by summing the figures for the five individual groups of diseases, because 8 deaths included in Tables V and XVI under lung cancer and peptic ulcer have been excluded. For these deaths, lung cancer and peptic ulcer were certified only as associated causes; they are included here in the disease group to which death was primarily attributed.

If the association suggested by the upper part of the table were due merely to a bias in our method of investigation, we would expect to see that bias operating to some extent in all, or nearly all, causes of death. It does not appear to do so. Secondly, if the effect of smoking were merely to influence the apparent cause of death, without in any way determining the occurrence of death, the second group of diseases should show a negative association complementary to the positive association of the first group. They do not do so.

SUMMARY AND CONCLUSIONS

1. In reply to a questionnaire sent out at the end of 1951, over 40,000 men and women on the *British Medical Register* informed us of their smoking habits at that time or, in the case of ex-smokers, when they previously gave up smoking. On the basis of these answers we classified them into a few broad groups—namely, non-smokers and smokers (or ex-smokers) of three different amounts by cigarette, pipe, or both (Tables I and II). The subsequent mortality of each of these groups has now been recorded for nearly four and half years (Table III). The present study relates to men aged 35 years and above, amongst whom there were 1,714 deaths, including 81 from lung cancer (in three others lung cancer was mentioned as a contributory cause).

2. The analysis shows that in this population there has been a marked and steady increase in the death rate from lung cancer as the amount smoked increases. Its death rate per year rises from 0.07 per 1,000 in non-smokers (based upon the observations of one death only) to 0.47 per 1,000 in "light" smokers of 1 to 14 g. a day, to 0.86 per 1,000 in "medium" smokers of 15 to 24 g. a day, and finally to 1.66 per 1,000 in smokers of 25 g. or more a day (1 g. is almost equal to one cigarette). The death rate of the heavy smokers is approximately twenty times the death rate of the non-smokers (Tables V and VI).

3. This rising mortality from lung cancer in smokers compared with non-smokers, and in heavy smokers compared with lighter smokers, has been a feature of each stage of life, 35-54 years, 55-64, 65-74, and 75 years and over (Table VII).

4. The mortality from lung cancer has been substantially and significantly greater in cigarette smokers

than in pipe smokers, with smokers by both methods falling in between (Table VIII). This difference between pipe and cigarette smokers is to be observed for each of the smoking categories, light, medium, and heavy, and therefore appears to be a function of the method of smoking irrespective of the amount.

5. Those who reported themselves as smokers at November 1, 1951, have been compared with those who had given up smoking at that time within the previous 10 years or for more than 10 years. The comparison reveals a progressive and significant reduction in mortality with the increase in the length of time over which smoking has been given up (Table IX).

6. From conclusions 4 and 5 it follows that the highest mortalities have occurred amongst those who reported themselves as continuing to smoke cigarettes at November 1, 1951. Among them the annual death rate rose from 0.95 per 1,000 for smokers of 1 to 14 cigarettes a day, to 1.67 per 1,000 for smokers of 15 to 24 cigarettes a day, and to 2.76 per 1,000 for smokers of 25 cigarettes or more a day—that is, to approximately forty times the death rate of the non-smokers.

7. For every death attributed to cancer of the lung confirmation of the diagnosis was sought from the certifying doctor and, when necessary, from hospital or consultant. Additional information was obtained in every case. The deaths can thus be divided into those quite firmly established by necropsy, histological evidence, and the like, and those less well established and lacking histological evidence (Table IV). The increased death rate associated with the increase in smoking is found to be just as great with the firmly established cases as it is with the remainder (Table X). The relationship cannot therefore be attributed to a biased attitude in the medical profession in certifying cancer of the lung as the cause of death.

8. Analysis of the deaths from lung cancer separately in each of the first four years of the inquiry shows that the increase in mortality associated with increase in smoking has been a feature of each year. On the whole, there has been a remarkably constant gradient which has become no less marked with the passage of time (Table XI). We also estimate that in the fourth year of the inquiry the mortality of the doctors who answered the questionnaire was as much as 92% of the mortality of all doctors, whether they answered us or not. On these grounds we do not believe that the gradient of mortality with smoking can be regarded as merely an artifact due to bias in those who chose to reply to the questionnaire.

9. An analysis of a random sample of the questionnaires shows that there was remarkably little difference between the smoking habits of doctors resident (at November 1, 1951) in Greater London, in large towns, or in other districts (Table XII). The contrasts in lung cancer mortality between smokers and non-smokers, and between light, medium, and heavy smokers, cannot therefore be attributed to a differential exposure to atmospheric pollution which happens to be associated with smoking habits. This observation supports those of previous investigations.

10. Study of the deaths from cancer in sites other than the lung reveals, with one possible exception, no association between mortality and smoking. The exception is cancer of the upper respiratory and upper digestive tracts, from which the number of deaths is at present insufficient to substantiate a possible trend. In total,

cancer of sites other than the lung shows a mortality of 2.04 per 1,000 in non-smokers and 2.02 per 1,000 in smokers. It reveals no gradient by amount smoked (Table XIII). In other words, the marked and steadily increasing mortality from lung cancer in association with smoking is not compensated for by a decrease in cancer of other sites. The result indicates a total mortality from cancer in the smoking groups in excess of the mortality that would have prevailed in the absence of smoking.

11. If the causes of death as certified are accepted at their face value, mortality from coronary thrombosis reveals a slight but significant relationship with smoking (Table V). Division by age, however, shows that the trend is distinct only at the youngest ages, 35-54 years (Table XV).

12. Three other causes of death show a steady increase in mortality from non-smokers to heavy smokers—chronic bronchitis, peptic ulcer, and pulmonary tuberculosis (Table XVI). Only with chronic bronchitis is the gradient statistically significant. The remaining causes of mortality reveal no trend (Table XVII).

13. From our retrospective studies of the smoking habits of nearly 1,500 patients with lung cancer and over 3,000 patients with other illnesses we concluded that if large groups of persons of different smoking habits were observed for a number of years they would reveal distinct differences in their rates of mortality from lung cancer. They would show, we believed, (1) a higher mortality in smokers than in non-smokers, (2) a higher mortality in heavy smokers than in light smokers, (3) a higher mortality in cigarette smokers than in pipe smokers, and (4) a higher mortality in those who continued to smoke than in those who gave it up. In each case the expected result has appeared in the prospective inquiry here reported. These results are evident in spite of the fact that our method of inquiry is such as constantly to underestimate the mortality differences. The reason for the underestimate is that our classifications are based, for the most part, upon a statement of the smoking habits at one point of time. We have seldom been able to take previous habits into account, and any subsequent changes have been unknown to us. As a result we shall sometimes have included in the light smoking group persons who had previously smoked heavily for a long time; we shall sometimes have included as "pure" pipe smokers persons who had previously smoked cigarettes and vice versa; we shall sometimes have continued to class as smokers persons who have given up. All such errors in classification must inevitably have reduced the, nevertheless, clear associations between the mortality from lung cancer and the smoking of cigarettes which we have observed in these British doctors.

This work was made possible by the co-operation of the thousands of doctors who completed our questionnaires. We are most grateful to them and to the many consultants who have provided us with further details of the evidence on which the diagnosis of lung cancer was made. We are deeply indebted to the British Medical Association, who dispatched the questionnaires on our behalf and who subsequently helped us in tracing the deaths of doctors; to the Registrars-General of the United Kingdom and the Registrars of the General Medical Council and its Branch Councils in Ireland and Scotland for information about the deaths of doctors; and to the Statistical Department of the Ministry of Labour for the mechanical analysis of the results. We are grateful to Dr. R. Bignall for advice on the clinical classification of some of the deaths from lung cancer. We also offer our thanks to Mrs. Joan Bodington, Mrs. Jean Gilliland, Miss Keena Jones, and Mrs. M. Lloyd for the onerous work of sorting and analysing the mass of data.

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AN ASSOCIATION BETWEEN SMOKING AND RESPIRATORY TUBERCULOSIS

BY

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In England and Wales mortality from respiratory tuberculosis has been falling for at least a century. The rate of decline has not been the same at all ages, however, and in the two sexes the pattern of mortality, which seventy-five years ago was not dissimilar, is now strikingly different (Fig. 1). During the decade 1871-80 mortality for both males and females was highest in early adult life. Seventy years later this is still true for females, but for males death rates in young adult life have fallen so much more rapidly than in middle and late life that maximum mortality now occurs at a much later age.

A number of partial explanations have been offered for this change in the age pattern of mortality, but they do not add up to a very convincing whole, and the sex difference remains an incompletely solved epidemiological

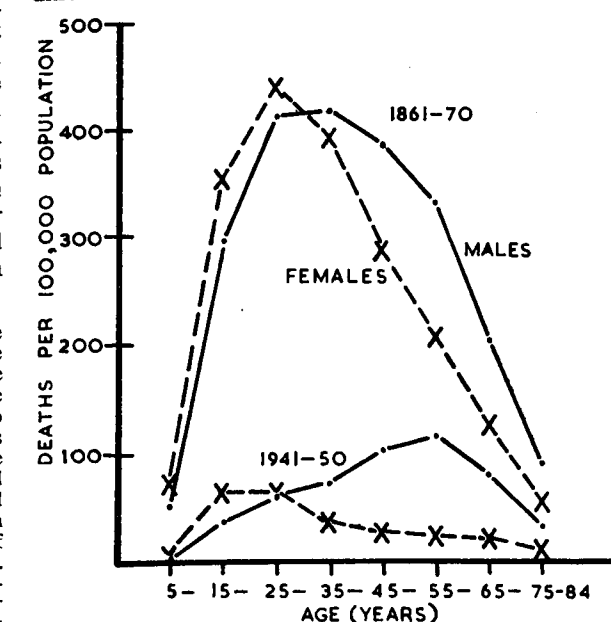


FIG. 1.—Mortality from respiratory tuberculosis in England and Wales (1861-70 and 1941-50 compared).

puzzle. The two most quoted explanations have been, first, that the difference is in part the result of a cohort or generation effect, and, second, that it is related to the degree of urbanization and the proportion of males in industrial occupations.

The cohort method of examining mortality from tuberculosis was first explored by Frost (1939) and was used again by Springett (1952), who gave a clear explanation of this rather complicated procedure. In brief, the method traces death rates experienced at successive ages by a group of persons (the "cohort") born in the same decennium (or any other convenient time interval), in contrast to the orthodox method illustrated in Fig. 1, which examines age-specific death rates of a population in a stated year (or group of years). When male death rates are examined in this way the shift of maximum mortality towards middle and late life disappears. It

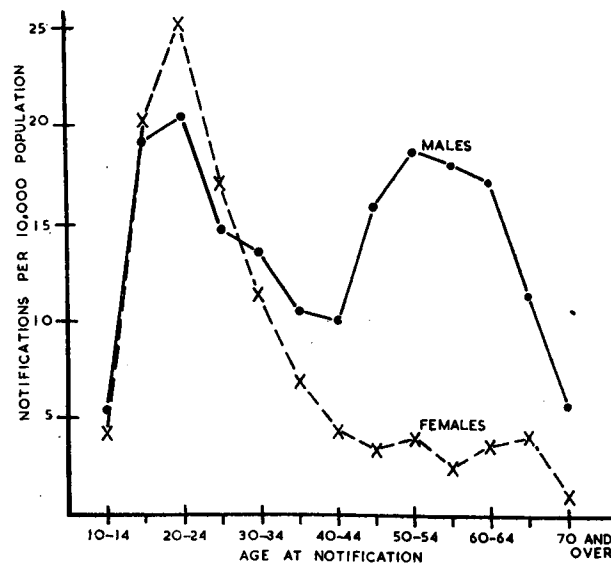


FIG. 2.—Age-specific respiratory tuberculosis notification rates (Birmingham, 1951).

has been suggested, therefore, that this apparent shift is an artifact produced by the orthodox way of looking at age-specific death rates. But in a recent communication (Lowe, 1954) it was demonstrated that in Birmingham, although female age-specific notification rates followed much the same pattern as the corresponding national death rates, male notification rates were unmistakably bimodal in distribution (Fig. 2). This curious sex difference is now becoming apparent even in the four broad age groups used for notification rates in national statistics (Registrar-General, 1955), and it is difficult to believe that this is a statistical illusion which, if the data were available, cohort analysis could explain away. In any case the cohort method of looking at death rates does not explain why in middle and late life mortality has fallen at a much slower rate in males than in females, while in early adult life, if anything, the reverse is true (Table I).

TABLE I.—Mortality From Respiratory Tuberculosis in 1941-50 Expressed as a Percentage of Mortality in 1861-70

	Age					
	15-24	25-34	35-44	45-54	55-64	65-74
Males ..	12.7	14.8	17.0	26.3	35.3	39.2
Females ..	18.7	15.0	10.0	9.8	12.4	17.6

A more plausible explanation rests upon the observation that the pattern of male mortality in late adult life appears to some extent to be related to the degree of urbanization. Dahlberg (1949) examined the recent mortality from tuberculosis in many different countries. He found that for males there was an excessive mortality in middle and late life in Germany, France, Italy, and the U.S.A., as well as in England and Wales, but that the sex difference was by no means so marked in Sweden, Norway, and Denmark. He suggested that this difference might be due to "a greater measure of urbanization in the larger countries" and in particular to the much greater risk of coming into contact with persons suffering from tuberculosis to which employment in congested and highly industrialized communities exposes the male. In addition, McDonald (1952) has demonstrated that in England and Wales the sex difference in age-mortality pattern is much more marked in London and county boroughs than in small towns and rural districts, and he believes with Dahlberg that greater opportunity for contact with infection at place of work is the probable explanation.

In recent years, however, it is becoming accepted that "a large part of the tuberculosis mortality in males in later life is due to a final breakdown of disease acquired many years earlier" (Springett, 1952). It seems unlikely, therefore, that opportunity for infection or reinfection at place of work is the principal reason for the difference between the sexes. And unless there is some inherent difference between males and females in their reaction to infection, which is, of course, possible, the explanation must lie in a sex difference in middle and late life in the risk of exposure to environmental influences that can lead to breakdown of healed or quiescent lesions. In industry men are often exposed to dust, fume, smoke, and mist hazards in a bewildering variety, and it is possible that these may in part account for the difference in rate of breakdown. But one of the most profound differences between the pulmonary environment of males and females, the degree to which the lungs are exposed to tobacco smoke, has so far been overlooked as a possible explanation. In view of the established relationship between smoking habits and cancer of the lung, in which male mortality is also relatively high, it was thought worth while to investigate the smoking habits of patients with respiratory tuberculosis.

Method of Investigation

Since tuberculosis is a notifiable disease, it is an easy matter to identify large numbers of patients with respiratory infection. The problem of interviewing patients is also simplified by the fact that substantial numbers are to be found in sanatoria, while the majority of those living at home attend chest clinics at fairly regular intervals. In this investigation notification was accepted as the diagnostic criterion, and the sample of patients was drawn from sanatorium and chest clinic.

During February, March, and April, 1955, a social worker questioned about their smoking habits all patients occupying beds in the three principal sanatoria providing accommodation for Birmingham residents. During October, November, and December, 1955, the same social worker interviewed all patients attending the Birmingham Chest Clinic. Apart from one sanatorium patient who was too ill to be questioned and one clinic patient who refused to co-operate, there was no selection. For the purpose of this investigation it was decided to exclude non-Europeans, patients who were under 20 years of age at notification,

TABLE II.—Source of Patients and Controls

Place of Interview	Males	Females	Total
Patients:			
Sanatorium	255	179	434
Chest clinic	508	258	766
Total	763	437	1,200
Controls:			
Accident hospital out-patients ..	327	261	588
General hospital in-patients ..	237	154	391
Total	564	415	979

and patients who at the time of interview had not been notified. The source of the final sample of 1,200 patients is shown in Table II.

The identification of a suitable control group was more difficult. In the first place it is clear from the literature that smoking habits vary considerably with age. The advantage of an age-matched control series is, however, more than outweighed by the difficulty of collecting it, and it was decided to rely upon age-specific and age-standardized comparisons. In the second place, since a number of conditions which may lead to hospital admission are already known to be associated with smoking habits (lung cancer, chronic bronchitis, and coronary thrombosis), hospital patients, although the most accessible, are certainly not the best population from which to draw a control series. The difficulty of interviewing a large random sample of the general population is so great, however, that it was decided to use as controls certain sections of the local hospital population.

During May, 1955, the social worker interviewed all new patients attending the Birmingham Accident Hospital with minor injuries. In June and again in September of the same year she interviewed all patients occupying beds in the surgical wards of Dudley Road Hospital (a large non-teaching Birmingham hospital). Patients under 20 years of age, non-Europeans, and patients with lung cancer and of the respiratory tuberculosis were excluded. The source of the 979 controls is also given in Table II.

Smoking habits were recorded as the number of cigarettes per day (1 oz. (28 g.) of pipe tobacco a week was considered the equivalent of four cigarettes a day), and persons who had never smoked as much as one cigarette a day for as long as a year were entered as non-smokers (Doll and Hill, 1950). Smokers were asked how much they were smoking at present, the maximum amount they had ever smoked, the age at which they had begun to smoke, and, if they had given up smoking, the time that had elapsed since they last smoked. In addition, tuberculous patients were asked how much they were smoking immediately before notification (of which the date was recorded), and controls who were hospital in-patients were asked how much they were smoking immediately before their present illness.

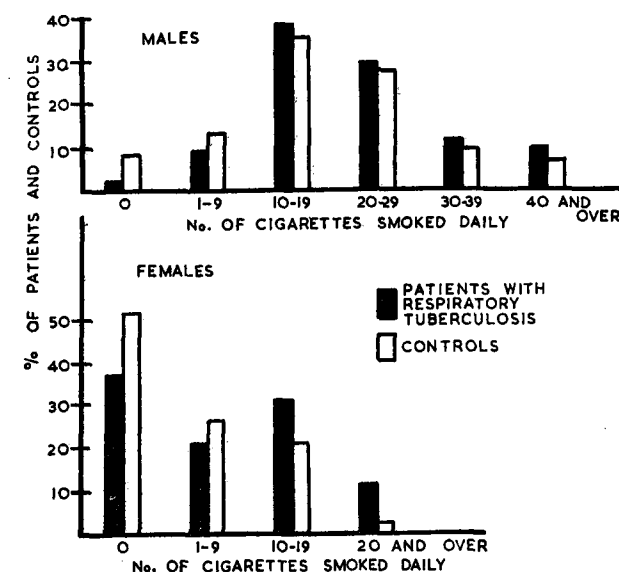


FIG. 3.—Smoking habits of patients with respiratory tuberculosis and controls compared (aged 30 years and over).

TABLE III.—Smoking Habits of Patients and Controls Aged 30 Years and Over

	Males							Females				
	No. of Cigarettes Smoked per Day						Total	No. of Cigarettes Smoked per Day				Total
	0	1-9	10-19	20-29	30-39	40+		0	1-9	10-19	20+	
Patients ..	2.5 (13)	9.2 (48)	38.1 (198)	29.4 (153)	11.3 (59)	9.4 (49)	100% (520)	37.3 (69)	20.5 (38)	30.8 (57)	11.4 (21)	100% (185)
Controls ..	8.1 (34)	12.9 (54)	35.6 (149)	27.4 (115)	9.3 (39)	6.7 (28)	100% (419)	51.4 (128)	25.7 (64)	20.5 (51)	2.4 (6)	100% (249)

Males: $\chi^2_{10} = 21.2$; $P < 0.01$. Females: $\chi^2_{10} = 24.0$; $P < 0.01$.

TABLE IV.—Smoking Habits of Sanatorium and Chest Clinic Patients Compared (Aged 30 Years and Over)

Source of Patients	Males							Females				
	No. of Cigarettes Smoked per Day						Total	No. of Cigarettes Smoked per Day				Total
	0	1-9	10-19	20-29	30-39	40+		0	1-9	10-19	20+	
Sanatorium ..	0.6 (1)	9.8 (17)	39.7 (69)	32.8 (57)	8.6 (15)	8.6 (15)	100% (174)	34.1 (29)	21.2 (18)	35.3 (30)	9.4 (8)	100% (85)
Chest clinic ..	3.5 (12)	9.0 (31)	37.3 (129)	27.7 (96)	12.7 (44)	9.8 (34)	100% (346)	40.0 (40)	20.0 (20)	27.0 (27)	13.0 (13)	100% (100)

Males: $\chi^2_{10} = 3.5$; $0.3 < P < 0.5$. (Male non-smokers and those smoking less than 10 cigarettes a day grouped together.)
Females: $\chi^2_{10} = 2.0$; $0.7 < P < 0.5$.

TABLE V.—Smoking Habits of Out-patient and In-patient Controls Compared (Aged 30 Years and Over)

Source of Controls	Males							Females				
	No. of Cigarettes Smoked per Day						Total	No. of Cigarettes Smoked per Day				Total
	0	1-9	10-19	20-29	30-39	40+		0	1-9	10-19	20+	
Accident hospital out-patients ..	9.1 (20)	13.2 (29)	31.5 (69)	29.2 (64)	9.6 (21)	7.3 (16)	100% (219)	50.9 (85)	27.5 (46)	18.6 (31)	3.0 (5)	100% (167)
General hospital in-patients ..	7.0 (14)	12.5 (25)	40.0 (80)	25.5 (51)	9.0 (18)	6.0 (12)	100% (200)	52.4 (43)	22.0 (18)	24.4 (20)	1.2 (1)	100% (82)

Males: $\chi^2_{10} = 3.9$; $0.7 < P < 0.5$. Females: $\chi^2_{10} = 1.3$; $0.7 < P < 0.5$. (All females smoking 10 or more cigarettes a day grouped together.)

Results

The data collected permit the smoking habits of patients and controls to be compared in a number of different ways. In the analysis which follows the number of cigarettes smoked daily by patients with tuberculosis refers to regular smoking habits immediately before notification. (In all tabular material, therefore, the age of these patients is age at notification and not age at interview.) The number of cigarettes smoked daily by controls refers, in the case of out-patients, to smoking habits at time of interview and, in the case of in-patients, to habits immediately before the present hospital illness. A small number of patients and controls had given up smoking before notification and interview (or, hospital admission) respectively. These persons were classified according to the amount they were smoking immediately before they gave it up.

The essential findings of the investigation are summarized in Table III and Fig. 3. In both sexes patients of over 30 years of age with pulmonary tuberculosis showed when compared with the controls a highly significant deficiency of non-smokers and light smokers and an excess of moderate and heavy smokers (11.7% of the tuberculous males were non-smokers or had smoked less than 10 cigarettes a day,

compared with 21.0% of the controls; 50.1% had smoked 20 or more cigarettes a day, compared with 43.4% of the controls).

This observation was confirmed when the data were examined according to place of interview (Tables IV and V). There was very little difference for either males or females between the smoking habits of sanatorium and chest clinic patients or between out-patient and in-patient controls, and both sanatorium and chest clinic patients showed the same excess of heavy smokers and deficiency of light smokers and non-smokers when compared with either of the two control groups.

It has already been mentioned that in the general population the amount smoked is known to vary considerably with age. The possibility has to be considered, therefore, that the observed difference between smoking habits of tuberculous patients and controls may be due at least in part to the fact that the two groups have different age structures. That this is not the explanation is demonstrated in Tables VI and VII. For both sexes there was in each ten-yearly age group a consistent excess of heavy smokers and deficiency of light smokers and non-smokers when compared with the corresponding control group. Age standardization of the smoking habits of patients and controls aged 30 years and over (by applying the observed smoking rates in each ten-yearly age group to a standard population with the age structure of patients and controls combined—Table VIII) indicates that in fact Table III somewhat underestimates the difference. And at this point it is of interest to note that for the age group 20-24 years there was no appreciable difference between the smoking habits of the tuberculous and their controls (Table IX).

There still remains one serious objection to be considered: we have been comparing smoking habits of controls at the present time with smoking habits of a tuberculous population at the time of notification. This might have influenced the result in two ways. First, since tobacco consumption in the United Kingdom is still rising, on the average persons of a given age are likely to be smoking a little more heavily to-day than persons of the same age a few years ago. Clearly this cannot account for the observation that tuberculous patients had smoked more than controls, since they were asked about their smoking habits at a time when tobacco consumption was on the average a little less than it is to-day. Secondly, estimates of amount smoked in the past are likely to be less reliable than estimates of amount smoked at time of interview, and it is possible that this may have resulted in exaggeration of past smoking habits. Table X suggests that this is not so. There was no appreciable difference in estimates of amount smoked at time of notification between patients notified within the twelve months preceding interview and patients notified five or more years earlier.

TABLE VI.—Smoking Habits of Male Patients and Controls in Ten-yearly Age Groups

Age		No. of Cigarettes Smoked per Day						Total
		0	1-9	10-19	20-29	30-39	40+	
20-29	Patients	13.6	16.0	39.9	20.2	4.1	6.2	100% (243)
	Controls	20.7	11.7	34.5	22.8	7.6	2.8	100% (145)
30-39	Patients	4.3	7.6	39.8	28.9	11.8	7.6	100% (211)
	Controls	12.7	9.5	31.7	33.3	7.9	4.8	100% (126)
40-49	Patients	1.8	7.9	38.4	25.6	12.2	14.0	99.9% (164)
	Controls	7.1	8.5	39.7	23.4	11.3	9.9	100% (141)
50-59	Patients	1.0	11.5	36.5	35.6	10.6	4.8	100% (104)
	Controls	3.9	16.5	37.9	28.2	9.7	3.9	100% (103)
60+	Patients	—	17.1	31.7	31.7	7.3	12.2	100% (41)
	Controls	8.2	26.5	28.6	22.5	6.1	8.2	100% (49)

TABLE VII.—Smoking Habits of Female Patients in Ten-yearly Age Groups

Age		No. of Cigarettes Smoked per Day				Total
		0	1-9	10-19	20+	
20-29	Patients	45.2	28.6	21.0	5.2	100% (252)
	Controls	48.2	28.3	17.5	6.0	100% (166)
30-39	Patients	35.4	23.1	32.3	9.2	100% (130)
	Controls	40.7	31.9	24.8	2.7	100% (113)
40-49	Patients	30.6	16.7	33.3	19.4	100% (36)
	Controls	54.3	18.1	24.5	3.2	100% (94)
50+	Patients	63.2	10.5	15.8	10.5	100% (19)
	Controls	73.8	26.2	—	—	100% (42)

TABLE VIII.—Smoking Habits of Patients and Controls (Aged 30 Years and Over) Standardized for Age Distribution

	Males							Females				
	No. of Cigarettes Smoked per Day						Total	No. of Cigarettes Smoked per Day				Total
	0	1-9	10-19	20-29	30-39	40+		0	1-9	10-19	20+	
Patients	2.3	9.5	37.8	29.6	11.2	9.5	100%	37.9	19.4	30.3	12.4	100%
Controls	8.5	12.3	35.4	27.9	9.2	6.6	100%	49.5	27.0	21.2	2.5	100%

TABLE IX.—Smoking Habits of Patients and Controls Aged 20-24 Years

	Males							Females				
	No. of Cigarettes Smoked per Day						Total	No. of Cigarettes Smoked per Day				Total
	0	1-9	10-19	20-29	30-39	40+		0	1-9	10-19	20+	
Patients	23.9 (26)	14.7 (16)	41.3 (45)	12.8 (14)	3.7 (4)	3.7 (4)	100% (109)	51.9 (69)	23.3 (31)	21.1 (28)	3.8 (5)	100% (133)
Controls	23.0 (17)	10.8 (8)	36.5 (27)	23.0 (17)	5.4 (4)	1.4 (1)	100% (74)	60.7 (51)	23.8 (20)	11.9 (10)	3.6 (3)	100% (84)

Males: $\chi^2=2.5$; $0.7 < P < 0.5$. (All males smoking 30 or more cigarettes a day grouped together.)
Females: $\chi^2=2.8$; $0.3 < P < 0.2$. (All females smoking 10 or more cigarettes a day grouped together.)

TABLE X.—Smoking Habits of Males Aged 30 Years and Over Related to Interval Since Notification

Years Since Notification	No. of Cigarettes Smoked per Day						Total
	0	1-9	10-19	20-29	30-39	40+	
0	2.9	10.9	38.5	27.5	12.1	8.0	100% (174)
1-2	1.2	8.0	40.1	29.6	11.7	9.3	100% (162)
3-4	2.4	8.5	34.1	35.4	8.5	11.0	100% (82)
5 and over	3.9	8.8	37.3	27.5	11.8	10.8	100% (102)

Discussion

If the control group is representative of the local population from which the tuberculous patients were drawn, and there is no reason to doubt this, there appears to be a direct association between smoking habits and respiratory tuberculosis in adults. The interpretation of this observation is another matter, and it is hardly necessary to point out that although such an association suggests that the amount of tobacco smoked may play a part in determining whether a healed or quiescent pulmonary lesion breaks down, it does not and can never prove it. We must inquire whether the hypothesis is consistent with our knowledge of respiratory tuberculosis and of the history of smoking.

In the past it has been generally accepted that the high death rate among middle-aged and elderly males indicates a high attack rate, and consequently in the search for an explanation attention had been focused upon the opportunities for infection (or reinfection) offered by working conditions in highly industrialized communities. Recently serial mass x-ray examination of a group of people has shown that in both sexes attack rates are highest in young adult life and decline rapidly with increasing age (Springett, 1951), and the discrepancy between high mortality and low attack rates in elderly males suggests that "tuberculosis deaths in later life are usually, though not always, the result of disease acquired many years earlier" (Springett, 1952). This is supported by the analysis of Birmingham notification data already referred to (Lowe, 1954). The notification peak in young adult life (shown graphically in Fig. 2) was almost entirely due to early (group I) disease, while the second peak exhibited by males in late life was predominantly made up of advanced (group III) disease. To solve the problem of the sex difference it now seems that we have to ask not what conditions are likely to provide opportunity for infection but what influences can precipitate the breakdown of healed or quiescent lesions. General influences (such as faulty nutrition and physical or mental stress) which affect the sexes more or less equally are unlikely to be of great importance, and tobacco smoke is probably the commonest lung irritant with a marked sex differential. And since tuberculosis in young adults is principally a consequence of new infection rather than of breakdown of old disease, if our hypothesis is true we should expect to find no difference between the smoking habits of young tuberculous patients and the population from which they were drawn. Table IX indicates that this is so.

If it is true that smoking can lead to the breakdown of old lesions, it is still not possible from the data available to say whether it is the principal reason for the sex difference in mortality and morbidity in middle and late life. There are, however, two indications that this may be so. First, smoking is still essentially a male habit. Not only are there far fewer non-smokers among males (over 30 years of age 8.1% of male and 51.4% of female controls were non-smokers—Table III), but also among smokers males smoke much more heavily than females (49.9% of male and 5.0% of female smokers had smoked 20 or more cigarettes a day). Second, the difference in amount smoked between patients with respiratory tuberculosis and controls in this investigation is similar to the difference between patients with cancer of the lung and their controls reported by Doll and Hill (1952). For both males and females there is a similar deficiency of non-smokers and light smokers and an excess of moderate and heavy smokers. In England and Wales during the quinquennium 1950-4 the ratio of

male to female deaths from cancer of the lung was 6:1, while for respiratory tuberculosis at age 55 years and over it was 5:1.

Finally, we must consider whether what is known about the growth of the tobacco habit in this country and the changing pattern of tuberculosis in middle life is consistent with the suggestion that there may be a causal relationship between them. Tobacco consumption in the United Kingdom began to rise steeply shortly after the 1914-18 war, and it was during the decade 1921-30 that a rapid increase in mortality attributed to cancer of the lung first began to attract attention (Doll and Hill, 1950). No great weight can be attached to this relationship, since, as has so often been pointed out, a substantial part of the increase in mortality from cancer of the lung is probably due to improved diagnosis and more accurate death certification. In the case of respiratory tuberculosis a direct comparison between mortality and tobacco consumption is even less instructive, because death rates have always provided a very unreliable measure of incidence, and in recent years therapeutic advances have profoundly altered the pattern of survival. Since our principal concern is with the change in sex pattern of tuberculosis in middle life it is possible to side-step these difficulties. In Fig. 4, which illustrates

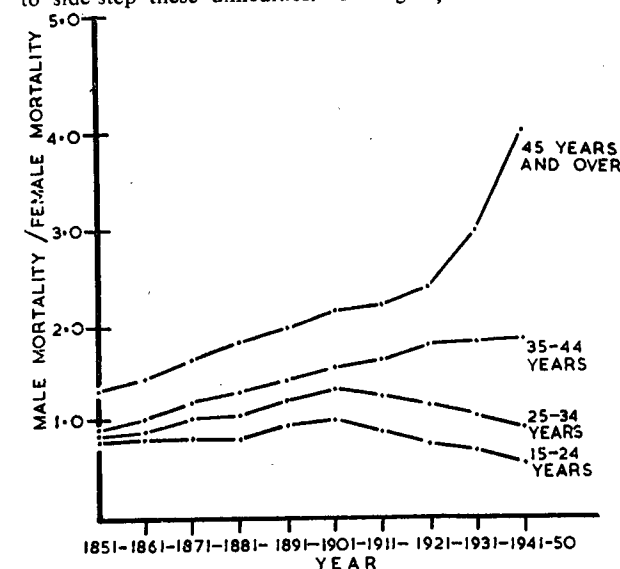


FIG. 4.—Changes in the ratio of male to female death rates from respiratory tuberculosis in certain age groups from 1851.

changes in the ratio of male to female death rates for various age groups over the past hundred years (a method used by Springett, 1952), a rising ratio indicates that the male death rate is declining less rapidly than the corresponding female death rate, and vice-versa. It is evident that in the age group "45 years and over" male mortality has been declining less rapidly than female mortality for at least a century, but since 1911-20 (the decade in which tobacco consumption began to climb) the sex difference has become very much more pronounced.

It seems reasonable to conclude that smoking may be an important cause of the breakdown of healed or quiescent respiratory tuberculosis in middle and late life and perhaps the principal reason for the rapidly increasing sex difference in mortality at these ages.

Summary

No satisfactory explanation has been provided for the observation that in most large industrialized countries mortality from respiratory tuberculosis in middle and late life is now very much higher for males than for females. In view of the association between smoking and cancer of the lung, in which male mortality is also relatively high, it was decided to investigate the smoking habits of patients with respiratory tuberculosis.

A social worker questioned 1,200 patients with notified respiratory tuberculosis about their present and past smoking habits: 766 were interviewed at the Birmingham Chest Clinic and 434 in the three principal Birmingham sanatoria. The same worker interviewed as controls 588 patients attending the Birmingham Accident Hospital with minor injuries and 391 patients occupying beds in the surgical wards of a large non-teaching hospital in Birmingham.

In both sexes patients of over 30 years of age with respiratory tuberculosis showed a highly significant deficiency of non-smokers and light smokers and an excess of moderate and heavy smokers when compared with the controls. It seems unlikely that this difference is due to a bias in choice of patients and controls or to the method of comparison.

From this and from certain other considerations it is suggested that smoking may be an important cause of the breakdown of healed or quiescent respiratory tuberculosis in adults and may account for a considerable part of the excessive male mortality in middle and late life.

I acknowledge with pleasure my indebtedness to Dr. V. H. Springett, medical director, Birmingham Chest Services, Mr. W. C. Gissane, surgeon-in-chief of the Birmingham Accident Hospital, and Mr. K. O. Parsons, consultant surgeon to Dudley Road Hospital, for the facilities they afforded me for collecting the data used in this paper. I should also like to thank Miss Ida Giles, who interviewed all patients and controls and helped with the sorting of the data.

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LATE RESULTS OF VAGOTOMY COMBINED WITH GASTRO-JEJUNOSTOMY OR PYLOROPLASTY IN THE TREATMENT OF DUODENAL ULCERATION

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Sedation, diet, antacids, and antispasmodics have long been accepted in the medical treatment of duodenal ulceration. There is, however, no equivalent unanimous surgical opinion regarding the most satisfactory operative procedure, for the functional result achieved has to be evaluated in conjunction with the incidence of recurrent or stomal ulceration.

Vagal nerve section, reintroduced by Dragstedt *et al.* (1944), soon fell into disrepute for duodenal ulceration because of the high incidence of gastric retention, with all its sequelae, which followed this operation. The addition of gastro-jejunostomy or pyloroplasty as a simultaneous procedure has materially diminished the frequency of this delay in stomach emptying. Nevertheless, both these gastric drainage procedures have complications peculiar to themselves. Particularly is this so with gastro-jejunostomy, in which both the

liability of the stomach region to peptic ulceration and also the production of symptoms by mechanical factors or by the regurgitation of duodenal juice have long been appreciated.

Present Series

In this paper are embodied the results of an analysis of 366 cases of chronic duodenal ulceration treated by vagotomy combined with either gastro-jejunostomy or pyloroplasty. The length of time post-operatively has been five years or longer in most cases. The series consists of consecutive cases drawn from several surgical centres in this country. In this way it is thought to be representative of the overall late results obtained in current surgical practice by these operations.

Out of this complete group, 22 (6%) patients had died from causes unconnected with their duodenal ulceration, and 14 (3.8%) have been lost, leaving 330 (297 males, 33 females) for study. In all cases section of the vagi was performed transabdominally, the nerves being exposed on the lower oesophagus after mobilization of the left lobe of the liver. Pyloroplasty was carried out in most cases by the method of Heineke-Mikulicz, which consists of enlargement of the pyloric opening by an incision parallel to the long axis of the stomach and closure of this by suture at right angles to the original incision. In other patients the method of combined pyloroplasty and pylorotomy advocated by Beattie (1950) was employed. All operations were elective, none being for the emergency treatment of haemorrhage or perforation. In all cases the clinical and radiological diagnosis of duodenal ulceration was confirmed at operation.

Follow-up has been by personal visit to the patient's home in 37 cases (10.2%), out-patient review of 120 cases (36.4%), and by questionnaire in 173 cases (53.4%). The questionnaire covered the following points: (a) the extent of the patient's satisfaction with the operative result; (b) any return of ulcer pain; (c) any further stomach operations; (d) any post-operative haematemesis or melaena; (e) a survey of the possible post-operative symptoms; and (f) weight gain or loss since operation. In any case where there was doubt the patient was seen or the position made clear by further correspondence.

The length of time since operation was four years in 52 (15.8%) cases, five years in 219 (66.4%), six years in 51 (15.4%), and seven years in 8 (2.4%).

The operative procedure in 198 cases (60%) was vagotomy and gastro-jejunostomy, and in 132 cases (40%) it was vagotomy and pyloroplasty.

Clinical Results

The results of the review have been classified in general accordance with the method of Visick (1948). Separation has been made into the following groups:

Grade I: Patients Who are Completely Symptom-free.—There were 167 cases (50.6%) in this grade. With the complete absence of subjective or objective troubles, the excellence of the result obtained leaves nothing to discuss.

Grade II: Patients Who Have Mild Symptoms which Cause No Disability.—There were 113 cases (34.2%) in this grade. It must be emphasized that the symptoms complained of were minor and did not detract from the good operative result, either in the patients' or the reviewer's opinion. They occurred so infrequently in the majority that it was only the rigid adherence to the complete absence of symptoms necessary for classification in grade I that prevented their inclusion in this latter grade. The complaints were of

occasional looseness of stool, attacks of weakness or faintness, flatulence, fullness, and biliary regurgitation or vomiting.

Grade III S: Patients Who Have Moderate Symptoms not Relieved by Care, but Who are Improved Symptomatically and Clinically by the Operation.—There were 19 cases (5.8%) in this grade. Their complaints were analysed as follows:

1. General physical condition poor from congestive heart failure and carcinoma of the prostate respectively, with consequent symptoms overshadowing satisfactory operative result, 2 cases.
2. Moderate dyspeptic symptoms, but no ulcer pain and no evidence of recurrent ulceration, 6 cases.
3. Moderate dyspeptic symptoms, but no ulcer pain and no evidence of recurrent ulceration, but with functional overlay and under psychiatric care, 6 cases.
4. One past attack of ulcer pain after vagotomy but no recurrent ulceration found on investigation then and symptom-free since, 5 cases.

The attack of ulcer type pain suffered by five patients was thought to have been associated with minor stomal ulceration with spontaneous healing, for in each of these patients the stomach drainage operation had been gastro-jejunostomy. The difficulty of achieving complete symptomatic cure in patients who enjoy their disabilities or who have personality disorders is well exemplified in this grade.

Grade III U: Patients Who Have Moderate Symptoms not Relieved by Care and in Whom the Clinical Result is Unsatisfactory.—There were 11 cases (3.3%) in this grade. Their complaints were analysed as follows:

1. Many severe dyspeptic symptoms but no clinical or radiological evidence of recurrent ulceration, 2 cases. These two patients had radiological evidence of gastric retention as shown by a six-hour delay in stomach emptying after a barium meal. This delay in both cases followed vagotomy and pyloroplasty.
2. Symptoms of recurrent ulceration present at all times but radiological or gastroscopic proof unobtainable, 4 cases. These four patients had had vagotomy and gastro-jejunostomy performed. Three presented with ulcer pain and the fourth had had two bouts of haematemesis and melaena. Although proof of recurrent ulceration could not be obtained, it was felt from the extent of the symptoms that sooner or later the presence of such ulceration would be confirmed in these cases.
3. Troublesome diarrhoea, 5 cases. There was barium-meal evidence of delay in stomach emptying in one of these cases.

Grade IV: Patients Not Improved by Operation.—There were 20 cases (6.1%) in this grade. They were subdivided as follows:

1. Recurrent duodenal ulceration, 4 cases. This had been proved in each case at the further operative procedure required. The primary gastric drainage operation in each case was pyloroplasty. The presenting symptom common to all was ulcer pain, and all had radiological evidence of active duodenal ulceration, with marked duodenal stenosis in two. All four cases had had a subsequent partial gastrectomy.
2. Anastomosis ulceration, 5 cases. Ulcer pain was present in all five patients. One had perforated a stomal ulcer in America and had had a simple suture performed, but has since been untraceable. One man had had repeated haematemeses, had not been operated on, and had died four years later from unconnected causes. The remaining three had each had an elective partial gastrectomy performed.
3. Gastric ulceration, 4 cases. In two of these patients, in addition to the presence of lesser-curve ulceration at the angulus, there was coexistent barium-meal evidence of delay in stomach emptying due to duodenal stenosis from pyloroplasty failure. These patients presented with ulcer pain. The third patient was averted to have had a high lesser-curve ulcer found on routine barium-meal examination. He was symptom-free at that time and had been so ever since his primary procedure of vagotomy and gastro-jejunostomy. No further operation had been undertaken in his case and no further investigation was possible. The fourth patient developed a gastric ulcer at the angulus seven years after vagotomy and short-circuit, and presented with ulcer pain.
4. "Gastric cripples," 4 cases. All these had had subsequent partial gastrectomy, but in none of them had any evidence of recurrent ulceration been found, although two had multiple adhesions. One of these patients died from peritonitis following his partial gastrectomy. No improvement in the many symptoms

of the remainder had resulted from partial gastrectomy. One had had a further entero-anastomosis performed and then a further division of adhesions, and still had multiple symptoms.

5. Successful partial gastrectomy for ulcer type of pain but ulcer not confirmed at operation, 3 cases. One patient had pain after food and was tender over the duodenum. At laparotomy he was found to have a stitch abscess associated with unabsorbable suture material used for repairing the duodenum at his original pyloroplasty. The second patient had had ulcer type of pain after food for three years following vagotomy and pyloroplasty, but the absence of active peptic ulceration was confirmed at partial gastrectomy. The third patient with pain after food had developed a stenosis at the pyloroplasty stoma, and was also treated by partial gastrectomy, no active duodenal ulceration being found at this operation. All have subsequently remained well.

Patients in grades I, II, and III S have been regarded as having a satisfactory clinical result, and patients in grades III U and IV as having an unsatisfactory clinical result. The result of this classification, when applied to the whole series, is shown in Table I.

TABLE I.—Grading of Whole Series

Grade	No. of Patients
I	167 (50.6%)
II	113 (34.2%)
III S	19 (5.8%)
Total satisfactory	299 (90.6%)
III U	11 (3.3%)
IV	20 (6.1%)
Total unsatisfactory	31 (9.4%)

Sex in Relation to Clinical Result

There is no difference between the results obtained in males and in females, for, as is shown in Table II, satisfactory results were achieved in 90.2% of males, as compared with 93.9% females, and unsatisfactory results occurred in 9.8% of males, as compared with 6% of females. Allowing for the small size of the female group (33 cases), the small differences in these findings are not significant.

TABLE II.—Sex in Relation to Clinical Result

Grade	Males	Females
I	150 (50.5%)	17 (51.5%)
II	104 (35.0%)	9 (27.3%)
III S	14 (4.7%)	5 (15.1%)
Total satisfactory	268 (90.2%)	31 (93.9%)
III U	11 (3.7%)	0 (0%)
IV	18 (6.1%)	2 (6%)
Total unsatisfactory	29 (9.8%)	2 (6%)

Post-operative Nutrition

All patients were questioned regarding any change in their weight since operation. It was clear that in the majority of patients their weight had returned to normal and had remained steady. Clinical observation confirmed this most strongly, and patients' satisfaction in their ability to eat normal-sized meals was often reflected in their resumption of heavy industrial or mining work, where high calorie intake was essential.

Thus 214 (65%) were keeping to a steady normal weight and 72 (21.8%) had gained weight well, a total of 286 (86.8%) with a satisfactory nutritional result. Minor weight loss had occurred in 27 (8.2%) and considerable loss in 5 (1.5%). This last group of five patients were all graded as unsatisfactory in the general result classification because of their post-operative symptomatology. Thus all patients with weight loss totalled only 32 (9.7%). No information was available concerning the weight of 12 patients.

It is appropriate to compare these figures with weight levels after partial gastrectomy. Ivy, Grossman, and Bachrach (1950) reviewed 864 patients, made up of six series, treated by this operation. They found that the post-

operative weights remained steady or increased in 53% and decreased in 47%. Thus even with any other relevant factors excluded, there appears to be significant evidence that weight maintenance after vagotomy and a gastric drainage operation is more generally satisfactory than after partial gastrectomy.

General Analysis of Post-operative Symptoms

Diarrhoea.—Seventy-four patients in the series complained of loose stools or diarrhoea, an incidence of 22.5%. It was not considered troublesome by 64 (19.4%), and of these 40 stated that they only passed loose stools intermittently, periods of normality of a month or more being usual. On the other hand, 10 (3%) complained of troublesome diarrhoea, but in only three of these was there radiological evidence of delay in stomach emptying.

Flatulence.—Increased flatulence compared with their pre-operative condition was complained of by 67 patients (20.4%). Of the three who found it worrying or severe, two were air swallowers. In the third case foul eructations were associated with proved gastric retention. There was radiological evidence of gastric delay in one further mild case. Thirty-three of these patients also complained of occasional diarrhoea.

Biliary Regurgitation or Vomiting.—Occasional biliary regurgitation or vomiting occurred in 44 cases (13.4%). It was generally infrequent or mild, although in nine cases it was accompanied by other post-operative symptoms to an extent sufficient for them to be classified in grade III S. In only one case, following upon a vagotomy and gastro-jejunostomy, was biliary vomiting severe enough to warrant further operation. This man was not improved by subsequent partial gastrectomy and a later entero-anastomosis.

Hypoglycaemic Attacks.—Mild occasional hypoglycaemic attacks were not uncommon following both vagotomy and gastro-jejunostomy (18 patients) and vagotomy and pyloroplasty (27 patients), making a total of 45 cases (13.6%) with this complaint. The attacks occurred typically one to three hours after food; they were characterized by a feeling of weakness or faintness, sometimes accompanied by sweating, and were rapidly relieved by food or a sweet drink. Patients stated that the frequency and severity of these attacks had diminished as time had passed following their operation, and none found them distressing at the time of review.

Other Post-operative Side-effects.—Undue fullness after food was difficult to evaluate as a subjective symptom. It occurred to a significant extent in 10 patients (3%), and only two of these had lost weight post-operatively. There was evidence of coexistent gastric stasis in 3 of these 10 cases. Only one patient complained of symptoms of a typical immediate postprandial "dumping" syndrome, and this followed vagotomy and gastro-jejunostomy.

Post-operative Gastric Retention

Barium-meal examination showed a delay of six hours or longer in stomach emptying in eight patients. They had all had vagotomy and pyloroplasty. Gastric retention did not occur among the group in which vagotomy and gastro-jejunostomy had been carried out. In five patients inadequacy of the pyloroplasty outlet was the cause of the delay in emptying. In two cases recurrent duodenal ulceration with stenosis had occurred. The last case had pylorospasm and obstruction from a gastric ulcer at the angulus with surrounding oedema.

An organic obstruction lesion was present in all these cases of delay in stomach emptying. All presented at periods longer than one year after vagal section. It may be that partial loss of stomach motor function may render almost impassable a degree of pyloro-duodenal stenosis which could be easily overcome by a stomach possessing normal motor power. Thus even if only a minor diminution in stomach tone and peristalsis is likely, the provision of a stomach outlet which remains permanently widely patent is essential.

Recurrent Peptic Ulceration

The site of a recurrent ulceration in the 13 (3.9%) proved cases is shown in Table III, together with a possible explanation for each recurrence. Six (4.5%) followed

TABLE III.—Sites of Recurrent Ulceration

Case	Operation	Site of Recurrence	Vagal Section	Reason for Recurrence
1	V. and P.	D.U.	Incomplete	Incomplete vagotomy
2	"	"	"	"
3	"	"	"	"
4	"	"	"	"
5	"	G.U. at angulus	"	Duodenal stenosis, and inc. vagotomy
6	V. and G.J.	G.J.U.	"	Incomplete vagotomy
7	"	"	"	"
8	"	"	"	"
9	"	"	"	"
10	"	"	"	"
11	"	"	Unknown	Unknown
12	"	G.U.	"	"
13	"	G.U. at angulus	Complete	"

V. and P.—vagotomy and pyloroplasty. V. and G.J.—vagotomy and gastro-jejunostomy. D.U.—duodenal ulcer. G.U.—gastric ulcer. G.J.U.—gastro-jejunal ulcer.

vagotomy and pyloroplasty, four being duodenal ulcers and two being gastric ulcers, and seven (3.5%) followed vagotomy and gastro-jejunostomy, five being gastro-jejunal ulcers and two being gastric ulcers.

In addition to the proved cases there were four other patients (graded III U) whose symptoms of pain or bleeding following vagotomy and gastro-jejunostomy were such as to warrant a presumptive diagnosis of gastro-jejunal ulceration despite negative radiological or gastroscopic findings. If these patients are included, then the proved and presumed recurrence rate totals 5.1% in the whole series and 5.6% following vagotomy and gastro-jejunostomy.

The number of years after operation at which these ulcers occurred is shown in Table IV.

TABLE IV.—Time of Recurrence After Operation

Time in Years of Recurrence after Vagotomy	Site and No. of Ulcers	Total
0-1	2 G.J.U.; 1 D.U.	3
1-2	3 G.J.U.; 1 D.U.; 1 G.U.	5
2-3	1 D.U.	1
3-4	1 G.U.	1
4-5	1 D.U.	1
5-6	1 G.U.	1
6-7	1 G.U.	1

The following points of importance arise: (1) Proved recurrent duodenal ulceration occurred only after vagotomy and pyloroplasty, and its incidence was evenly divided through a five-year follow-up period. (2) Proved gastro-jejunal ulceration, occurring after vagotomy and short-circuit, presented only during the first two post-operative years. (3) There was insulin-test-meal evidence of incomplete vagotomy in eight out of the nine patients with proved anastomotic or recurrent duodenal ulceration. A test-meal examination could not be performed in the remaining case. (4) Gross delay in stomach emptying occurred in two of the four cases in which gastric ulceration had taken place. (5) There is no statistical difference between the total recurrence rate of 5.6% following vagotomy and short-circuit, and that of 4.5% following vagotomy and pyloroplasty (standard error=2.4).

Operative Mortality

Table V is an analysis of the five (1.5%) deaths directly associated with the operative procedure.

One of the deaths from uncontrollable diarrhoea was proved at necropsy to be due to an enteritis severe enough to have caused sloughing of the mucosa of the small bowel. Similar cases, but occurring after partial gastrectomy, have been reported by Williams and Pullan (1953).

TABLE V.—Operative Deaths

	Operation	Survival	Cause of Death
1	V. and P.	3 days	Peritonitis—leak from pyloroplasty
2	"	10 "	"
3	V. and G.J.	4 "	Severe diarrhoea
4	"	5 "	"
5	"	6 "	Uræmia—renal failure

Comparison between Gastro-jejunostomy and Pyloroplasty as Stomach Drainage Procedures

Table VI shows the respective gradings and the extent of the post-operative complications arising in the 198 patients who had gastro-jejunostomy combined with vagotomy, and in the 132 patients who had pyloroplasty combined with

TABLE VI.—Comparison of Results and Symptoms After Vagotomy and Gastro-jejunostomy With Those After Vagotomy and Pyloroplasty

	Vagotomy and Gastro-jejunostomy	Vagotomy and Pyloroplasty	Standard Error
Total No.	198 (60%)	132 (40%)	—
Satisfactory results	183 (92.4%)	116 (87.9%)	4.5/3.2
Unsatisfactory results	15 (7.6%)	16 (12.1%)	4.5/3.2
Grade I	105 (53%)	62 (47%)	6.0/5.6
Grade II	65 (32.8%)	48 (36.4%)	3.6/5.6
Grade III S	13 (6.6%)	6 (4.5%)	2.1/2.6
Grade III U	7 (3.5%)	4 (3.0%)	0.5/2.0
Grade V	8 (4.0%)	12 (9.1%)	5.1/2.5
Recurrent ulceration	11 (5.6%)	6 (4.5%)	1.1/2.4
Gastric retention	0	8 (6.0%)	6.0/1.7
Diarrhoea	37 (19%)	37 (28%)	9.4/7
Biliary regurgitation	28 (14%)	16 (12%)	2/3.8
Flatulence	29 (15%)	24 (18%)	3/4.1
Hypoglycaemic attacks	18 (9%)	27 (20%)	9/3.8
Operative mortality	3 (1.5%)	2 (1.5%)	—

The standard error is expressed as the ratio of the difference in percentage to the standard error between proportions.

vagotomy. Allowing twice the standard error as a measure of significance, it is clear that the only definite statistically significant differences between the results of these procedures were: (1) There was a higher number of patients thus placed in grade IV, than there were after vagotomy and gastro-jejunostomy (4%). (2) There was a marked incidence of gastric retention following pyloroplasty, 8 cases (6%) occurring, as opposed to the absence of this complication following gastro-jejunostomy. (3) The incidence of hypoglycaemic attacks was higher following pyloroplasty (20%) than after gastro-jejunostomy (11%).

Insulin-test-meal Findings

Adequate records of post-vagotomy insulin test meals were available in only 87 cases. Separation into complete and incomplete vagotomy was made by the criteria of Hollander (1946, 1948). This separation revealed that no fewer than 26 (29.8%) of these 87 cases had insulin test meals showing marked response to hypoglycaemia with very high levels of free acid. These figures do not represent the correct incidence of incomplete vagotomy as a whole, since insulin test meals had sometimes been carried out only when recurrence of ulcer symptoms suggested that vagal section had not reduced free acidity down to a safe level. The seriousness of failing to achieve adequate vagal section is emphasized by anastomotic or recurrent duodenal ulceration developing in 8 (30%) of these 26 cases.

A review of the test meals from one surgical centre, where satisfactory results were available from 62 out of 102 consecutive patients, disclosed that 17 had clear evidence of incomplete vagal section. Thus the incidence of incomplete vagotomy for this hospital lies somewhere between 16.6% and 27.4%.

No case of anastomotic or recurrent duodenal ulceration was found among those patients who had insulin-test-meal evidence of complete vagal section.

Comparison with other Surgical Procedures

Recurrent Ulceration

When simple gastro-jejunostomy headed the surgical field in duodenal ulceration it was clear that pyloroplasty, as a sole procedure, had no place in operative treatment. Even in 1906 Paterson recorded a relapse rate of 54% in 22 cases reviewed. Presumably, therefore, success from vagotomy and pyloroplasty depends on the vagal nerve section. Douglas (1947) found stomal ulceration in 27.1% of 37 cases in which simple gastro-enterostomy was performed for duodenal ulceration without stenosis. Tanner (1952) thought that there was a 30% risk of stomal ulceration in such cases.

Anastomotic ulceration after Polya type partial gastrectomy for duodenal ulceration may be as low as the figure of 0.25% quoted by Pulvertaft (1952), reviewing 458 of Visick's cases, but in his operations the level of gastric section was very high. It is probably true to say that the more radical is the gastrectomy, the more rare is recurrent ulceration, but the higher is the incidence of post-operative symptoms. The figure of 5.1% for recurrent ulceration after this operation quoted by Ivy *et al.* (1950) may well be taken as the expected upper limit.

It has been shown that the proved recurrence rate after vagotomy and gastro-jejunostomy in the present series was 3.5% and that there was an additional presumed recurrence rate of 2.1%, making a total of 5.6%. Crile (1952) reported a recurrence rate of 5% following vagotomy and gastro-jejunostomy in 140 cases, and Hoerr (1953) a recurrence rate of 8% in 146 cases. In more recent papers on the results of vagotomy and short-circuit in duodenal ulceration, Bennett-Jones and O'Donnahill (1955) reported 7.4% recurrences out of 95 cases followed from four to six years. Holt and Robinson (1955) gave an incidence of 2.7% in 110 of their patients followed for three years. The much higher figure of 12.4% recurrences has been found by Henson and Rob (1955) in 89 of their patients up to 29 months after operation.

With the exception of this last series, there would therefore appear to be only a slightly higher rate of recurrent ulceration following vagotomy and gastro-jejunostomy, when compared with that which would be accepted with equanimity by some surgeons after Polya partial gastrectomy. However, with regard to the series on which this paper is based, it is possible that there may be a further small incidence of recurrence as the years go by. Therefore it may well be that a ten-year follow-up of these patients may disclose further occasional failures. Nevertheless, this figure is not likely to be large, for, as Guy *et al.* (1953) have shown, the great majority of such unsatisfactory results become apparent within the first two years after operation.

The reports of Wilkins (1953) and Weinberg (1954) do not give sufficient long-term data on recurrence after vagotomy and pyloroplasty for their figures to be comparable. In the present series the recurrence after this operation was 4.5%, and this, as previously stated, is not statistically different from that following vagotomy and short-circuit.

Relief of Symptoms

There are no recent long-term evaluations of the results of the Billroth I operation for duodenal ulceration. This procedure is thought by Moloney (1954) to be better than Polya gastrectomy because the loss of weight is not so marked and symptomatic complaints tend to wear off.

Although it might appear from the findings presented earlier in this paper that cases after vagotomy and gastro-jejunostomy or pyloroplasty show a considerable incidence of minor post-operative symptoms, Ivy *et al.* (1950) found that of the 475 cases after Polya type partial gastrectomy where information was available only 46.3% were symptom-free. There is no significant difference between this figure and that of 53% found symptom-free following vagotomy and short-circuit and of the 47% similarly graded after vagotomy and pyloroplasty in the present series.

If those symptoms associated with gastric retention and recurrent ulceration are excluded, a review of the present series shows that complaints after vagotomy and an adequate gastric drainage operation tend to be relatively minor, and do not approach in severity or disablement the syndromes that sometimes follow partial gastrectomy.

Operative Mortality

The mortality rate following partial gastrectomy performed by experts is now low, for Hosford (1949) reported a death rate of 0.5% in 200 consecutive cases, while Goligher and Riley (1952) thought that a figure of 2% to 3% might be regarded as a fair estimate of the operative risk of death. Johnson and Orr (1953) suggested that up to 4% may generally be accepted as the average mortality rate following this operation.

Crile (1952) has reported 2 (0.4%) operative deaths among 445 patients undergoing vagotomy and gastro-jejunostomy, and Hoerr (1953) 0.5% deaths in patients in whom this procedure was performed, while the figure in the series under review is 1.5%.

It thus appears that there is a lower operative risk for vagotomy and gastro-jejunostomy than for partial gastrectomy.

Conclusions

This review indicates that in a gratifyingly large proportion of cases complete vagotomy combined with an adequate gastric drainage operation is followed by a lasting cure of duodenal ulceration.

The finding of statistically similar figures for recurrent ulceration following vagotomy and gastro-jejunostomy (5.6%) and vagotomy and pyloroplasty (4.5%) suggests that recurrence does not depend upon the type of gastric drainage employed but upon the completeness of vagal section. Support for this contention comes from the insulin-test-meal evidence of incomplete vagotomy found in all those cases of anastomotic or recurrent ulceration where the results of this investigation have been available. Nor has recurrent ulceration been found when vagotomy has been complete. Therefore it can only be presumed that the high recurrence rates reported in some series may be closely related to the incompleteness of vagal section. It is therefore of considerable importance that a surgical technique should be employed which is most likely to ensure complete division of the vagal nerves. The anatomical and operative considerations of Chamberlin and Winship (1947), Dragstedt *et al.* (1947), and Jackson (1949) are particularly valuable in this respect.

An additional incidence of 2.1% of presumed though unproved recurrent ulceration after vagotomy and gastro-jejunostomy raises the recurrent rate for this operation to 5.6% and the total rate in the whole series to 5.1%. This figure is not regarded as being at a prohibitive level, although it is higher than that generally achieved by Polya type subtotal partial gastrectomy. It must be remembered, however, that after vagotomy and a gastric drainage procedure there may also be a further incidence of recurrent ulceration as the years after operation pass by. Elucidation of the final figures for recurrence after these operations must therefore be deferred until at least a 10-year follow-up can be made of patients so treated.

The 6% incidence of gastric retention after vagotomy and pyloroplasty, as opposed to the absence of this complication following vagotomy and gastro-jejunostomy, would indicate that pyloroplasty cannot be relied upon as a gastric drainage procedure. It has also been found that post-operative symptoms after vagotomy and pyloroplasty are relatively more common than after vagotomy and gastro-jejunostomy. For

these reasons vagotomy and pyloroplasty cannot be supported as a procedure for general elective use in duodenal ulceration.

When the post-operative symptoms are considered, the absence of severe postprandial "dumping" phenomena must be emphasized. Moreover, while the incidence of biliary regurgitation (14%), diarrhoea (19%), flatulence (15%), and hypoglycaemic attacks (11%) after vagotomy and gastro-jejunostomy is not small, these symptoms were commonly minor and infrequent. Although direct comparison of symptoms with those occurring after partial gastrectomy is not easy, the figure of 92.4% for clinically satisfactory results after vagotomy and gastro-jejunostomy is similar to that generally quoted for Polya type partial gastric resection. Furthermore, the numbers of patients completely symptom-free after either of these two operations correspond closely.

In some important respects, however, the results of vagotomy combined with a proper gastric drainage operation would appear to be better than those of Polya type partial gastrectomy. Particularly is this so from the viewpoint of post-operative nutrition.

Additionally, the data shown in Table II indicate that the clinical results achieved in the series are as satisfactory in women as they are in men. Finally, the evidence shows that vagotomy combined with gastro-jejunostomy or pyloroplasty has a lower operative mortality rate than Polya partial gastrectomy.

Thus for the present the increased risk of recurrence would seem to preclude the general adoption of vagotomy and gastro-jejunostomy as the elective procedure of choice in chronic duodenal ulceration. The incidence of recurrent ulceration found in the present review is not high enough, however, completely to contraindicate this operation, and there is also evidence to suggest that the late recurrent rate is unlikely to be large.

It is felt, therefore, that the clear advantages that have been described merit its employment in certain selected cases. Thus when elective surgery is necessary in the treatment of duodenal ulceration, vagotomy and gastro-jejunostomy seems to be indicated when it is essential that the post-operative calorie intake be high, as in patients who perform heavy physical work or who have pulmonary tuberculosis. Moreover, the satisfactory results obtained in women would favour its adoption in females in preference to subtotal gastric resection, in view of the disappointing clinical results which this latter operation often gives in this sex. Finally, the lower mortality rate also supports the use of vagotomy and gastro-jejunostomy in old or poor-risk patients.

The final decision whether the better clinical results of vagotomy and gastro-jejunostomy in these cases justify its general use in the surgical management of duodenal ulceration must, however, await the determination of the true recurrence rate of this procedure.

This investigation has been carried out during the tenure of a grant from the Dan Mason Research Foundation, West London Hospital Medical School. It has been made possible by the generous co-operation of Mr. G. F. G. Batchelor, Mr. B. N. Brooke, Mr. H. W. Burge, Mr. W. M. Capper, Mr. G. Y. Feggetter, Mr. J. W. Leslie, Mr. R. Marnham, Mr. T. W. Mimpriss, Professor C. G. Rob, Professor F. A. R. Stammers, and Mr. N. C. Tanner, in allowing me to follow-up their patients. I am also indebted to Dr. C. G. Magee for his assistance, and to Mr. Bonewell, Miss M. Meredith, and Mrs. M. Stewart for their help with the record and secretarial work inseparable from a review of this nature.

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SOME NEW ASPECTS OF THE ACTION OF MORPHINE-LIKE ANALGESICS*

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In 1941 Krueger, Eddy, and Sumwalt published a review on the pharmacology of morphine and summarized the world literature on this subject. It was an admirable achievement. They collected the evidence from more than 9,000 publications and condensed it into a volume of 800 pages. Considering that the analgesic action of morphine is by far the most important of its effects, it is surprising that only 9 of these 800 pages were concerned with analgesia and that only 30 of the 9,000 references dealt with its experimental investigation. More than 99% of the work was devoted to the so-called side-effects.

There is a simple explanation for this strange disproportion. Until 1939 morphine and some of its derivatives, such as heroin, "dilaudid" (dihydromorphine hydrochloride), and "eukodal," were our only powerful weapons in the struggle against pain. The clinical experience with these drugs was sufficient to evaluate their analgesic potencies. The mechanism of analgesia was explained by the rather vague assumption of an action on the central nervous system. In their review Krueger *et al.* wrote: "Analgesic action is predominantly central, though recent work advocates a peripheral component. Its site and mechanism have not been determined. Nor has the mechanism of narcotic action been ascertained." This statement was made in 1941.

Measuring Analgesic Potency

After the discovery of synthetic substitutes for morphine much more work was devoted to the study of analgesia. Between 1939 and 1942, after the discovery of pethidine (Eisleb and Schaumann, 1939), innumerable substances have been synthesized in the laboratories of the Höchster Farbwerke by varying the chemical structure of active drugs (Kleiderer, Rice, and Conquest,

*University of London Lecture given at St. Thomas's Hospital Medical School, London.

1945). The pharmacologist was thus faced with the task of looking for analgesic activity in hundreds of compounds and of comparing the potencies of the active derivatives.

This requirement was met by about 50 different methods for measuring analgesia which have been elaborated within the last 10 to 15 years. The purpose of these methods was to provide exact figures for the analgesia produced and to allow a statistical evaluation of the results the accuracy of which could be relied upon.

Nowadays this kind of work is a little overdone, particularly when analgesic potencies are determined up to the second decimal place with well-defined fiducial limits. Often the possibility is overlooked that the values obtained are not the result of analgesia but are due to other factors—for instance, to changes in blood flow. Many workers are not disturbed by the fact that their results are inconsistent with those of other authors, so long as the validity of these results is proved by statistics. In Table I the analgesic potency of pethidine

TABLE I.—Relative Analgesic Potency (Morphine=1)

	Experimental	Clinical
Pethidine		
Author 1	0.135	0.15
" 2	0.45	
" 3	0.94	
Methadone		
Author 4	1.2	1.5
" 5	6.5	

Clinical doses: morphine, 15 mg.; pethidine, 100 mg.; methadone, 10 mg. Relative potency: morphine, 1; pethidine, 0.15; methadone, 1.5.

and of methadone, as tested by different workers, is compared with that of morphine. There is a wide variation in the ratios, and some of the figures are not in agreement with clinical experience. There is no reason to doubt the experimental results or the statistical evaluation of these different results. However, quantitative comparisons in animal experiments are obviously useful only if the results correspond to the experience obtained in man. Therefore, in many cases inadequate methods must have been used, a possibility not always realized.

Nevertheless, we have a number of reliable methods for measuring analgesia. The most subtle methods, however, are not necessarily always the best. As a historical demonstration I would like to tell you which instrument and which method I used in my discovery of the analgesic property of pethidine and in the determination of the analgesic potencies of methadone and of hundreds of other compounds. It was nothing but a forceps with which I pinched the tails of mice. Nevertheless, with this simple method I determined (Schaumann, 1940) the relative potencies of pethidine, methadone, phenadoxone, and ketobemidone, and the results have been confirmed by the majority of later investigators and by clinical experience. The method was actually described as early as 1929 by Haffner.

Criteria of Specificity

With the synthetic analgesics it became possible to separate the specific from the non-specific effects. An effect is specific if it is common to all analgesics whatever their chemical structure, and if the potency in producing the effect runs parallel to their analgesic potency.

Another criterion for the specificity of an action is its great sensitivity against small changes in the chemical constitution. If we exchange the N-methyl group in morphine or in levorphanol against an allyl group, we obtain two

antagonists of morphine. The analgesic effect is also abolished by an exchange of the methyl group in the side-chain of methadone for an ethyl group. From pethidine, an active compound can be derived by substituting a hydroxy-group in meta-position, but inactive products result from substitution in ortho- or para-position.

A particularly striking example of the sensitivity of the analgesic effect to small changes in the chemical structure is the difference between the optical isomers of the same compound. This became clear when the synthetic products became available. The dextro-isomer of levorphanol, for instance, has no analgesic potency, and in methadone the dextro-isomer is 30 times less potent than the laevo-isomer.

This difference between optical isomers allows a clear-cut distinction between the specific analgesic effect of the morphine-like analgesics and general anaesthesia. The potency of general anaesthetics is determined chiefly by their solubility in lipids. Therefore there is no difference between the optical isomers. This has been shown for the optical isomers of the secondary butyl alcohol (Viditz, 1933; Butler and Dickson, 1940) and for some barbiturates (Kleiderer and Shonle, 1943). In local anaesthesia too, there seems to be no significant difference between optical isomers (Gottlieb, 1923; King, 1924).

A further criterion for the specificity of an effect of analgesic is the fact that it is abolished by nalorphine.

Thus there are four criteria which allow us to test whether an effect observed with one of the analgesics is specific or not: (1) the sensitivity to small changes in chemical constitution; (2) the difference in potency between its optical isomers; (3) the antagonistic effect of nalorphine; and (4) the parallelism between the potency in producing the effect and the analgesic potency.

Based on these criteria, there are the following specific effects of morphine-like analgesics: (1) analgesia; (2) the depression of respiration; (3) the effect on intestinal motility; (4) central excitation in cats and mice; (5) the hyperglycaemic effect; (6) the effect on body temperature; and (7) the liability to produce addiction.

It is therefore not correct to say that the depression of respiration and the constipating effect of the analgesics are side-effects. They are inseparable from their analgesic action. This is unfortunately also true for the liability to cause addiction. It will therefore not be possible to find morphine-like analgesics without this undesirable addition, and in fact all efforts in this direction have been unsuccessful.

Analgesics and Constipation

A great deal of work has been wasted on the constipation produced by analgesics. In their review of 1941 Krueger *et al.* devoted 136 pages to this action of morphine and quoted more than 200 references. Nevertheless, in summarizing the results they arrived at the following conclusion: "In spite of the many and extensive studies . . . it is clear that there are many gaps yet to be filled before a clear and complete account can be given of the effect of morphine on the gastro-intestinal tract." The reason for this unsatisfactory result is that the overwhelming majority of authors stuck to the same method (the Thirty-Vella fistula), to the same experimental animal (the dog), and to the same intestinal segment (the small intestine), and were apparently very pleased when they always obtained the same results.

It is not easy to oppose such a bulk of experimental work. I think that the many published tracings which show a rise in tone and an increase in motility of the intestine, however constructive and impressive they may be, only prove that the method is unsuitable to explain the constipating effect in man. The method is open to the following criticisms: first, morphine causes diarrhoea in the dog, therefore the dog is not a suitable animal; second, the Thirty-Vella fistula is not a normal intestine; and third, the small intestine is the least important part of the intestine for the constipating effect.

In my opinion, three factors are predominant in causing constipation after morphine (1) Suppression of the call for defaecation. It is an old observation that a patient under morphine with severe diarrhoea often notices the call for defaecation for the first time only when the fluid has reached the skin. (2) Inhibition of the defaecation reflex. In rabbits (Eddy, 1932; Emerson and Moodey, 1935; Karr, 1947; Scott *et al.*, 1947) and rats (Schaumann, Giovannini, and Jochum, 1952) the number of faecal balls which appear per unit time diminishes, and this diminution runs parallel to the intensity and duration of analgesia (Table II). (3) Inhibition of propulsive motility as by the peristaltic reflex, especially in the large intestine.

TABLE II.—Rat, Number of Scybala

	Dosage (mg./kg.)	No. of Scybala During		
		1-3 hours	4-6 hours	7-9 hours
Control ..	0	4.4	3.2	2.3
L-Methadone ..	0.1	2.9	3.2	3.3
	0.5	1.4	3.0	5.2
	1.0	0	4.0	5.0
D-Methadone ..	1.0	3.5	4.1	3.4
	5.0	1.4	4.0	4.6
	10.0	0.8	3.0	4.3
Morphine ..	0.2	2.5	1.0	2.5
	0.5	1.7	4.2	5.1

Nearly all authors accept the theory of a spastic constipation with increased intestinal motility. In my opinion it is unlikely that this occurs. According to Vaughan Williams and Streeten (1951), morphine spasms in the small intestine of the dog can be overcome by 19 cm. water pressure; the force of the peristaltic wave, however, is at least 15 to 20 times stronger. As everybody knows from his own sad experience, even the anal sphincter is no safe barrier against an oncoming peristaltic wave.

So far I have dealt with the specific effects. The unspecific actions are: their toxicity to animals, spasmolytic effects on smooth muscle, local anaesthesia, and inhibition of certain enzymes. These effects are unspecific because they do not run parallel with the analgesic power of the analgesics, because there is no difference between the optical isomers, because they are not antagonized by nalorphine, and because they occur also with compounds of entirely different chemical structure.

Toxicity

A few more words about toxicity. It can be seen from Table III that there is no constant relation between analgesia and toxicity. Pethidine is about seven times weaker than morphine in producing analgesia, but is twice as toxic for mice. D-methadone is just as toxic as its L-isomer, although its analgesic potency is 30 times weaker. In man the situation is different, because in man toxicity is determined by the depressant effect on respiration. It is therefore not possible to calculate a therapeutic index for use in man from animal experiments. Otherwise the clinical use of pethidine would be criminal, since it has a 15 times lower index than morphine in animal experiments. However, clinical experience has shown that the contrary is true, or pethidine would not have displaced the use of morphine in general anaesthesia to the extent it has.

Paradoxically we might even say: the greater the toxicity of a morphine-like analgesic in mice in comparison to its

TABLE III

	Toxicity (Mice subc. inj.)	Analgesia (Morph = 1)	Analgesia/Toxicity Therapeutic Index (Morph = 1)
	(mg./kg.)	(Morph = 1)	
Morphine ..	400	1	1
Pethidine ..	200	2	1/14
DL-Methadone ..	42	10	1/5
Phenadoxone ..	200	2	1/5
L-Methadone ..	35	11	1/3
D-Methadone ..	50	8	—

analgesic potency, the smaller is the danger of respiratory failure in man. The depression of respiration is antagonized by the central excitatory effect which in mice causes lethal convulsions. Therefore a low therapeutic index in animals means less danger in man. It is also a strange and paradoxical fact that in man the smallest overdoses are the most dangerous in morphine poisoning and that the mortality decreases with increasing doses. Krueger *et al.* have compiled some 200 cases of morphine poisoning from the literature with the following result: with doses from 60 to 600 mg. there was a mortality of 25%; with doses from 700 to 1,200 mg. the death rate went down to 6%; and with enormous doses from 1,500 to 7,200 mg. it reached only 15%. The highest known doses administered—that is, 4.5 g., 4.8 g., and 7.2 g.—were not fatal. Tatum, Seever, and Collins (1929) found the same paradox in monkeys: with 20 to 150 mg./kg. the mortality was 27%, and the fatal effect was due to depression; with doses from 200 to 300 mg./kg. there were no alarming symptoms, and doses of over 500 mg./kg. caused convulsions and death.

The parallelism between the specific actions suggests that a close relation exists also so far as their site and mechanism of action are concerned. This in turn makes it likely that a close relation exists also between the apparently different physiological functions which are affected by the analgesics. In my opinion, this is really the case. All these functions have the common task of warning and protecting the organism against imminent damage; they exert a protective function.

The "Protective System"

There can be no doubt that pain in all its variations—from the subconscious (subcortical) pain reflex to the conscious experience of pain—has such a protective function. The reflex protects against damage of the tissue—just think of the decapitated frog pulling its leg out of an acid solution—and the experience of pain warns against imminent dangers. The morphine-like analgesics inhibit this protective function of pain by suppressing first the conscious experience of pain and in higher doses also the reflex response to painful stimuli.

In analogy, we must recognize a protective function in the regulation of respiration. It protects the body against acidosis. Apart from the subconscious autonomic regulation we have the warning sensation of dyspnoea which corresponds to the experience of pain and which can reach the terrible feeling of suffocation. Here, too, the analgesics block first the conscious sensation of dyspnoea, and finally, in higher doses, the subconscious, automatic regulation of respiration as well.

There is a similar safeguard concerning circulation. We have the regulation of blood pressure and the Bezold reflex. The disagreeable throbbing of the heart and the feeling of anxiety associated with stenocardia warn against imminent collapse by overstrain of the heart and may be compared to the sensations of dyspnoea and of pain. Again the morphine-like analgesics in therapeutic doses abolish the feeling of oppression, and in high doses the blood pressure regulation as well.

The effects on the gastro-intestinal tract and on the temperature regulation can be regarded in the same light. The analgesics first suppress the call to defaecate, then the defaecation reflex, and finally the entire propulsive motility. They first abolish the feeling of cold, then the shivering fit, and finally the whole system of temperature regulation.

These physiological functions can be separated from the rest of the autonomic regulations and from the epicritical system of sensual perception because of their special task and because of their specific sensitivity to the morphine-like analgesics. They can be considered together as forming what I have termed the "protective system" (Schaumann, 1954a, 1954b) (Table IV).

It is characteristic of this protective system that its different functions are brought into action by noxious stimuli and that in man they enter the psychic sphere. All these

TABLE IV.—Some Parts of the Protective System

Individual Function	Noxious Stimulus	Subconscious Regulations	Psychical Equivalent
Protection of tissue Respiration Circulation	Damage to tissue CO ₂ Over-strain	Defence-reflex Hyperpnoea Bezold-Jarisch effect Peristalsis. Defaecation reflex	Sensation of pain Dyspnoea Palpitations. Oppression Call to defaecation Feeling of cold. Shivering fit
Digestive tract	Distension. T.x. stimulus	Temp. reg.	
Constancy of body temp.	Body temp.		

separate functions are inhibited by the morphine-like analgesics in proportion to their analgesic potencies. Analgesia is therefore only one part of a general anti-protective action of the analgesics.

Doses of analgesics which suppress the dysphoric sensations connected with the functions of the protective system do not influence sensory perceptions like touch, taste, vision, and hearing and their mental assimilation. In this respect, analgesics contrast with general anaesthetics. The invaluable relief given by the analgesics rests on their ability to suppress the protective system with its dysphoric sensations and anxiety. When using analgesics we have to keep in mind that they inactivate this protective system, which serves the useful purpose of warning against injury. Therefore the use of analgesics should be permitted, or indeed ordered, only when the warning has been heeded or the functions of the system have lost their meaning.

We have also to remember that liability to produce addiction has its cause in the suppression of these tormenting sensations. The danger of becoming an addict will be particularly great in people who have an abnormally oversensitive protective system and who are troubled with dysphoric sensations by stimuli which are quite normal. These people must be regarded as being ill. Suppression of their over-active protective system at first results in the feeling of relief from their troubles; there is therefore the temptation to continue using analgesics, which in the end results in physical dependence. This is the reaction of the protective system against the depressing effect of the analgesics and becomes apparent in the form of the symptoms of withdrawal. The longer and the more intensive the use of analgesics has been, the stronger will be these symptoms.

Conclusion

When we gained our intellectual powers we lost paradise. We were enabled to enjoy all that is good, beautiful, and true, but we were also condemned to suffer pain, worries, and fear to an extent unknown to animals. But in addition we have been endowed with the mental powers and the free will to obey the warning voice of our protective system, or to stifle it when it becomes a senseless tormentor. If we are forced to stifle these promptings, the morphine-like analgesics are our most efficient weapons for the purpose.

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TABLE V.—Medical Cases: Incidence of Side-effects Following a Total of 803 Injections

Vomiting	..	..	..	9
Sweating	..	..	..	8
Nausea	..	..	..	7
Headache	..	..	..	5
Giddiness	..	..	..	5
Blurring of vision	..	..	..	1
				35

TABLE VI.—Post-operative Cases: Incidence of Side-effects Following a Total of 800 Injections

	Total Hysterectomy	Pelvic Floor Repair	Vaginal Hysterectomy	Caesarean Section	Others	Total
Sweating	7	8	2	—	4	21
Giddiness	2	2	—	4	1	10
Nausea	1	2	—	—	1	4
Vomiting	2	—	—	2	—	4
Headache	1	—	—	—	—	1
Total	13	12	3	6	6	40

veretum ("omnupon") $\frac{1}{2}$ gr. (22 mg.), six-hourly. Adequate post-operative analgesia to facilitate early leg and breathing exercises has been found to be especially valuable, and rigorous adherence to this regimen has lowered the incidence of fatal pulmonary embolism to one in the last 1,000 major gynaecological operations performed by one of us (E.C.).

During this trial no obvious respiratory depression or change in blood pressure or pulse rate occurred, nor did any patient complain of anorexia or constipation. In the dosage used, dipipanone appeared to have little hypnotic effect. The post-operative patients were awake and completely co-operative as soon as the anaesthetic had worn off; in fact, amylbarbitone sodium, 3 gr. (0.2 g.), had to be given to some of the patients before they were able to go to sleep.

The blood picture of patients whose blood was examined during the trial showed no change attributable to dipipanone. No withdrawal symptoms were noted after up to 80 effective analgesic doses. However, since in the majority of cases pain was short-lived and prolonged analgesia unnecessary, no conclusion can at present be drawn concerning habit formation with this drug.

Morbidity and Mortality

There were no deaths in the series during the period of the trial. One patient, who had a hysterectomy for fibroids, had a small pulmonary embolism on the fourth day. She was given anticoagulant therapy and made a complete recovery.

Summary

The results of the administration of a new analgesic, dipipanone hydrochloride, to two distinct series, each of 100 cases, are presented. All the cases treated suffered from pain severe enough to justify the use of a potent analgesic.

In the dosage employed, dipipanone was an effective analgesic. Adequate pain relief was obtained in the great majority of cases of post-operative pain following major gynaecological surgery and of pain due to a variety of acute and chronic medical conditions. Only 3 out of the 200 cases treated failed to obtain any relief from this drug. The optimal dose was found to be 20 mg. in the medical cases and 25 mg. in the post-operative cases.

The onset of analgesia after subcutaneous injection occurred within 10 minutes and maximal relief was obtained in about 20 minutes in most cases. The effect lasted for approximately five to six hours. There was no obvious depression of respiration or tendency to drowsiness, nor was there any local reaction or pain at the site of injection.

Side-effects were rare, their incidence in relation to the number of doses administered being 4–5%. The only side-effects of any importance were nausea, vomiting, sweating, and giddiness. In only one case were they severe enough to justify transfer to another analgesic.

Our thanks are due to our assistants and to the sisters in charge of the medical and gynaecological wards at Dudley Road Hospital, Birmingham, without whose co-operation this clinical trial could not have been carried out. The material used in the trial was "pipadone" brand injection of dipipanone hydrochloride, kindly supplied by Burroughs Wellcome and Co.

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N-ACETYL-PARA-AMINOPHENOL AS AN ANALGESIC

A CONTROLLED CLINICAL TRIAL USING THE METHOD OF SEQUENTIAL ANALYSIS

BY

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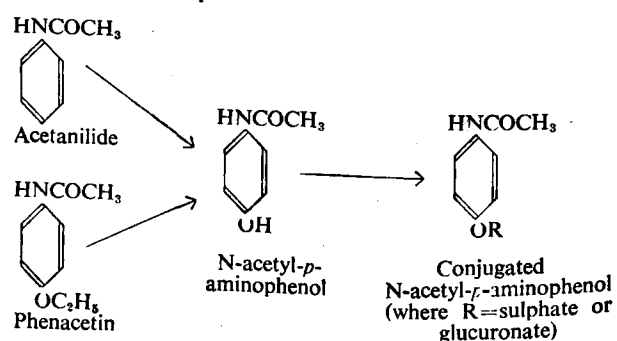
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Acetanilide and phenacetin have long been used for their analgesic and antipyretic properties. Brodie and Axelrod (1948, 1949) have shown that the metabolism in the human body of acetanilide and of phenacetin closely resemble one another in that the major route in each case involves the production of N-acetyl-*p*-aminophenol (N.A.P.A.P.). In each case a high percentage of the ingested drug is excreted by the kidney as conjugated N-acetyl-*p*-aminophenol:



In addition to the major route shown above there is a minor metabolic route which for acetanilide involves the formation of aniline and for phenacetin the formation of *p*-phenetidin. Although neither of these products has been shown to be directly responsible for methaemoglobin formation it is thought that they are both precursors of the methaemoglobin-forming substance. It seems that N.A.P.A.P. is not responsible for

the formation of methaemoglobin. Neither does it appear to cause the haemolysis occasionally encountered as a toxic manifestation following the administration of acetanilide and phenacetin.

The fact that after ingestion of acetanilide and phenacetin plasma levels of the parent substances remained low whilst the level of N.A.P.A.P. rose rapidly led Brodie and Axelrod to believe that the analgesic and antipyretic properties of both drugs might be due to this derived product. Doses of 1 g. of N.A.P.A.P. given by mouth to human subjects were rapidly absorbed, and peak plasma levels were reached in one to two hours. No methaemoglobin was formed, and it appeared that dose for dose N.A.P.A.P. and acetanilide were equal in analgesic activity.

Using a cutaneous heat-radiation method, Flinn and Brodie (1948) found that the pain threshold of human subjects rose 30 minutes after the ingestion of N.A.P.A.P., reached a peak at two and a half hours, and returned to the baseline at four hours. The maximal rise averaged 30% as against 4% for a placebo.

Boreus and Sandberg (1953) found in rats that the analgesic and antipyretic properties of phenacetin and N.A.P.A.P. were approximately equal, though the latter seemed to be less toxic. In human subjects they found that, following a single 3-g. dose of either drug, methaemoglobin formation was low with phenacetin and negligible with N.A.P.A.P.

Batterman and Grossman (1955) carried out controlled trials, using either N.A.P.A.P. or acetylsalicylic acid as an analgesic, and concluded that, with the exception of exudative forms of arthritis, N.A.P.A.P. was a superior analgesic to acetylsalicylic acid alone for the treatment of musculo-skeletal conditions. Side-effects occurred no more commonly than after the administration of a placebo. A dose of N.A.P.A.P. of 3.6 g. daily for up to 116 weeks failed to produce any blood, kidney, or liver disturbances. No uricosuric effect was noted.

Keele (1953) has mentioned N.A.P.A.P. as an analgesic, but so far as we are aware no controlled clinical trial of this drug has been performed in this country, where it is now marketed under the trade name of "panadol."

Purpose of the Trial

Many patients suffering from musculo-skeletal disorders find that salicylates alone are insufficient to control their symptoms, but a large number gain relief from the use of tab. codein. co. (compound codeine tablets, B.P., containing acetylsalicylic acid 4 gr. (0.26 g.), phenacetin 4 gr. (0.26 g.), codeine $\frac{1}{2}$ gr. (8 mg.)). However, mild side-effects due to one or other of the constituents commonly occur and sometimes are troublesome enough to preclude the routine use of the drug. Thus if N.A.P.A.P. could be shown to be as effective an analgesic as tab. codein. co., and its side-effects significantly less, it might find a useful place in the treatment of rheumatic disorders, and it was for this reason that a controlled trial of N.A.P.A.P. against tab. codein. co. was carried out.

Selection of Patients

The patients who took part in the trial were selected by one of us during the course of routine hospital follow-up attendance. They had to conform to the following criteria, which could be rigidly applied since the number of potentially suitable cases was large: (a) The patient was known to require regularly some form of simple analgesic, usually tab. codein. co., to control symptoms. (b) Either by knowledge of the individual patient or the nature of his or her

disease the observer could be reasonably certain that the same average level of pain could be expected during the whole four weeks of the trial. (Thus all acute and subacute conditions and those commonly showing frequent periods of pain remission were excluded.) (c) No alteration in therapy by drugs, physical methods, or any other means had been made during the period immediately preceding the trial, and sufficient stability of the patient's condition must have been present to obviate the need for any such change during the trial period of four weeks. (Any alteration in condition during the trial period which necessitated a change in treatment automatically excluded that patient from the trial.)

The cases used in the trial were made up as follows:

Rheumatoid arthritis	..	..	..	19
Osteoarthritis	..	..	..	12
"Frozen shoulder" (periarthritis)	..	..	..	6
Ankylosing spondylitis	..	..	..	2
Chronic gout	..	..	..	1
Scleroderma with joint involvement	..	..	..	1
Cervical spondylosis	..	..	..	1
				42

Method of Trial

The two drugs were compared by their action in the same patient, and each comparison was carried out twice on each patient to ensure greater reliability of result. The statistical technique used in the trial was that known as sequential analysis. Sequential methods appear to have been used in medical research on only one or two occasions in this country, but in many forms of clinical trial they offer great possibilities of economy in material, time, and computation. An excellent introduction to the method was given by Bross (1952) and a more complete account has been published by Armitage (1954).

Administration of Drugs

The first requirement of a proper clinical trial is to confuse completely the doctor who gives the patient the drugs, and in this we succeeded admirably. The test period for each patient was four weeks. During the first two weeks each patient received drug A for one week and drug B for one week, and at the end of the fortnight was required to say, at his weekly interview with one of us, which, if either, had been more effective in easing his pain. A similar comparison was carried out during weeks three and four. The order in which the drugs were given was randomized, and the doctor was unaware which he was giving. Indeed, at one time he began to believe, despite knowledge of the statistical design, that he could spot which drug was which from the patients' responses. A record was therefore kept for a few weeks, which when later compared with the identification file showed that he scored no better than chance expectation in his "hunches."

In the first instance each patient was asked to co-operate in the trial of a new analgesic drug: they were never told that they were comparing different drugs, and the few queries which arose were concerned with whether there was a difference in "strength" from one week to the next. At the end of each fortnight the observer questioned the patient concerning his symptoms only: no suggestion was made that different preparations were being compared. The dosage used in the trial was tab. codein. co. 2 three times daily and N.A.P.A.P. 2 tablets (1 g.) thrice daily respectively. Every patient was told to take extra doses of their usual analgesic if required, but it was understood that the trial drug must be the basic medicament.

The randomization was performed as follows: The numbers 1 to 400 were written down in a random order from their appearance in Fisher and Yates tables. Four hundred bottles, stamped 1–400, were then arranged in this order. The first 200 in the row were then filled with drug A, and the last 200 with drug B, the identification file being made at this point. The first two bottles were taken from the A batch and stamped +, and the first two bottles taken from the B batch and stamped -. These four bottles were tied

of the solutions used were, 0.5% solution of bemegride (5 mg. per ml.), and a 1% solution of amiphenazole (10 mg. per ml.), the latter being made up immediately before use.

Postural drainage and breathing exercises were begun and continued daily throughout the patient's stay in hospital. Eleven of the cases regained full consciousness within 12 hours.

Case Reports

Case 1.—A married woman aged 58 was admitted to hospital in coma after taking 15 "carbrital" capsules. On examination she was unresponsive to any stimuli; B.P. 90/0; pulse 80, feeble and regular. Deep reflexes were absent except for plantars, which were flexor. The pupils reacted sluggishly to light and accommodation. She was treated with a total of 3 ml. of amiphenazole and 30 ml. of bemegride and regained full consciousness in 10 hours.

Case 2.—A married woman aged 51 was admitted in coma after taking 15 3-gr. (0.2-g.) tablets of amylobarbitone sodium. On examination she was unresponsive to any stimuli; cyanosed; B.P. 100/40; pulse 110, irregular and of poor volume; systolic murmur at the apex and aortic areas. Deep reflexes were absent except for plantars, which were flexor. The pupils were contracted and responded sluggishly to light and accommodation. She was treated with a total of 8 ml. of amiphenazole and 80 ml. of bemegride and regained full consciousness in nine hours.

Case 3.—A man aged 55 was admitted in coma after taking 15 3-gr. (0.2-g.) tablets of amylobarbitone sodium two and a half hours before admission. On examination he was unresponsive to any stimuli; B.P. 100/50; pulse 84 and regular. Deep reflexes were present but diminished; plantars flexor. The pupils were contracted and reacted sluggishly to light and accommodation. He was treated with a total of 18 ml. of amiphenazole and 180 ml. of bemegride and regained full consciousness in 11 hours.

Case 4.—A man aged 28 was admitted in coma after taking 12 carbrital capsules in mistake for mints in the cinema. On examination he was unconscious but responded to painful stimuli; B.P. 100/60; pulse 70. Deep reflexes were present but diminished; plantars flexor. The pupils were dilated and reacted sluggishly to light and accommodation. He was treated with a total of 4 ml. of amiphenazole and 40 ml. of bemegride and regained full consciousness in nine hours.

Case 5.—A married woman aged 36 was admitted in coma after taking 10 1-gr. (65-mg.) tablets of phenobarbitone one and a half hours before admission. On examination she was unconscious and unresponsive to any stimuli; B.P. 100/60; pulse 88 and regular. Deep reflexes were present but diminished. The pupils were contracted and reacted sluggishly to light and accommodation. She was treated with a total of 3 ml. of amiphenazole and 30 ml. of bemegride, became semi-conscious and muttered unintelligibly, and regained full consciousness in eight and a half hours.

Case 6.—A man aged 45 was admitted in coma after taking 15 tablets of butobarbitone one hour before admission. On examination he was unconscious and unresponsive to any stimuli; B.P. 90/60; pulse 68 and regular. Deep reflexes were present but diminished; plantars flexor. The pupils were dilated and did not react to light and accommodation. He was treated with a total of 4 ml. of amiphenazole and 40 ml. of bemegride and regained full consciousness in seven hours.

Case 7.—A man aged 49 was admitted in coma resulting from 20 1-gr. (65-mg.) tablets of phenobarbitone taken one hour before admission. On examination he was unconscious and unresponsive to any stimuli; B.P. 90/40; pulse 120 and feeble. Deep reflexes were present but diminished; plantars flexor. The pupils were contracted but reacted to light and accommodation. He was treated with a total of 5 ml. of amiphenazole and 50 ml. of bemegride and recovered full consciousness in nine hours.

Case 8.—This patient, the same as in Case 2, now aged 52 was admitted in coma after taking 25 3-gr. (0.2-g.) tablets

of amylobarbitone sodium one and a half hours before admission. On examination she was in coma and unresponsive to any stimuli; B.P. 90/40; pulse 100 and regular. Deep reflexes were absent; plantars flexor. The pupils were dilated and did not react to light and accommodation. She was treated with a total of 10 ml. of amiphenazole and 100 ml. of bemegride, became semi-conscious, and regained full consciousness in six hours.

Case 9.—A married woman aged 29 was admitted in coma after taking 8 3-gr. (0.2-g.) tablets of amylobarbitone sodium three hours before admission. On examination she was unconscious and unresponsive to any stimuli; B.P. 100/50; pulse 80. Deep reflexes were present but diminished. The pupils were dilated and did not react to light and accommodation. She was treated with a total of 9 ml. of amiphenazole and 90 ml. of bemegride and regained full consciousness in eight hours.

Case 10.—A married woman aged 34 was admitted in coma after taking 10 3-gr. (0.2-g.) tablets of amylobarbitone sodium and 20-25 25-mg. tablets of pethidine. On examination she was unconscious and unresponsive to any stimuli; B.P. 100/40; pulse 120 and feeble. Deep reflexes were absent in the lower limbs and diminished in the upper limbs; plantars extensor. The pupils were contracted and did not react to light and accommodation. She was treated with 100 mg. of nalorphine hydrobromide and a total of 4 ml. of amiphenazole and 40 ml. of bemegride, became semi-conscious, and regained full consciousness in three hours.

Case 11.—A single woman aged 25 was admitted in coma after taking 20 carbrital capsules and 20 3-gr. (0.2-g.) tablets of amylobarbitone sodium from seven to eight hours previous to admission. On examination she was unconscious, cyanosed, unresponsive to any stimuli; respirations were slow and stertorous; B.P. zero; pulse 130 and feeble. Deep reflexes were absent except for plantars, which were extensor. The pupils were dilated and did not react to light and accommodation. She was treated with 29 ml. of amiphenazole and 290 ml. of bemegride and became semi-conscious. She relapsed after one hour. A further 15 ml. of amiphenazole and 150 ml. of bemegride were given and full consciousness was regained 17 hours after admission.

Case 12.—A man aged 49 was admitted in coma after taking 30 1-gr. (0.1-g.) tablets of phenobarbitone sodium two hours before admission. On examination he was unconscious and unresponsive to any stimuli; B.P. 100/60; pulse 100 and feeble. Deep reflexes were absent except for plantars, which were extensor. The pupils were contracted and did not react to light and accommodation. He was treated with a total of 22 ml. of amiphenazole and 220 ml. of bemegride and recovered full consciousness in 12 hours.

Comment

It is obviously difficult to compare these cases critically owing to the variety of barbiturates taken, the length of time of coma before the beginning of treatment; and the fact that it was not possible to estimate the blood barbiturate in any of them. However, several salient points do emerge from the small experience gained with this form of treatment: (1) A safe level of consciousness can be attained in a short period of time, which can be maintained and gradually improved to full consciousness in a matter of hours. (2) The incidence of chest infection is minimized. In these cases it was reduced to zero, and all the patients were able to look after themselves within 24 hours. (3) The stay of the patient in hospital was reduced, the time varying from five to nine days—an important factor, bearing in mind the high incidence of barbiturate intoxication and the shortage of beds in a ward for acute medical cases.

Summary

Twelve cases of fairly severe barbiturate poisoning were treated with amiphenazole and bemegride. All the patients regained consciousness within 24 hours, the

majority well within this period. No deaths occurred, and there was no incidence of chest infection in any of these cases. The stay of the patients in hospital was cut down dramatically compared with former methods of treatment. Although the number of cases treated is small, I feel that it is worth while reporting them, in view of the results obtained, which, in my opinion, are a vast improvement on the previous methods at our disposal.

I am indebted to Drs. W. A. Jaques, G. D. Owen, and A. W. B. Edmunds, consultant physicians at this hospital, for permission to publish these cases. In particular I must thank Dr. Edmunds for his advice, encouragement, and criticism, without which I should have been unable to present these cases.

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Medical Memoranda

Case of Strychnine Poisoning

Apart from accidental strychnine poisoning, particularly in young children, reports of attempted suicide with strychnine sulphate are uncommon. The toxic dose of strychnine in man appears to vary from about 2 mg., which has resulted in unpleasant symptoms, to about 15 mg., which has caused death. Recovery, however, has taken place after 1 g. or more has been ingested (Thienes and Haley, 1955).

The following case is of an intelligent boy aged 14 who obtained two 4-gr. (50-mg.) capsules of pure strychnine and swallowed them impulsively after a quarrel with his mother.

CASE REPORT

The boy was admitted to hospital about one and a half hours after 1½ gr. (100 mg.) of strychnine had been swallowed. He was fully conscious. Classical intermittent strychnine convulsions, occurring every few minutes, were present. He complained of severe pain, especially in his back, neck, and limbs. His colour was normal, and he looked extremely anxious. A mild stimulus such as holding his wrist produced a generalized contraction. He admitted he had swallowed the capsules of strychnine. No other physical examination was made at this stage because touching him caused convulsions.

He was immediately transferred to the theatre, where he was given atropine sulphate, 1/100 gr. (0.65 mg.) intravenously, followed by thiopentone sodium, 0.5 g., and suxamethonium chloride, 50 mg. A cuffed endotracheal tube, size 7, was passed and controlled respiration begun. The convulsions were then controlled by an intravenous infusion of 1 pint (570 ml.) of normal saline to which 1.5 g. of thiopentone sodium and 200 mg. of suxamethonium chloride had been added. The rate of drip was regulated to 20-30 drops a minute as required to maintain muscular relaxation. His blood pressure was 120/70 and pulse 120.

A wide-bore stomach tube was passed and a few ounces of fluid aspirated. This was followed by several wash-outs. The stomach contents were sent for analysis.

As a cover against respiratory infection penicillin was given intramuscularly and a catheter inserted into the bladder.

Still anaesthetized, the patient was taken to a single room. After six hours the anaesthetic was stopped for approximately two minutes, but tetanic contractions immediately developed. Rigidity of all muscles and marked ankle clonus were present. The thiopentone-suxamethonium drip was therefore continued for another six hours, then stopped again. No signs of contractions occurred, the limbs and

neck muscles remaining quite flaccid. Altogether 1 pint (570 ml.) of normal saline and 1½ pints (850 ml.) of glucose-saline, containing 3.25 g. of thiopentone and 500 mg. of suxamethonium, were given in 12 hours.

On stopping the anaesthetic 3 gr. (100 mg.) of phenobarbitone sodium was injected intramuscularly. The cuffed endotracheal tube was replaced after six hours by an ordinary tube, so as to prevent damage to the trachea by pressure.

The following day the boy merely complained of some back pain and a sore throat, otherwise he was quite well. He was discharged after a week's observation.

A large amount of strychnine was found in the gastric contents and the urine.

COMMENT

As in the treatment of tetanus so in this case of strychnine poisoning, complete control of the convulsions by an anaesthetist using a general anaesthetic plus a muscle relaxant is required.

It was of particular importance to aspirate the stomach after induction of anaesthesia, for a quantity of strychnine was found in the mucous gastric contents, although no food was recovered and ingestion of strychnine had taken place one and a half hours previously. The need for rapid treatment is shown.

It is of interest that in some cases of strychnine poisoning a reappearance of convulsions has been reported more than 48 hours after initial treatment. Strychnine is apparently again released into the blood stream by the liver. In the above case no further symptoms or signs of strychnine poisoning appeared.

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Acute Haemolytic Anaemia following Sulphadimidine Therapy

Acute haemolytic anaemia is now a recognized complication of medication with the sulphonamide group of drugs. It was first described by Harvey and Janeway (1937) during sulphanilamide therapy. Since then many further cases have been reported with sulphathiazole (Rothstein and Cohn, 1942), with sulphapyridine (Ravid and Chesner, 1940), and with sulphadiazine (Ross and Paegel, 1946). In addition, comprehensive reviews have been published by Wood (1938) and by Long *et al.* (1940).

No case, however, has yet been recorded of haemolytic anaemia following sulphadimidine ("sulphamezathine") therapy; indeed, toxic effects following the use of this drug are rare and usually limited to mild nausea and vomiting, and it is generally regarded as the "best sulphonamide for routine use" (*National Formulary*, 1955, p. 41).

CASE REPORT

A boy aged 2½ years was admitted to hospital on January 22, 1956. Five days previously he had developed acute otitis media preceded by 24 hours' diarrhoea, for which he had been given 1 g. of sulphadimidine, followed by 0.5 g. six-hourly to a total of 8 g. On January 20 he suddenly began passing dark urine and became progressively jaundiced.

On examination in hospital he was extremely jaundiced and obviously pale and still had diarrhoea, the fluid motions being dark brown in colour with no visible blood or mucus. There was tachycardia, the pulse rate was 160, and the temperature 99.4° F. (37.4° C.). The liver was enlarged to two fingerbreadths, but the spleen could not be felt. A history of measles in August, 1955, was subsequently revealed for which he had then received a short course of sulphadimidine to a total of 3 g.

Laboratory Findings on Admission.—Hb 24% (3.55 g.); W.B.C., 25,000 per c.mm. (segmented polymorphs 63%, metamyelocytes—band forms 3%, lymphocytes 26%, monocytes 8%); the red cells showed anisocytosis and polychromasia and nuclear remnants; 15 normoblasts were counted per 100 W.B.C.s; platelets plentiful; reticulocytes, 11%; Race-Coombs test; both the direct and the indirect were negative. The blood serum was dark brown in colour and showed spectroscopically typical bands of methaemoglobin. Schumm's test was positive. Fragility test of the red cells was normal. The urine was light red in colour and contained free haemoglobin and granular casts, but no red blood cells.

A diagnosis of acute haemolytic anaemia was made and treatment with whole blood transfusion, 2 pints (1,140 ml.), was immediately started together with cortisone, 12.5 mg. six-hourly, by mouth, for six days. Thereafter he made a gradual but uneventful recovery, the haemoglobin level gradually climbed to 95% (14 g.) by February 3, and the only abnormality remaining in the urine on discharge was a slight trace of albumin.

It is interesting to note that the child had received a small amount of sulphadimidine five months before, without any apparent ill effect, and this substantiates the theory of sensitization.

I am grateful to Dr. T. S. Rodgers, consultant paediatrician, and to Dr. K. R. Lown for the opportunity of reporting this case.

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Generalized Vaccinia

The following is a report of a fatal case of generalized vaccinia occurring in an infant aged 5 months who had been vaccinated sixteen days before death.

CASE REPORT

The patient was a healthy, well-nourished male infant of 5 months who had been vaccinated on January 17, 1956. The vaccination took normally, but on January 27 (ten days after vaccination) a vesicle appeared on his right leg, and another on his trunk. At this stage fresh vesicles continued to erupt on different parts of his body until the day before admission. On January 29 he vomited, went off his feeds, and passed two or three loose stools.

He was admitted to hospital on February 2 because of his skin rash and a generalized convulsion lasting a few minutes which had occurred about one hour before admission. Following the convulsion he had remained semi-conscious.

On admission the infant was conscious but drowsy. His temperature was 95° F. (35° C.), pulse 168, and respirations 50. He had a generalized vesicular rash distributed over the whole body, including the scalp, both palms, and the sole of the left foot. Some of the vesicles were umbilicated, some haemorrhagic, and some were beginning to crust. Over the left deltoid region the primary vaccination was a raw bleeding area involving the whole skin thickness, 5 cm. in diameter, with undermined, indurated edges. There were no secondary vesicles at this site. Examination was otherwise negative and in particular there were no signs of encephalitis. The infant collapsed and died three hours after admission.

The mother was vaccinated successfully at 7 years and the father in infancy. Neither had been revaccinated. There were no other children.

Post-mortem Findings.—In addition to the skin lesions already described there were numerous petechiae on the

peritoneal surface of the liver, otherwise nothing grossly abnormal was found and there was no evidence of encephalitis. Specimens were taken for virus study and histology.

Histology.—*Skin vesicle:* The vesicle appeared as a circumscribed area of destruction of the epidermis. The appearances suggested autolysis of the epidermal cells *in situ*, leaving clear spaces with the supporting stroma intact and the surface entire. The vesicle contained a few degenerate leucocytes but there was no surrounding or subjacent cellular infiltration. No inclusion bodies were seen by haematoxylin or eosin nor by erythrosin and toluidine blue stains. *Liver:* The petechiae consisted of small zones of necrosis of the liver cells and associated haemorrhage. *Brain:* There was no evidence of encephalitis.

Virology.—Culture, on the chorio-allantoic membranes of developing chick embryos, of the fluid obtained from abdominal vesicles showed the presence of a virus. A further series of chick embryo inoculation tests with diluted virus and virus mixed with antivaccinal serum showed that complete neutralization and inhibition of growth was obtained when antivaccinal serum was added. The virus grew normally without the serum. This result indicated that the virus was vaccinia.

COMMENT

Serious complications of vaccination against smallpox are very rare. According to Jubb (1943) generalized vaccinia occurs in 1 in 100,000 vaccinations. Laurance, Cunliffe, and Dudgeon (1952) give an incidence of 1 in 25,000 for infants vaccinated in the first year of life. Keidan, McCarthy, and Haworth (1953) describe a case of fatal generalized vaccinia and mention that of eight cases known to them seven had been fatal. Including the case reported above the mortality rate of generalized vaccinia in childhood is about 90%.

It is a well-known fact that people with a damaged skin—for example, burns or eczema—are more prone to develop generalized vaccinia than people with a healthy normal skin. Our patient had no evidence of any skin condition. The distribution of the lesions was more in keeping with haematogenous spread rather than auto-inoculation.

Jubb (1943) suggests the following points as being helpful in making the diagnosis of generalized vaccinia: "(1) Auto-inoculation should be excluded. (2) The eruption does not appear earlier than the fourth, and seldom earlier than the ninth, day after vaccination. (3) The eruption must be elsewhere than in the neighbourhood of the vaccination site. (4) There must be a vesicular stage."

We acknowledge the help of Professor A. MacDonald in identifying the virus.

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The *Transactions of the Hunterian Society*, vol. 14, records the work of the society for the session 1955-6. It includes Mr. A. DICKSON WRIGHT's presidential address on "How Patients Have Deceived Me," a striking collection of cases of simulated disease and artifacts which serve to show how difficult diagnosis may be sometimes. Also included in the volume is the Hunterian Society's Oration, "Reflections on the Hunterian Method," delivered by the then Sir HENRY COHEN last February, a lecture on "Lung Resection in the Treatment of Pulmonary Tuberculosis" by Professor J. J. NUBUOE; Dr. JOHN FRY's prize essay, "Headache in General Practice," and a useful discussion on sex instruction of the young.

Reviews

VARICOSE VEINS

The Pathology and Surgery of the Veins of the Lower Limb. By Harold Dodd, Ch.M., F.R.C.S., and Frank B. Cockett, M.S., F.R.C.S. Foreword by R. R. Linton, M.D. (Pp. 462 +ix; illustrated. 65s.) Edinburgh and London: E. and S. Livingstone Ltd. 1956.

"We would say that every 'bad' leg can be materially improved by systematic diagnosis and treatment." This statement, made early in the book, gives a clue to the authors' approach to their subject—an approach which in clarity and detail brings refreshing breath to the study of venous disorders. It is both pleasurable and stimulating to read this admirable monograph, which deals primarily with varicose veins and venous ulcers of the leg. The authors have a very large experience in this field and have gathered besides a great deal of relevant information. They have been assisted by Dr. S. T. Anning and Mr. C. I. Murphie, who contribute valuable chapters on the historical aspects and on the physiology of the leg veins respectively. One learns from Dr. Anning that in 1550 B.C. the author of a papyrus advised against operation for varicose veins—of a remote origin of this branch of surgery. With these two chapters is an excellent one on the surgical anatomy of the leg veins; together they form Part I of the book. Part II is concerned with varicose veins and covers all aspects of their care. Stress is properly laid on exact diagnosis based on a full knowledge of the variable anatomy of the superficial and communicating veins. Part III deals with the investigation and surgery of the deep and communicating veins and of venous ulcers. The importance of incompetent communicating veins at the ankle in the genesis of ulcer, made clear in Mr. Cockett's previous writings, is given due prominence.

The book is generously illustrated by photographs and diagrams of high quality. One joins with Dr. R. R. Linton, of Boston, who writes a foreword, in believing this to be the best book on the subject; moreover, it is likely to be a long time before it is bettered.

C. J. LONGLAND.

GROWING UP

Youth: The Years from Ten to Sixteen. By Arnold Gesell, M.D., Frances L. Ilg, M.D., and Louise Bates Ames, Ph.D. (Pp. 340 + xv. 25s.) London: Hamish Hamilton. 1956.

This is a sequel to a previous book, *The Child from Five to Ten*, and is based mostly on a study of 60 to 88 children at each age from 10 to 16. The majority of the children were of a favourable socio-economic status, representing a high average to superior level of school population. Most of the fathers had professional or skilled occupations. The book attempts to interpret the manifestations of adolescence under the following headings: (1) maturity profiles; (2) maturity traits—"total action system, routines and self care, emotions, the growing self, interpersonal relationships, activities and interests, school life, ethical sense, and philosophical outlook"; and (3) maturity trends—the sequences and gradients of growth. The authors write: "The maturity profiles, maturity traits and the maturity trends are not to be regarded as rigid age norms nor as models. They simply indicate the kinds of behaviour, desirable or otherwise, which tend to occur at certain stages and ages. Every child has an individual pattern of growth unique to him. The profiles, traits, and trends are designed to suggest the various maturity levels at which he is functioning." It is inevitable and natural that the various maturity traits and trends should reflect the American way of life, with particular regard to matters of discipline and attitudes to sex, and this, together with the fact that the children come from a highly selected group, makes the findings less universally applicable than those of earlier books, particularly books dealing with infancy. Yet

all in this country who are concerned with the care of children aged 10 to 16 will find much of interest in this work.

R. S. ILLINGWORTH.

INSECTS OF MEDICAL IMPORTANCE

A Handbook for the Identification of Insects of Medical Importance. By John Smart, M.A., D.Sc., with chapters on Fleas by Dr. Karl Jordan, F.R.S., and on Arachnids by R. J. Whittick, B.Sc. Third edition. (Pp. 303 + xi; 13 plates. 40s.) London: British Museum (Natural History). 1956.

The first edition of this now well-known guide to the identification of insects of medical importance was published in 1943 and reviewed in this *Journal* on January 1, 1944; a second impression, which contained a new index and some minor corrections, appeared later in the same year. The success of the work resulted in the publication of a second edition in 1948, in which knowledge of such medically important insects as fleas and malaria-carrying mosquitoes was brought up to date and many new drawings were added to the sections dealing with the morphology of the Diptera, while the chapter on the distribution and recognition of the different species of tsetse flies was modified in accordance with recently acquired knowledge. The present, third, edition is a photo-litho reprint of the second edition, with, as the foreword explains, such corrections in the text as "have been possible without altering the make-up of the type-face." These changes appear to be few and of little significance, but a further effort has been made to bring the edition up to date by the addition of six pages of addenda and corrigenda, three of them by Mr. P. J. Mattingly, who lists the major revisionary works published since 1947 on the disease-carrying mosquitoes, and three by Dr. Smart, who deals similarly with books and papers on the other arthropods.

There is no doubt that the demand for this book will continue, and it is to be hoped that when the present edition is exhausted the fourth edition will be fully revised, particularly as regards the Arachnida. It is suggested that any economy necessitated by such expansion of the text could be achieved by omitting those sections which are concerned with arthropods of veterinary, as distinct from those of medical, importance.

The present volume maintains the very high standard of its predecessors, and although, alas, its price is £2, as compared with the 15s. charged for the first edition, it is still good value for the money.

R. M. GORDON.

CANCER PAIN

Management of Pain in Cancer. By Eight Contributors. Edited by M. J. Schiffrin, Ph.D. Foreword by Warren H. Cole, M.D. (Pp. 245; illustrated. 33s.) Chicago: Year Book Publishers Inc. London: Interscience Publishers Ltd. 1956.

This book deals with the management of pain in the terminal stages of incurable malignant disease—a formidable problem which confronts the practising doctor almost daily, and yet one which has been somewhat neglected by the medical profession. The aim of the work is to present a simple yet comprehensive description of pain-relieving procedures, together with a discussion of the indications and contraindications for the use of each method. Though the book is written primarily for the family doctor, there are few clinicians who would not profit from its study. In the seven chapters which make up the volume the authors discuss analgesic drugs; nerve blocks; neurosurgical and surgical palliative procedures; chemotherapy, including the use of hormones; radiation; and the psychological management of patients suffering from painful incurable disease. The advice given is clear, concise, and up to date. The drawbacks to the book are its price in Britain, and the somewhat unfamiliar names of a few of the drugs mentioned. To many British doctors it will be unbelievable that Americans can be made at all comfortable on their deathbeds without recourse to heroin.

D. M. DUNLOP.

BRITISH MEDICAL JOURNAL

LONDON

SATURDAY NOVEMBER 10 1956

MORTALITY AND SMOKING

Five years ago Dr. R. Doll and Professor A. Bradford Hill started an investigation into the mortality of British doctors in relation to smoking habits. Their plan was to ascertain the smoking habits of a defined group of men and women, and subsequently to obtain information about the causes of deaths among this group. It was hoped that this method might meet some of the criticisms of the retrospective investigations of the effect of smoking upon the incidence of cancer of the lung which had been conducted by the same investigators¹ and by several other groups²⁻⁵ in various parts of the world, and which had all shown that smoking, especially of cigarettes, greatly increases the risk of developing lung cancer. For this prospective investigation, members of the medical profession of the United Kingdom were asked to reply to a simple questionnaire about their past and present smoking habits. Arrangements were made for the causes of death of all doctors subsequently to be made known to the investigators. The preliminary report on this investigation was published in 1954,⁶ after two and a half years, when the lung cancer deaths among the rather more than 40,000 doctors who had provided adequate replies to the questionnaire amounted to 36. Even at this early stage analysis of the data gave strong confirmation of the earlier retrospective investigations. The second report, published in the opening pages of the *Journal* this week, confirms these preliminary conclusions, refutes criticisms that were levelled against them, and produces some interesting information about the relationship of smoking to other causes of death.

The main part of the analysis concerns male doctors aged 35 and over, among whom there were 1,714 deaths, including 84 from lung cancer. The doctors were classified into non-smokers, who had never consistently smoked as much as 1 g. of tobacco (the

equivalent of one cigarette) a day for as long as a year; light smokers (1-14 g. daily); moderate smokers (15-24 g. daily); and heavy smokers (25 g. and more daily). There was a steady gradient of incidence of death from lung cancer with increasing amount smoked. The standardized rates per thousand were: non-smokers 0.07, light smokers 0.47, moderate smokers 0.86, and heavy smokers 1.66. Although the authors do not comment on this point, it can be seen from one of their tables that the mortality from lung cancer among non-smokers was concentrated in the older age groups, whereas that for heavy smokers was distributed much more widely through the years from early middle age onwards. The mortality from cancer of other sites was almost the same in non-smokers and smokers, the figures being 2.04 and 2.02 per thousand respectively; this observation refutes the suggestion^{7,8} that smoking may simply determine the site of cancer in persons already destined to develop this disease at some site. The total mortality from all causes among smokers was significantly higher than among non-smokers, the rate for non-smokers being 13.25 per thousand and for heavy smokers 18.84. A convincing answer is given to a question of great importance for all smokers: does giving up smoking diminish the risk of developing lung cancer? For smokers who, when the questionnaire was completed, had given up smoking more than 10 years, the mortality rate from lung cancer was 0.35 per thousand; for those who had given up less than 10 years it was 0.59, while for those who were still smoking it was 1.03. The authors point out that the method of investigation is such as to minimize the trends in this, as in other, phases of the investigation; some smokers who were still smoking when the questionnaire was completed may have given up subsequently, and some who had given up at that time may have started again subsequently. In view of this the evidence must be accepted as indicating beyond doubt that giving up smoking does diminish the liability of a smoker to subsequent development of lung cancer. Those who were continuing to smoke 25 or more cigarettes daily at the beginning of the investigation suffered a mortality from lung cancer nearly 40 times that of the non-smokers. The suggestion from earlier investigations that pipe smoking is less dangerous than cigarette smoking is confirmed. Pipe smoking appears to have been about one-third as dangerous as cigarette smoking. The gradient of mortality from lung cancer with increasing consumption of tobacco was found to exist for each year examined separately. It was found that the smoking habits of doctors resident in rural and urban districts were remarkably

similar, so that the results cannot have been affected by varying exposure to atmospheric pollution.

In the same investigation a highly significant trend of increased mortality with increasing consumption of tobacco was found for chronic bronchitis, the death rate ranging smoothly from 0.12 per thousand for non-smokers to 0.72 for heavy smokers. A suggestive gradient was found for coronary thrombosis, and smaller gradients, not statistically significant, for pulmonary tuberculosis and peptic ulcer.

That the danger of smoking is not confined to the increased risk of lung cancer is further demonstrated by another investigation which is reported in the *Journal* this week by Dr. C. R. Lowe (p. 1081). A remarkable feature of the mortality from pulmonary tuberculosis in recent years has been the shift of the peak of mortality in men towards the older age groups. No convincing explanation of this phenomenon has been advanced, though several hypotheses have been considered. There is good evidence that much of the mortality among middle-aged and older men must be attributed to breakdown of inactive disease acquired in earlier life. The question arises whether this reactivation among older men may be due at least in part to the same factor which is known to be responsible for the increasing mortality from lung cancer in the same group—namely, smoking. Dr. Lowe therefore investigated the smoking habits of 1,200 patients with notified respiratory tuberculosis in sanatoria and chest clinics in Birmingham, comparing them with a control population in the same area. This investigation showed that among patients with pulmonary tuberculosis over 30 years of age there was a significant deficiency of non-smokers and light smokers and an excess of moderate and heavy smokers as compared with the controls. These observations suggest that smoking may be an important cause of the breakdown of inactive pulmonary tuberculosis.

The consumption of tobacco in Britain has risen steadily since 1948, and in the first six months of 1956 tobacco consumption was 3% more than for the corresponding time last year.⁹ This increase in tobacco consumption has continued in spite of the fact that the public have had access to the knowledge which has been accumulated about the noxious effects of smoking, since this has been freely discussed in the press, albeit sometimes in a somewhat confusing manner. According to authoritative medical opinion specific steps should be taken to make the facts known in a more effective way. The response of the Minister of Health to advice on these lines from his Standing Medical Advisory Committee¹⁰ was to make a statement in the House of

Commons that the Government would take such steps as were necessary to ensure that the public were kept informed of the relevant information as and when it became available, but that in the present state of knowledge a national publicity campaign would not be appropriate.¹¹ The weight of evidence that smoking has a causal connexion with lung cancer, already sufficient to convince an unbiased observer, has been greatly increased by the latest report from Doll and Bradford Hill. This report also gives statistical evidence of what many had suspected, that smoking is an important factor in determining death from chronic bronchitis; and the evidence produced by Lowe clearly implicates smoking as a factor in the breakdown of pulmonary tuberculosis. The new evidence now published makes it more than ever imperative for all concerned to see that the public is repeatedly informed of the possible dangers to health and life from smoking cigarettes.

REHABILITATION

The development of the modern concept of rehabilitation is due very largely to the pioneer work of Sir Robert Jones and to the consequences of two world wars. It is regrettable that the effect of Sir Robert Jones's teaching and leadership between the wars was greater upon American than upon British medicine, although the B.M.A.'s Committee on Fractures in 1935 did stimulate a restudy of some of the problems of rehabilitation.¹ The social legislation of the late 1940's made no exclusive provision for the disabled, but did include many administrative measures to meet their special needs, so that the numerous Acts did cover most of the field, although it was not always clear which Government department was responsible for a particular service. In retrospect it is perhaps unfortunate that Mr. Ernest Bevin, in his anxiety to maintain full production during the second world war, introduced the Ministry of Labour rather hurriedly into full responsibility for the training and resettlement of disabled persons. The Tomlinson Report² of 1943 which followed, although stating in its first conclusion that "rehabilitation in its widest sense is a continuous process," proceeded, for administrative convenience, to divide rehabilitation into medical and social or industrial aspects, a division never really acceptable to medical opinion. The

¹ Report of a Committee on Fractures, 1935, British Medical Association, London.

² Report of Inter-departmental Committee on the Rehabilitation and Resettlement of Disabled Persons, 1943, H.M.S.O., London.

³ Report of the Committee of Inquiry on the Rehabilitation, Training, and Resettlement of Disabled Persons, 1956, H.M.S.O., London. Price 5s. 6d. net.

⁴ "Report on Rehabilitation" by a Special Committee of the B.M.A., *British Medical Journal Supplement*, 1946, 1, 187.

⁵ Rehabilitation and Resettlement of Disabled Persons, 1954, British Medical Association, London. See leading article in *British Medical Journal*, 1954, 1, 1479.

¹ Doll, R., and Hill, A. B., *British Medical Journal*, 1952, 2, 1271.

² Müller, F. H., *Z. Krebsforsch.*, 1939, 49, 57.

³ Scheerer, E., and Schoninger, E., *ibid.*, 1943, 54, 261.

⁴ Wassink, W. F., *Ned. T. Geneesk.*, 1948, 92, 3732.

⁵ Wynder, E. L., and Graham, E. A., *J. Amer. med. Ass.*, 1950, 143, 329.

⁶ Doll, R., and Hill, A. B., *British Medical Journal*, 1954, 1, 1451.

⁷ Fairweather, R. F., *ibid.*, 1954, 2, 100.

⁸ Goodhart, C. B., *ibid.*, 1956, 1, 1296.

⁹ *The Times*, October 27, 1956.

¹⁰ *British Medical Journal*, 1956, 1, 809.

¹¹ *Ibid.*, 1956, 1, 1118.

changing nature of disability away from traumatic injuries to disorders such as peptic ulcer, chronic bronchitis, osteoarthritis, hypertension, circulatory disorders, and the neuropsychiatric disturbances has placed increasing importance not only upon the social and welfare aspects of rehabilitation but also upon the need to make greater provision for people suffering from partial disability. The prolonged period of full employment, during which the loss of productivity from strikes has been insignificant compared with the loss due to sickness, has also emphasized the magnitude of the problem.

The consequence of these developments and the administrative difficulties encountered by voluntary organizations and the medical profession, as well as the increasing awareness of the importance of rehabilitation by the public, led the Ministers of Labour and National Service and of Health and the Secretary of State for Scotland to set up in 1953 a select committee, under the chairmanship of Lord Piercy, "to review in all its aspects the existing provision for the rehabilitation, training and resettlement of disabled persons, full regard being had to the need for the economy in the Government's contribution and to make recommendations." The committee has received written evidence from over 150 sources, oral evidence from the representatives of nearly 50 organizations, including twice by the British Medical Association, and has visited many centres both voluntary and statutory. The evidence submitted by the Council of the B.M.A., both written and oral, receives a most generous tribute from the committee in its report,³ which was published last week. The committee has exhaustively reviewed and summarized existing provisions as well as frankly discussing many of the problems and criticisms submitted in evidence. It is particularly unfortunate that the terms of reference, "To review in all its aspects the existing provision for the rehabilitation, training and resettlement of disabled persons," suggested that the word rehabilitation did not cover the whole process of restoration of function, in contrast to the view expressed in the British Medical Association's report⁴ of 1946 and reiterated in the written evidence⁵ submitted by the Council to the committee in 1954. Owing to the terms of reference the committee has confined the use of the term rehabilitation "to medical and surgical treatment designed to restore physical and mental functions." This artificial attempt to divide rehabilitation is unfortunate, because throughout the report the concept of rehabilitation as a continuous process including the restoration of the patient to self-supporting work is acknowledged. Just credit is given to the many pioneering experiments which

have been made in this country on behalf of the disabled, and the report stresses that what is most needed is a greater knowledge among the medical profession, industrialists, trades-union leaders, and the public of what could be achieved with a more widespread application of the knowledge available. The recommendation for the publication of special booklets for the medical profession and for social workers and for the public was suggested by the Council of the B.M.A. in its evidence, and it is to be hoped that, although several Ministries collectively are recommended to issue such publications, the responsibility will be accepted without unnecessary interdepartmental delay.

Criticism has been made outside the profession of the importance attached by the Council in its written evidence to the role of the general practitioner, but the frequent references in the report to the important position of the general practitioner in the rehabilitation service are encouraging. Two examples are quoted below:

"The Committee recognizes the many calls on the general practitioners, but it considers (with the British Medical Association) that he can and should undertake fuller responsibility for rehabilitation and resettlement to some of his patients than he normally does now."

"Officers of the local authority, visiting a disabled person at home, should form part of a domiciliary team under the clinical leadership of the general practitioner, with whom all members of the team should be in personal contact in order to bring the maximum benefit to a disabled person living in his own home."

The committee has recommended many of the suggestions made by the Council in its written evidence—the need to obtain reliable information about the real needs of a rehabilitation service; the potentialities of a resettlement clinic; the need for the provision of planned convalescence; the amendment of the regulations for juveniles to cover the period from leaving school until attaining the age of 16; the development of work and welfare schemes for the handicapped both in special centres and in the home.

The committee, while admitting the interest of several Ministries in some aspect of rehabilitation, seems to have been reluctant to suggest administrative reform and is content to leave the co-ordination of facilities to the standing interdepartmental committee. Many experienced in the problems of rehabilitation will regret this decision. The recommendation for the establishment of resettlement clinics—stressed by the B.M.A.—without any recommendation that they should have statutory powers is unlikely to lead to their useful development. Medical interviewing committees were recommended by the Ministry of Health many years ago, and only exceptionally, where there has been someone keenly interested in rehabilitation

(usually a respected and senior member of the hospital staff) has much success been achieved. The loss to industry and in morale arising from the present methods of certification, through not recognizing a state of partial fitness, has been accepted by the committee, but the report fails to recommend even a slight modification of the sickness certificate to include a phrase that in the practitioner's opinion the patient is fit to undertake some work, if not fit for full work, and that he might benefit from a period of rehabilitation. As to the misunderstanding about the degree of fitness necessary for admission to an industrial rehabilitation unit, the report states: "All that is required is that the man should be regarded by the unit doctor as likely to be fit for work at the end of the rehabilitation course. . . . The committee accordingly trusts that removal of any misconception about the eligibility on medical grounds for admission will lead to more industrial workers being sent to these units at an early stage of their recovery." The lack of any definite recommendation, however, is unfortunate, and may lead, with a greater use of the service, to even more friction between the medical profession and the administrative branches of certain departments.

Throughout the report great stress is laid upon the role of three individuals—the medical practitioner whatever his specific standing, the disablement resettlement officer, and the social worker. It is evident that much criticism has been made by those submitting evidence, including the Council of the B.M.A., of the qualifications and training of the disablement resettlement officer; yet the suggestions of the committee for improving the quality, the training, and the conditions of service for such officers are little more than pious hopes—suggestions which include the possibility that the preliminary training be increased to more than three days, some initial supervision on the job, and the selection of individuals from the general staff of the Ministry of Labour for approximately five years for work in this branch.

One important section of the committee's terms of reference related to the need for the utmost economy in the Government's contribution, and on this the report states: "The Committee is satisfied that the existing state of affairs discourages and retards developments which are essential." The specific new proposals are for the granting of approximately £6,000,000 to the local authorities for the development of welfare schemes for the handicapped and a suggestion that the Ministry of Health should deploy "its existing resources in staff and in accommodation both for out-patients and in-patients at the convalescent stage." The Piercy Report, so long awaited, will perhaps disappoint the enlightened, but it does

give a valuable account of work well done, though limited in scope, and which, despite the limitations imposed by the need for economy, has gone far towards laying the foundation of a complete rehabilitation service. The committee acknowledges the British Medical Association's submission that the medical profession has a leading part to play in rehabilitation and that the rate of development and the efficiency of the service will be dependent very largely on the initiative and energy of the profession.

TREATMENT OF BARBITURATE POISONING

There is no agreement yet on the best way to treat patients poisoned by barbiturates. The dangers of too vigorous analeptic therapy are now realized; they include convulsions, vomiting (with aspiration of gastric contents), and cardiac arrhythmias. At the other extreme claims are made that simple management as for the anaesthetized comatose patient is enough. The criteria of severity used in different series vary, and thus comparison of the results of different treatments is hampered. Many cases are mild, and the overall mortality is under 10%. It is the severely poisoned patient in deep coma with low blood pressure, subnormal temperature, and absent tendon reflexes who presents the most difficult problem. J. T. Wright,¹ using ultra-violet spectrophotometric methods, showed a quantitative relationship between barbiturate levels in the blood and the degree of coma. As barbiturates are evenly distributed in the body water, the dose taken can be calculated from the blood level and body weight, but the dose is not a simple measure of severity of poisoning, for other factors such as senility and disease play a part.

It is claimed² that bemegride ("megimide"), 50 mg. intravenously every five minutes in a total dose of up to 1 g. with amiphenazole ("daptazole") 15 mg. by the same route in a total dose of up to 0.3 g., will quickly bring the patient into a "safe state" from which recovery will follow. This week Dr. A. Worlock reports at p. 1099 of the *Journal* a series of 12 cases treated successfully with these drugs in smaller doses than this. Chest infection did not occur, and stay in hospital was short. The successful treatment on these lines of a child as young as 15 months has also been reported.³ However, it has not yet been

¹ Wright, J. T., *Quart. J. Med.*, 1955, 24, 95.

² Shulman, A., Shaw, F. H., Cass, N. M., and Whyte, H. M., *British Medical Journal*, 1955, 1, 1238.

³ Perinpanayagam, M. S., Nicholls, G., and Osmond, J. D., *ibid.*, 1955, 2, 912.

⁴ Sunshine, I., and Leonards, J. R., *Proc. Soc. exp. Biol. (N.Y.)*, 1954, 86, 638.

⁵ Bertram, L. B., Jeghers, H. J., Schreiner, G. E., and Pallotta, A. J., *J. Amer. med. Ass.*, 1956, 161, 820.

⁶ Eason, D. W., and Macnaughton, F. I., *Lancet*, 1956, 1, 835.

⁷ Hunter, R. A., and Greenberg, H. P., *ibid.*, 1954, 2, 58.

⁸ Merivale, W. H. H., and Smith, A. J., *ibid.*, 1955, 2, 1353.

shown conclusively by studies of blood levels that the drug is eliminated faster or that complete recovery is quicker on treatment with bemegride than it would have been with supportive measures and prevention of pneumonia alone. There is thus some doubt about the reputed antagonistic effect. A new method which may rescue the occasional critical case is haemodialysis. It has been shown⁴ that 40% of a dose of phenobarbitone in dogs can be recovered by this method. L. B. Berman and colleagues⁵ successfully treated eight patients by this method and used repeated spectrophotometric determinations of barbiturate in the plasma as a control. Attempts to simplify the method by estimations of barbiturate in the urine are of no value, because secretion of urine is suppressed in barbiturate coma. Exchange transfusion might be a more practicable substitute.

But new methods must not lead to neglect of the basic symptomatic treatment of the poisoned patient. Artificial respiration by the Holger Nielsen method may be imperative and should be continued at hospital by mechanical methods with the help of the anaesthetist. In one case⁶ hypothermia at 84.2° F. (29° C.) from exposure on the sea shore may have helped recovery by cutting down oxygen requirements. Gastric lavage carries the risks of aspiration of gastric contents, of forcing them into the intestine, but if these are avoided by preliminary suction with a Senoran's evacuator, keeping the head lower than the stomach and using less than 1 pint (570 ml.) of fluid at a time, this method of removing the poison is an advantage. Various non-specific measures will prevent the doctor from being robbed of success by some complication such as pneumonia. Penicillin, A.C.T.H., potassium chloride, and maintenance of blood pressure are all important.

A study of the biochemical changes induced by barbiturates was suggested by the observation of R. A. Hunter and H. P. Greenberg⁷ that the symptoms of chronic barbiturate intoxication resembled those of an islet-cell tumour of the pancreas. Hunter and colleagues⁸ found that abnormally high levels of pyruvate and glucose occurred after glucose was given to patients receiving large doses of barbiturates, but not if vitamin-B complex had been given beforehand. The altered electroencephalogram of chronic barbiturate poisoning was also improved. The bearing of these researches on acute barbiturate poisoning remains to be worked out. Two methods of getting rid of the poison at one time advocated may be mentioned only to be condemned. Drainage of cerebrospinal fluid is not effectual, for the levels of barbiturate in the C.S.F. are lower than in the blood. Forced diuresis is of no value, since high rates of

urine flow do not significantly increase the renal clearance of barbiturates.

When confronted with the emergency it should not be forgotten that alcohol, aspirin, and some other common poison may have been taken as well as barbiturates, and the case may well have medico-legal aspects, so that specimens should be kept. The doctor's duty does not extend to informing the police.

LUMBAR SYMPATHECTOMY FOR ARTERIOSCLEROSIS

There is no doubt that lumbar sympathectomy can be of great benefit in the treatment of arteriosclerosis of the lower limbs. Good results follow wise selection of patients for this operation, and in this connexion some interesting points are raised by E. A. Edwards and C. Crane,¹ who have recently published a report on 100 patients followed up for five years after operation. They believe that their group of patients gave a fair sample of the disease; of the 100 patients, whose ages varied from 34 to 82 years, 79 were men and 27 of the total group were diabetic. Thirty-five of their patients died within the five-year period, the majority from coronary heart disease. Diabetes was the only general factor affecting the death rate, and 55.5% of their diabetic patients died as compared with 27% of the non-diabetic group.

The pattern of the local disease before operation bore some relationship to death or survival. A rapid progress of disease before sympathectomy was common in those who died within the five-year period, and established or threatened gangrene was often the presenting symptom in this group. The previous loss of the contralateral limb was associated with a particularly bad prognosis, and five out of nine such patients died within the follow-up period. It was also evident that survival was short in those patients who responded poorly to operation. Fifteen patients had a poor immediate response to sympathectomy, and of these only five survived five years post-operatively. Major amputations proved necessary in ten patients. Seven of these were done soon after operation and the remaining three within a year of operation. The incidence of major amputations was higher in the diabetic group, but a greater proportion of these patients had limbs which were in a desperate condition pre-operatively. Deep necrosis of the foot or leg inevitably led to amputation despite sympathectomy. It was noticeable that most of the serious complications occurred in the early post-operative period, and that once the difficulties of the first few months after sympathectomy were overcome the limb was usually safe. At the end of five years the state of the limb was good in 47 of the 65 surviving patients, fair in thirteen, and poor in five. Claudication was rarely overcome completely but was considerably improved in all patients in the good category. These

¹ Edwards, E. A., and Crane, C., *A.M.A. Arch. Surg.*, 1956, 72, 32.
² Berry, R. E. L., Flotte, C. T., and Collier, F. A., *Surgery*, 1955, 37, 115.
³ Pratt, G. H., *Surg. Gynec. Obstet.*, 1955, 100, 43.
⁴ Troensegaard-Hansen, E., *British Medical Journal*, 1956, 2, 262.

results are somewhat better than those reported in two similar follow-up studies by R. E. L. Berry, C. T. Flotte, and F. A. Collier² and by G. H. Pratt.³ Edwards and Crane feel that this is due to their more discerning choice of patients for operation.

It is clear that the proper selection of patients for lumbar sympathectomy is of great importance. How is this selection to be made? In the past many methods of pre-operative testing, such as response of the skin temperature to spinal analgesia or reflex vasodilatation, have been tried and found wanting, and the decision is best made on clinical grounds alone. In general, lumbar sympathectomy will be followed by a poor result if the pre-operative course of the disease has been rapid, and it is well established that such operative intervention for acute arteriosclerotic ischaemia may precipitate gangrene. Again, sympathectomy will usually fail if gangrene of a major part of a limb threatens, and the operation cannot be expected to save a limb in which the signs of widespread gangrene are unmistakable. Indeed, the correct timing of operation in the course of the disease is most important, and sympathectomy is best employed as a prophylactic treatment in the early stages of nutritional failure rather than as an emergency measure for limbs already in a desperate condition.

A good result can be expected in patients with local superficial necrosis or mild pain at rest without gross loss of tissue, and an excellent outcome will follow sympathectomy if the ischaemia is distal and if one of the pedal pulses remains palpable. If the major symptom is claudication the result of operation will be good so far as preservation of the limb is concerned, but complete relief can be expected only for the patient whose symptoms are mild. In the absence of nutritional change severe claudication is rarely an indication for lumbar sympathectomy. The scope of surgery in arteriosclerosis of the lower limb has widened recently with the introduction of amion implantation.⁴ Further experience of this apparently promising procedure is needed before it can be adequately compared with the alternative methods of treatment.

NOBEL PRIZE FOR CHEMISTRY

Sir Cyril Hinshelwood, P.R.S., shares this year's Nobel Prize for Chemistry with Professor Nikolai Semenov, director of the institute of chemical physics of the Soviet Academy of Sciences. The award is for their work on the kinetics of chemical reactions. Professor Semenov is the first Soviet citizen, though the fourth Russian, to have received a Nobel Prize; the other three were Pavlov (1904) and Metchnikoff (1908), who were awarded the prize for physiology and medicine, and Ivan Bunin (1933), an émigré, who was awarded the prize for literature.

Hinshelwood's researches in chemistry caused him to be elected a Fellow of the Royal Society at the age of 31, and he was appointed Dr. Lee's Professor of Chemistry at Oxford University eight years later in 1937. Now aged 59, he is probably best known to the medical

⁴ *The Chemical Kinetics of the Bacterial Cell*. C. N. Hinshelwood, Oxford, 1946.

profession for the bacteriological investigations he has carried out in the last decade or so. In these he has extended the range of his kinetic studies from molecules to microbes. In a book¹ and in an impressive series of papers with his colleagues he has sought to explain in physico-chemical terms the biological responses of bacteria to changes in their environment. Much of this work has been centred on the undoubted fact that bacteria can be "trained" to become resistant to drugs to which they were originally sensitive. The orthodox view is that permanent drug resistance arises by selection of drug-resistant mutants which were present often in a very small proportion of the cells in a bacterial culture before they had any contact with the drug. Hinshelwood, while not denying that this can occur, claims to have shown that more or less permanent changes in resistance to a drug can be induced in bacterial cells by prolonged exposure to the drug, as a result of a change in the enzyme patterns of the cell impressed upon them by the drug. Some geneticists have thought that this smacks of Lamarckian ideas, but, as Hinshelwood and others have pointed out, the germ-plasm of microbes is not, as in complex animals and plants, screened from the action of the environment. Changes which affect the cytoplasm may more easily affect the nuclear material in bacteria than in more complex animals, and many other workers have shown that such properties as resistance to streptomycin can be conferred on drug-sensitive bacterial cells by means of transforming principles extracted from resistant cells. Such principles are specific deoxyribonucleic acids and are in fact specific mutagenic agents. The idea, therefore, that permanent modifications can be induced in bacterial cells by changes in their environment is by no means as bizarre as it might appear to be at first sight. Hinshelwood with characteristic vigour and determination has marshalled strong arguments in support of his provocative and stimulating ideas on this central problem of microbiology.

SIR WILLIAM GILLIATT MEMORIAL FUND

The death of Sir William Gilliatt a few weeks ago was a great loss to the medical profession in Britain, for he was one of those from whom wise guidance was expected as a matter of course. By his own work and example he contributed much to his chosen specialty, and he would have been the first to approve the objects of those who have decided to raise a Memorial Fund to commemorate his name. The Fund will be held in trust by the Royal College of Obstetricians and Gynaecologists—of which Sir William Gilliatt was a distinguished president—and will be used to foster the aims of the College, especially in encouraging research. Donations may be sent to the Sir William Gilliatt Memorial Fund, The Royal College of Obstetricians and Gynaecologists, 58, Queen Anne Street, London, W.1.

The next session of the General Medical Council will open on Tuesday, November 27, at 2.15 p.m., when the President, Sir David Campbell, will take the chair and deliver an address.

HEBERDEN SOCIETY

The Heberden Society, with a membership restricted to 100 members and 20 associates, plus a handful of distinguished honorary and corresponding members, exists for the advancement of the study of the rheumatic diseases. It was founded twenty years ago, and ordinarily meets four times a year. A report of a recent clinical meeting is printed below. This year's president is Dr. ERNEST FLETCHER.

Long-term Treatment of Rheumatoid Arthritis

A clinical meeting was held at the Wellcome Foundation in London on October 19. Dr. OSWALD SAVAGE (West London Hospital) opened with a paper on the effect of prolonged adrenal-stimulation therapy upon the course of rheumatoid arthritis. Patients were given long-acting corticotrophin in a daily dose sufficient to produce clinical remission as judged by measurements of the erythrocyte sedimentation rate, tenderness of joints, and strength of grip. The 24-hour urinary output of 17-hydroxycorticosteroids was measured to assess the degree of adrenal stimulation that resulted in each case. The patients fell into three groups, said Dr. Savage: those who responded well but needed continuous adrenal stimulation to maintain their response; those who responded well and continued to respond in spite of an irregular adrenal response, as judged by their output of 17-hydroxycorticosteroids; and those who responded well and continued to respond, in spite of a diminution and finally a cessation of adrenal stimulation.

Dr. Savage stressed the difficulty caused by the variability in potency of different batches of corticotrophin gel, but self-administration of the corticotrophin and the collection of specimens of urine by out-patients for steroid assay had, he said, presented no problems. Some patients had injected themselves for as long as three years without mishap.

Dr. P. S. DAVIS (West London Hospital) had compared the results of the 17-hydroxycorticosteroid assays with the clinical response in the same group of patients. Where there was evidence of adrenal stimulation there was always some clinical response, but the converse did not always hold. In many patients maintained on the same batch of corticotrophin gel the output of 17-hydroxycorticosteroids fell. He thought this was probably due to the development of resistance to the preparation. Some patients on corticotrophin or cortisone therapy had a fluctuating output of 17-hydroxycorticosteroids. Perhaps the explanation of this was that the stress of their disease caused more, or less, utilization, thus affecting the amounts and types of corticosteroid metabolites in the urine. In this connexion Dr. Davis recalled that a large fraction of corticosteroid metabolites was not estimated in the 17-hydroxycorticosteroid assay. However, he did not think that the anomalies he had reported detracted from the value of regular corticosteroid assays in the control of corticotrophin therapy. Dr. A. J. POPERT (West London Hospital) spoke of the adrenal response of patients with rheumatoid arthritis to the stress of operation and severe infection. On several occasions he had not found the expected rise of urinary 17-hydroxycorticosteroids. He too considered that tissue utilization might alter their urinary output. (The work described above is being done with the help of the Dan Mason Foundation, West London Hospital.)

Professor F. T. G. PRUNTY (St. Thomas's Hospital) defined the factors that influence the response of the human adrenal cortex to corticotrophin as follows: (1) The potency of the corticotrophin preparation used, there being a wide divergence between labelled potency and that found on intramuscular injection. (2) The variation from patient to patient in responsiveness of the adrenal cortex to the same dose of the same corticotrophin preparation. (3) The effect of duration of treatment. The response to daily injections

increased to a maximum after a number of days which varied greatly from patient to patient. (4) The response to alterations in dosage, some patients being more sensitive than others to small changes. (5) The decreasing sensitivity to continued administration of corticotrophin seen in some patients. (6) The effect of the patient's endocrine constitution.

In the discussion that followed the need was emphasized for a pure preparation of corticotrophin that would have uniform potency and not be liable to tissue inactivation.

COLLEGE OF PATHOLOGISTS OF
AUSTRALIA

INAUGURAL MEETING

[FROM A CORRESPONDENT IN AUSTRALIA]

Three months ago, at a ceremony in Melbourne, the College of Pathologists of Australia was inaugurated. The college is to combine the function of a learned society with that of a ruling professional body, which makes it unlike any existing body of pathologists in the United Kingdom. It had its origins in the Australian Association of Clinical Pathologists, and the original move towards incorporation into a college came from Brisbane. It is hoped that the new college will encourage original research in pathology and help to raise standards in the specialty by making the approval of its censors the hallmark of a pathologist of truly consultant status. In granting the diploma, full account is to be taken of the special bent of the candidate towards one aspect or another of pathology.

The inaugural meeting on August 20 began with an impressive ceremony in the hall of the Royal Australasian College of Surgeons. After the president of the College of Pathologists, Dr. EDGAR THOMSON, had declared the proceedings open, the Australian Minister of Health, Dr. D. A. CAMERON, performed the official inauguration. In his speech the Minister, himself a medical graduate, stressed the need for the Australian profession, with its small numbers, to maintain a high standard of quality. Dr. Cameron pointed to the importance of pathology in modern medicine, and suggested that three main problems challenged the pathologist: cancer, ageing, and cardiovascular disease. The vice-president, Dr. JOHN PERRY, then gave an address entitled "Pathology's Part in Medicine." He dwelt on Australia's contribution to the specialty, discussing the work of the Bancrofts, Hone, and Swift, passing on to Sir Harry Allan, Martin, and Kellaway, and then to the present day with Burnet, G. R. Cameron, Florey, and Willis. Before the address, honorary membership of the College was granted to Sir Macfarlane Burnet, Sir Peter MacCallum, Professor E. King, and to Drs. Cleland, Duhig, Latham, Kingsbury, Little, O'Brien, Tebbat, Ward, and Webster.

The scientific meeting was marked by a high standard of presentation by those who read papers, despite the informal atmosphere prevailing. It was gratifying to find that some of the ablest pieces of research had been partially conducted while their authors had been in England on travelling fellowships. In this category came Dr. E. S. FINCKH's report on the acute tubular necrosis in rats caused by glycerol, and Dr. V. MCGOVERN's description of the lining cement of blood vessels and its relationship to mast cells. Both these speakers had completed their research at University College Hospital Medical School, London. Professor KING spoke about poliomyelitis virus in monkey tissues, and there followed a vigorous discussion. A reception for members and their wives was held by the committee in the evening, and the next day those attending the meeting dispersed to their homes, in some cases over 2,000 miles away. So great are the distances in Australia that the College would be well worth while if its sole function was to mitigate the professional isolation of these widely scattered pathologists.

Preparations and Appliances

AN EASY LIFTING APPARATUS FOR HELPLESS
AND HEAVY PATIENTS

Dr. A. BRYCE STEWART writes: The apparatus here illustrated has been specially designed to assist nurses in the care of chronic and helpless invalids. During the development of this hoist over the past year several other types of



FIG. 1.—The lifting apparatus with canvas seat and safety strap.



FIG. 2.—Inserting the canvas seat under patient.

ture. The accompanying photographs should give an idea of how this apparatus is used.

The frame is of tubular steel, which, on the removal of five bolts, separates into the upright jib and the horizontal chassis. The winding device is an adaptation of a 14:1 reduction gearbox with a spring release catch in the handle, which automatically locks when not in use, thus preventing movement of the winding-drum. Aircraft steel-wire rope is used, the breaking strain of which is greater than one ton.

The canvas seats—for which a patent has been applied for—are easy and cheap to make, so that several can be used with each machine. Patients are lifted on to a chair and the supporting rubber-covered wires unclipped, leaving the seat in place under the patient, ready for rehoisting on

return to bed. This avoids discomfort to the patient and saves nursing time.

For six months the lifting apparatus has been in use in the geriatric unit of Florence Nightingale Hospital. A trial has also been given at the Robinson Kay Home, where long-stay geriatric cases are accommodated. During these months

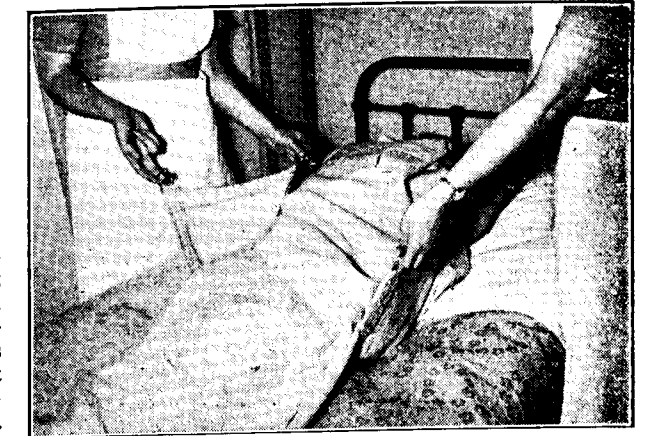


FIG. 3.—Ready for clipping the seat to the hoisting apparatus.

several interesting facts emerged: a bed-bath takes two nurses about 20 to 25 minutes and is then not as satisfactory as a proper bath. A technique has been worked out at the hospital whereby the patient is undressed before being hoisted from bed and is wrapped in a blanket. The patient is wheeled in the hoist to the bath, lowered in the canvas seat into the bath, washed, hoisted out of the bath, partially dried, and wheeled back to bed, where drying is completed on a blanket over a rubber sheet. The whole process takes between 10 and 15 minutes.

My thanks are due to Dr. F. R. Glover (Medical Superintendent) for his encouragement, to Dr. R. S. Savidge (Consultant Physician), and to the staff of Florence Nightingale Hospital. Also to Mr. H. Wilkinson (Secretary to the Bury and Rossendale Hospital Management Committee) for suggestions on the necessary safety factors, and to Messrs. Smethurst and Halliwell for technical advice. Sackers Ltd., Manor Street, Bury, are manufacturing this apparatus.

REFERENCES

- 1 Russell, W. R., and Schuster, E., *British Medical Journal*, 1956, 1, 211.
- 2 Prior, I. A. M., *Lancet*, 1956, 1, 616.
- 3 Rishworth, H. R., *ibid.*, 1956, 1, 903.

THE CHAILEY HERITAGE COMBINED
NOTE AND X-RAY TROLLEY

Dr. E. P. QUIBELL, medical administrator, Chailey Heritage, writes: The bulk of notes and x-ray films can become a real problem in long-stay children's orthopaedic hospitals: a trolley must be strong enough to carry the weight without becoming damaged and yet easily moved from bed to bed. Often, too, a series of x-ray films need to be examined: when put out on the bed they either get

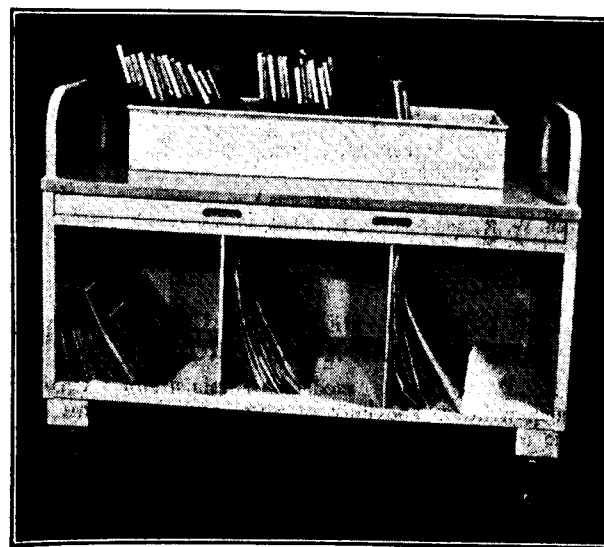
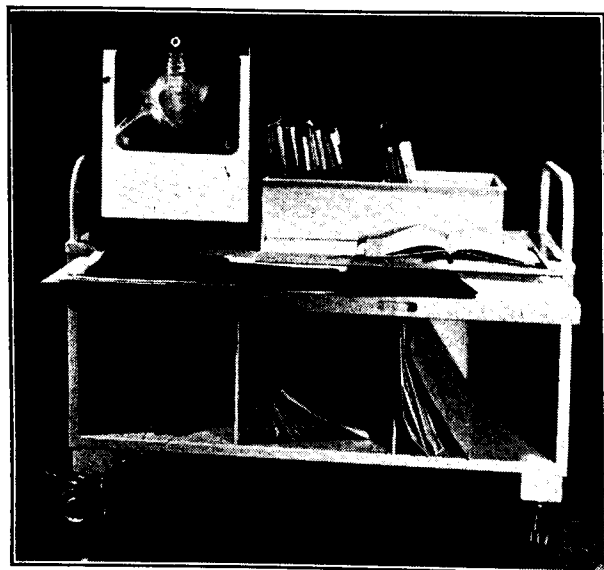
in the way or are knocked on to the ground; in addition, a surface on which notes can be written offers advantages. There should be room, too, for a diagnostic tray. The trolley illustrated here was designed to meet these various desiderata.

Basically, the construction is tubular steel, with sheet-metal surfaces. The top section for the notes, with two partitions, is offset to the back edge, to allow the maximum free surface, and the three compartments below house the x-ray folders (these compartments could advantageously be increased to four in number). Between the two sections is a shelf which fits flush when closed, but provides a good area when pulled out (see photographs). This shelf runs in concealed "guides" to prevent it jamming, and has two oval hand slots: if kept lightly greased it runs very smoothly.

The 4-in. (10-cm.) diameter castors are spring-loaded to reduce the "sway" effect when the trolley is pushed over the door ridges on to the solarium. This eliminates the damage of repeated end-to-end jarring which loosens the structure of so many trolleys in practice.

A light-coloured stove enamel gives a pleasing finish. Although the trolley is heavy, it moves easily and is not unduly bulky.

The photographs show the general appearance and construction, with the sliding shelf in the two positions; also some detail of the castors can be seen.



Details: Height (from ground to top surface), 2 ft. 6 in. (76 cm.); length, 4 ft. (122 cm.); depth, 1 ft. 8 in. (50 cm.); cost, £34 (approximately). The manufacturers are Brighton Sheet Metal Works, Ltd., 43, Devonshire Place, Brighton, 1.

I am indebted to Mr. A. Hayes, radiographer and clinical photographer at the Heritage, for the photographs, and also to the manufacturers for technical help in evolving the model to my design.

ANTIBIOTICS ON PARADE

In Washington, D.C., last month the fourth annual symposium on antibiotics was held. During the three days of the meeting, October 17, 18, and 19, no fewer than 143 papers on antibiotics were read. Their range and emphasis were well summarized by Dr. HENRY WELCH, who presided at the symposium, in his opening address. Dr. Welch is director of the antibiotics division of the U.S. Food and Drug Administration.

In the United States several hundred tons of antibiotics were used each year, said Dr. Welch. With this enormous use, the pattern of bacterial resistance established first with streptomycin and the tubercle bacillus was gradually emerging with other micro-organisms, and now there was the further problem of the overgrowth of resistant fungi. Not surprisingly, therefore, a large number of the papers at the symposium would deal with the therapy of infections due to resistant organisms.

Combined Therapy

Dr. Welch said that during the conference there would be emphasis on a trend towards a rational combined therapy, particularly with synergistic combinations. Oleandomycin, a new antibiotic, was combined in mixtures with tetracycline, oxytetracycline, and penicillin. In addition, it was compounded with penicillin to make a penicillin salt of oleandomycin. To reduce the numbers of both gram-positive and gram-negative bacteria in the intestinal tract before abdominal surgery, a combination of oleandomycin and neomycin was claimed to be useful. Further evidence on the value of a combination of nystatin and tetracycline would be presented. Combinations of neomycin and novobiocin, novobiocin and nystatin, neomycin and bacitracin, neomycin and chlorquinadol, neomycin and erythromycin, neomycin and oxytetracycline, and neomycin and isothiazylsulphathiazole, would all be discussed with respect to their enhanced value and activity, particularly in preparing patients for abdominal surgery. These preparations and others indicated a distinct trend towards combined therapy—"not," said Dr. Welch, "an old-fashioned shotgun approach, but a calculated rational method of attacking the problem of resistant organisms." It was quite possible that we were now in a third era of antibiotic therapy: the first being the era of the narrow-spectrum antibiotics, penicillin and streptomycin; the second, the era of broad-spectrum therapy; the third an era of combined therapy where combinations of chemotherapeutic agents, particularly synergistic ones, would be customarily used.

Practically an entire day, Dr. Welch continued, would be devoted to a discussion of antibiotics as food preservatives, an important economic problem "of great concern to the public health." There would be papers on the use of antibiotics in maintaining the freshness of poultry, fish, beef, ham, and vegetables. Five new antibiotics were to be described: ristocetin, PA 132, an antibiotic oil isolated from a plant, nucleocidin, and alazopeptin, which was active against mouse sarcoma 180. And more information on the relatively new antibiotics bryamycin, vancomycin, and amphotericin would be given. There would also be new studies on older agents such as erythromycin, nystatin, cycloserine, penicillin V, and synnematin B.

Correspondence

Because of heavy pressure on our space, correspondents are asked to keep their letters short.

Glycyrrhetic Acid

SIR,—If other clinicians add their experiences with glycyrrhetic acid under controlled conditions to those of Dr. F. Ray Bettley (*Journal*, October 13, p. 882) it should be possible to determine conclusively the value of this substance as a topical agent in the treatment of itchy inflammatory conditions.

I have compared glycyrrhetic acid ointment by alternation with hydrocortisone ointment, each patient serving as his own control. The results obtained were:

	Improved	No Change	Worsened
Hydrocortisone	13	2	0
Glycyrrhetic acid	3	8	4

Two preparations of glycyrrhetic acid were used. The results were:

	Improved	No Change	Worsened
Product A	1	7	0
" B	2	1	4

The response to glycyrrhetic acid was clearly inferior to the response to hydrocortisone. The figures are significant in spite of the smallness of the trial. In fact, $P < 0.002$.

No positive evidence, based on controlled trials, has yet been produced that glycyrrhetic acid has an anti-inflammatory action when applied to the skin comparable to that of hydrocortisone.—I am, etc.,

BRIAN RUSSELL.

London, W.1.

Neostigmine-resistant Curarization

SIR,—It was with great interest that I read Dr. A. R. Hunter's article on prolonged curarization (*Journal*, October 20, p. 919), having had two similar cases this year—described in the following report.

A man, aged 67, suffering from extensive carcinoma of bladder, had an operation for transplantation of the right ureter and had an operation for the left ureter. He had a history of pulmonary tuberculosis, and x-ray examination showed extensive cavitation in both lungs with signs of recent activity in one. Biochemical examination, on the day prior to operation, gave a relatively normal electrolyte content and his blood urea was 42 mg.%. The patient was premedicated with pethidine 100 mg., atropine 0.65 mg., and induced with a small dose of thiopentone, D-tubo-0.65 mg., and maintained with curarine and pethidine. He was intubated and maintained with N₂O-O₂ on a closed circuit. He was obese, and several supplemental doses of D-tubocurarine 5 mg. were required to provide adequate relaxation. He had a total dose of 35 mg. of D-tubocurarine. The blood pressure remained steady at the pre-operative level of 130/80 mm. Hg, but tended to rise towards the end of the operation. The pulse was full at rate of 90-100. When the peritoneum was stitched 1.3 mg. of atropine was given, the patient followed by neostigmine in intermittent doses of 2 mg. The patient's canister was removed from the circuit and the patient was mildly hyperventilated to restore level of alveolar CO₂. I had not realized at this stage the probability of a CO₂ accumulation, and had ventilated carefully to prevent anoxia. When neostigmine 6 mg. had been given with absolutely no effort at spontaneous respiration a large dose of nikethamide was given with no result. For three hours the patient was ventilated with high flow of oxygen and partly open expiratory valve. The pulse was now very full at rate of 90-100, and the blood pressure had risen to 170 mm. Hg. A very belated realization of a CO₂ accumulation caused me to hyperventilate with canisters changed every 15 minutes, and a slight return of spontaneous respiration after 40 minutes confirmed my suspicions. An infusion of Na

lactate was started to aid buffering, and an estimation was done which showed a total CO₂ content of plasma of 28 mm./l. and a free CO₂ content of 5.4 mm./l. When 200 ml. of Na lactate had been given the spontaneous respiration showed marked improvement, and by the time the pint (0.6 l.) had been given followed by 200 ml. Na citrate the tidal exchange was adequate. Three hours after the commencement of the Na lactate drip the patient objected to his endotracheal tube, and on its removal he was speaking and moving. He was returned to his ward eight hours after the end of operation and his condition was satisfactory. The blood pressure had fallen gradually during the Na lactate infusion, and was 110/70 on return to bed. Seven days after operation his general condition began to deteriorate, and he died ten days after operation of cardiac failure.

The second case, a primipara of 38 years, had been in labour for 72 hours. An anaesthetic was given in a nursing-home for forceps delivery. Thiopentone 250 mg. and succinylcholine 50 mg. was adequate until the perineum was being stitched, when a further 100 mg thiopentone was given. Respiration was adequate, but a few minutes after the delivery it became depressed and quickly stopped. The patient was flaccid, and tolerated the introduction of a No. 9 cuffed endotracheal tube—and respiration was controlled for one hour with constantly changing canisters—without any return of spontaneous respiration. The pulse was fast and irregular, and the blood pressure rose from a pre-delivery level of 110 to 170 mm. Hg. An infusion of Na lactate was started, and when 250 ml. had been given the blood pressure had fallen to 130 mm. Hg, and feeble efforts at spontaneous respiration were evident. No bleeding had complicated the third stage of labour, and no trauma except for a slight tear of the perineum. When the pint (0.6 l.) of Na lactate had been run in the blood pressure was 110, and the tidal exchange was adequate. A pint (0.6 l.) of glucose 5% was then started, and very shortly the patient started to move and objected to her tube. On its removal she opened her eyes and spoke. She had been on controlled respiration for three hours and assisted respiration for half an hour. The nurse gave a history of difficulty in making the patient eat or drink during her labour, and of vomiting and much belching and passing of flatus. Two days later her haemoglobin was 64% for which she received iron. A fortnight later a full blood count showed a haemoglobin of 66%, a red cell count of 3,890,000 and a white cell count of 7,500 with a colour index of 0.87. A blood film showed no abnormal forms in either red or white cells. Her puerperium was uneventful and she was discharged on the 12th day.

The man, with a respiratory acidosis due to poor ventilating capacity, reacted to active ventilation with frequent change of canisters, and infusions of Na lactate and Na citrate. The woman, with a metabolic acidosis due to vomiting and poor intake during labour, reacted to Na lactate only. In both cases the return to spontaneous respiration was parallel to the fall in blood pressure, and when the latter reached normal levels the return to consciousness was very rapid.

Such cases stress the need for the ready availability of microvolumetric estimation of plasma CO₂ levels and the quick report on pH reading. With these data a reading from a McClean nomogram would give a picture of the degree of acidemia present. It is an established fact that a lowered pH causes a fall in the plasma thiopentone level, but how does the altered pH cause prolonged apnoea with relaxant drugs? The first patient had D-tubocurarine, a myoneural blocking agent, and the second had succinylcholine, a depolarizing drug. Does the plasma pseudocholinesterase activity vary with altered pH?—I am, etc.,

Dublin.

SHEILA KENNY.

SIR,—I read with considerable interest Dr. A. R. Hunter's article (*Journal*, October 20, p. 919). The following case, I feel, is worth recording.

A white male, aged 71, was admitted to hospital on August 18, suffering from a strangulated inguinal hernia. He was successfully operated upon for the relief of this condition, but during the following week developed a persistent ileus. He was submitted to a further operation a week later because it was felt that he had a further mechanical obstruction of the bowel. In accordance with Dr. Hunter's experience, though ill and elderly, the patient was reasonably fit for anaesthesia. The blood electrolytes were normal and the renal function satisfactory. Blood urea 54 mg.%; haemoglobin 81%. Premedication: atropine

1/100 gr. (0.6 mg.), morphine 1/6 gr. (10 mg.). 5.15 p.m., induction: pethidine 25 mg., thiopentone 150 mg., succinylcholine 50 mg. Easy intubation with No. 10 Magill cuffed oral tube. Maintenance: 20 mg. D-tubocurarine chloride at the beginning of the operation in one dose N_2O/O_2 , closed circuit circle absorber. The operation proceeded smoothly, and on closure of the abdomen there was no reason for particular anxiety about the patient's condition.

At 6.15 p.m. 1/50 gr. (1.2 mg.) atropine, followed after five minutes by 5 mg. neostigmine, were given and spontaneous respiration started which was apparently satisfactory in volume. Over the next three or four minutes, however, it very rapidly failed and the patient became cyanosed. He was re-intubated and given artificial respiration. No response to nikethamide or to a further 2.5 mg. neostigmine was observed. The blood pressure started to fall and reached 60/?. A noradrenaline drip was set up and the blood pressure rose to 100/60. Movements of the accessory muscles became apparent at about 10 p.m., and very shallow respiration, insufficient to maintain life, was observed. The use of small doses of N-allyl-nor morphine (5 mg. $\times$ 3) and alternate periods of hypo- and hyperventilation produced no improvement. At 9.15 a.m. the next morning the blood pressure started to fall and cardiac failure and death occurred despite pressor drugs and intravenous plasma. At operation the patient was found to have a volvulus of the small bowel.

The respiratory weakness appeared to be peripheral—that is, at the myoneural junction—and this may come under the heading of "neostigmine-resistant curarization." It is interesting to note that neostigmine had some effect in reversing curarization, though an extremely transitory one.

An extensive search of the literature reveals an astonishing lack of information on the pharmacology of neostigmine. Its mode of metabolism and excretion by the body is unknown; knowledge of its duration of action is extremely uncertain. There are probably many unknown or ill-understood factors concerned with neuromuscular transmission. Potassium and ionic imbalance figures largely in theory and speculation at the present time. However, it seems that remarkably little is known about neostigmine considering the widespread clinical use of the drug, and that this may be a further line of attack on this problem. To quote Dr. Hunter, "It has become almost an article of faith with those who use agents of this type [competitive myoneural blockers] that it is safe to maintain curarization right up to the time at which the abdomen is closed, in the sanguine expectation that the paralysis will then be undone by neostigmine." If such reliance is to be placed upon a single drug it is surely necessary for its pharmacology to be well understood.—I am, etc.,

Prescot, Lancs.

J. B. MONTGOMERY.

SIR,—With reference to Dr. A. R. Hunter's article on neostigmine-resistant curarization (*Journal*, October 20, p. 919), I would point out the possibility of these cases being hidden myasthenics. I have two cases in mind.

The first was a young woman for pneumonectomy in 1954. I induced her with thiopentone 0.5 g. and "tubarine" (D-tubocurarine) 45 mg., maintenance with N_2O and O_2 . At the end of operation she was apnoeic, so I gave her atropine followed, after a proper interval, by neostigmine 5 mg. She began to breathe, but after a few minutes again became apnoeic. Smaller doses of neostigmine were given with atropine, followed by a favourable response but relapsing into a state of apnoea or near apnoea. This line of treatment was followed until breathing became normal in character and fairly good muscle tone could be felt. Neostigmine 25 mg. had been given at this stage. She was now returned to the ward, the operation having been concluded for two hours. She was given a further 10 mg. neostigmine by intravenous drip. Her convalescence was uneventful.

The second case was a woman in her sixties whom I saw in consultation with another anaesthetist half an hour after operation. She had been induced with thiopentone 0.5 g. and had gallamine 45 mg. Maintenance was with N_2O , O_2 , and pethidine. She had an inoperable carcinoma of the uterus. She had been given atropine followed by neostigmine 5 mg. She gave little response to this, but,

following doses of 2.5 mg. neostigmine, her breathing became adequate and muscle tone returned. In all she had a total of 40 mg. neostigmine. She had an uneventful convalescence except for signs of central overdosage of atropine in the first 24 hours post-operatively.—I am, etc.,

Boosterstown, Co. Dublin.

MICHAEL McGRATH.

SIR,—Dr. A. R. Hunter (*Journal*, October 20, p. 919) described a syndrome which many of us have experienced and regard with dread, in view of its almost certain fatal outcome. There are many facets to the problem of the patient who refuses to respond to neostigmine, but in the interest of brevity might I be allowed to mention a few?

My experience leads me to believe that it is most likely to occur in the patient with chronic widespread pulmonary disease with a poor vital capacity who is given large amounts of a long-acting myoneural blocking drug. We are left at the end of operation with an atonic patient making feeble inspiratory gasps accompanied by chin tugging and forehead twitching. Each gasp moves a volume of air hardly greater than that of the dead space. Drugs and hyperventilation have no effect.

Is it possible that in these "dilapidated" patients, as Dr. Hunter describes them, prolonged positive-pressure ventilation itself contributes to the final cardiac failure? I have had a measure of success by insufflating as low down the trachea as possible a jet of moistened oxygen through a long thin plastic endotracheal tube. Dead space is thus virtually eliminated and gaseous exchange by diffusion much encouraged. The tube may be left *in situ* until muscular tone returns, by which time respiratory activity is adequate. Meanwhile what little reserve of respiratory and cardiac action these patients possess is used to good effect.

Finally, I have never seen the syndrome after one or repeated doses of succinylcholine, and my experience leads me to hold that in such patients the safest method of obtaining good operating conditions is to use this relaxant with a maintenance anaesthetic of light ether and oxygen.—I am, etc.,

Wolverhampton.

J. F. RICKARDS.

B.C.G. and Vole Bacillus Vaccines

SIR,—I am grateful to Dr. P. D'Arcy Hart for his reasonable letter (*Journal*, October 20, p. 938), and I accept his assurance that the cases of tuberculosis which occurred during the Medical Research Council's survey were evenly distributed throughout the various groups of children in the different centres. Nevertheless, my main criticisms of the report still seem to be unshaken.

B.C.G. enthusiasts are always the first victims of their own propaganda, and their belief that B.C.G. is harmless dies hard. It is true, as Dr. Hart points out, that I have drawn attention elsewhere to the dangers of B.C.G. vaccination, but in case I might be thought to be prejudiced I quote from a recent authoritative pronouncement by Wallgren,¹ one of the leading exponents of B.C.G. in the world. He writes: "The knowledge that progressive B.C.G. tuberculosis may occur in human beings must shake our belief in the harmlessness of B.C.G. and should perhaps also lead us to re-examine the case for mass vaccination. It is no longer possible to contend that B.C.G. is harmless." In the same paper Wallgren mentions that, so far, four deaths have occurred from vaccination in Scandinavia alone. I cannot see any more reason, therefore, for ignoring a cold abscess caused by vaccination than for saying that death from B.C.G. tuberculosis is not the same as death from a natural infection. Dr. Hart does not deny that, apart from two cases of erythema nodosum, no record was kept of the lesions which followed B.C.G. in the survey.

I cannot agree that tuberculosis case-finding can be efficiently pursued by correspondence or by home visitation, unless, of course, it is intended to discover only cases of "clinical importance." If this was the purpose of the survey, there was no need to x-ray any of the children until

obvious symptoms aroused suspicion. But the diagnostic value of mass radiography is based on the fact that active pulmonary tuberculosis is often clinically unimportant and cannot be excluded except by radiography. Admittedly the percentage of vaccinated and unvaccinated children who were x-rayed was approximately the same, but percentages are comparable only if the totals to which they refer are comparable, and the vaccinated children exceeded the unvaccinated by 7,500. It follows that nearly twice as many vaccinated children as controls escaped being x-rayed during the survey.

The failure of Calmette and others to demonstrate convincingly a protective effect of B.C.G. vaccination in the early years of its long history was not entirely due to lack of large, well-controlled experiments but rather to attempts to compress the behaviour of tuberculosis into short, convenient periods of observation. The research worker is inclined to forget that tuberculosis is not especially, or even commonly, a disease of infancy, childhood or adolescence, but runs throughout the whole span of human life, and indeed, in this country, is now most lethal in middle-aged and elderly people. If our view of tuberculosis is broad and long, it becomes more than a coincidence that the maximum popularity of B.C.G. began with the discovery of the anti-tuberculosis drugs, the tremendous benefits of which have given B.C.G. a vicarious efficacy. For the same reason nothing has been accomplished in countries where mass vaccination has been practised for many years which has not been equalled or surpassed in countries where B.C.G. has never been used. It is necessary, therefore, to receive with healthy scepticism even such a careful study as the Medical Research Council's report, and the search for a genuine vaccine against tuberculosis must still be continued.—I am, etc.,

Dungannon, Co. Tyrone.

E. F. G. JAMES.

REFERENCE

¹ Wallgren, A., *Nord. Med.*, 1956, 55, 21.

B.C.G. Vaccination after Replacement Blood Transfusion

SIR,—We read with interest the account by Drs. A. S. Hutcheson and P. Macpherson (*Journal*, October 13, p. 863) of a rapid and severe reaction following B.C.G. vaccination of an infant who had received an exchange transfusion.

We think this must have been coincidental, as in our series we have had no similar occurrences. In the years 1952 to 1955 inclusive, 84 babies who have received exchange transfusions in the Royal Maternity Hospital, Belfast, have also received B.C.G. vaccination. Seventy-five of these were examined and tested after vaccination, and no abnormal findings were observed at the vaccination sites or in normal tuberculin reactions. One baby developed the post-vaccinal tuberculin reactions. One baby developed a regional abscess, but this did not appear until more than 12 months after vaccination.

It would be impracticable to check the Mantoux reactions of the donors concerned, but there is evidence that at least 50% of the adult population of Northern Ireland are Mantoux-positive, and the chances are that the great majority of the babies received blood from one or two such positive donors.—We are, etc.,

Belfast.

W. A. B. CAMPBELL.
H. M. PURSER.

Troublesome Staphylococci

SIR,—Staphylococcal resistance is even more difficult to assess after reading the *Journal* of October 13. May we soon have a leading article with more precise appraisal? Dr. Walsh McDermott's article (p. 837) is at strong variance with your leading article (p. 867). The leading article states: "There is a lot to be said for the idea that the use of antibiotics is selecting a tougher race of these organisms." Dr. McDermott says: "... Something we all knew—namely, that a penicillin-susceptible staphylococcal infection in a

patient virtually never becomes drug-resistant during therapy." The belief in acquired resistance during therapy is almost universal. All colleagues questioned, including a bacteriologist, believed in such acquired resistance of staphylococci. It is supported by your leading article (*Journal*, July 28, p. 217): "Our staphylococci are what we make them; the more an antibiotic is given, the more frequent does resistance to it become."

And yet it was "something we all knew"—penicillin-susceptible staphylococci virtually never become resistant during therapy. This deserves more comment than it has yet evoked. On what series is the remark based? To what extent does it apply to antibiotics other than penicillin? Can we imply there is no basis for the cry against indiscriminate use of antibiotics against staphylococci?

Dr. McDermott invalidates most popular experience on account of superadded infection in open lesions. I assume our safest attitude is to persist in the acquired resistance hypothesis unless disproved by a series of needle puncture cultures from closed lesions, which should be presented in the future.—I am, etc.,

London, N.W.2.

P. D. ELDER.

Herpes Zoster

SIR,—I should like to congratulate Dr. L. J. Barford on a most useful factual memorandum on herpes zoster (*Journal*, October 13, p. 864).

It is not clear if these patients were seen in general practice. If so, they probably represent almost the total incidence of zoster in the practice population during the period under review, and the age distribution as given could be much enhanced in value if it were related to the age distribution of the practice. Would it be putting Dr. Barford to too much trouble to ask him to obtain the necessary figures so that the age specific incidence could be calculated? It takes time to collect figures like this, and each contribution adds to the pool of knowledge about the natural history of this interesting disease.

One other statement in the memorandum calls for comment. In discussing the distribution of the rashes in relation to the sensory nerve areas, Dr. Barford writes: "There was some overlapping, as adjacent roots were often affected." If this refers to the spinal nerves it is of great theoretical importance, because the posterior root ganglia are anatomically well separated from one another. Was the decision that adjacent roots were involved dependent on the area of the skin covered by rash? If so, this is a rather misleading criterion, the skin areas supplied by the spinal nerves being widely variable, as Head and Campbell¹ first showed in a paper which is the classic for all time on the subject.—I am, etc.,

Cirencester.

R. E. HOPE SIMPSON.

REFERENCE

¹ Head, H., and Campbell, A. W., *Brain*, 1900, 23, 353.

SIR,—Doctors are usually considered to be bad patients, but they ought to be, as John Hunter and others certainly were, good observers of their illness, so the medical memorandum on herpes zoster by Dr. L. J. Barford (*Journal*, October 13, p. 864) tempts me to describe my own case from notes taken at the time, though it happened several years ago. It started with an uncomfortable and inexplicable feeling of coldness over the abdomen, just as if a cold pack had been laid upon it. I recognized it at once as similar to that described at times by patients for which I had never been able to find a cause. After two days this persistent chilly feeling mercifully passed off, to be replaced by a tender spot, about $\frac{1}{2}$ in. (1.3 cm.) in diameter, some 4 in. (10 cm.) to the right of the umbilicus. This was not hyperaesthetic in the ordinary sense, but it was sufficient to make the pressure of my trousers uncomfortable. It was not painful on pressure or tender on pinching, etc., and did not, so far as I knew, correspond to any special viscus. In spite of this I began to develop a flatulent dyspepsia, which I thought

might be due to a nervous indigestion, work having been very strenuous.

After two days more this spot slowly enlarged and then faded away to give place to a feeling of heaviness and discomfort around the liver. The dyspepsia increased and so did the discomfort, so that I could not sit in a chair with any comfort, and for three successive nights it woke me up at 3 a.m. By that time it had spread round to the kidney area, and it began to dawn on me that I was really developing herpes zoster. And so it was, for nine days after my first sensation of coldness the tell-tale pink papules appeared exactly where my tender spot had been. I got my wife to give me 2 ml. of "dekadexolin" (an intragluteal injection of vitamins A and D), and stayed in bed for two days, by which time the spots had almost faded, and I was well again.

The point of this recital is that so many of the symptoms I felt are so often described by patients whom we tend to describe as neurotic; in fact I wondered whether I was becoming neurotic myself. Though they showed, so far as I could find by careful examination, no physical signs whatever, they were in fact all due to some derangement of the posterior horn cells caused by the herpetic virus. I think that we too readily dismiss symptoms without signs as being psychological and of no importance, when they may have a really physical basis and be extremely uncomfortable into the bargain. I think too that we are often content to note pain, flatulence, etc., without sufficient inquiry as to the exact type. This may be useful for statistical analysis, but it almost certainly hides from us those finer points on which correct clinical diagnosis may well depend.

I mention the treatment with dekadexolin and its effect, because this is almost invariably what has happened in the many cases in which I have used it in the past 25 years. But there is one curious thing about it. Though it will usually cause the rapid disappearance of the eruption it does not, in my fairly large experience over the years, prevent the development of post-herpetic pain, though it reduces the pain at the time. Injections of vitamin B₁₂ in large doses have been recommended for herpes zoster, and I have used them several times. Personally I have not noticed much effect upon the eruption itself, but I think that these injections do tend to limit or prevent the post-herpetic pain. It is most probable that the two sets of vitamins act differently—for I do not think that there is any known connexion between the fat-soluble vitamins and cyanocobalamin—and it is curious that one should affect the eruption and the other the pain. If this observation should prove to be correct it might throw some light on the processes involved in at least one virus disease.—I am, etc.,

Winstord, Cheshire.

W. N. LEAK.

Antidote on the Label

SIR,—Several times a year I receive an urgent and frantic call from a parent whose child has swallowed some disinfectant or other commercial fluid. This usually means a call to the local chemist to find out if the fluid is poisonous and, if so, further inquiries to find out the antidote.

It would be a great help to us if manufacturers of household products labelled "Not for consumption" could print clearly on the label the immediate steps to be taken if the fluid is swallowed accidentally.—I am, etc.,

W. Horsley, Surrey.

DICK GLOVER.

Tranquillizers

SIR,—In view of the popularity of the so-called tranquillizing agents in the U.S.A. and the possibility of the same thing happening here, the experience of a patient of mine might be of interest to the medical profession.

A girl 18 years of age took two of these tablets before going to a dance. After the dance she missed the last bus home and was offered a lift in the car by a complete stranger and accepted it. In the car, she told me, she was assaulted by the driver and she did not resist him at all; after some time they both fell asleep. When they both woke up the driver tried to assault her again, but this time she resisted him strongly and asked him to drive her home. The driver, being a stranger to the district, asked two passers-by, who turned out to be policemen. The girl jumped out of the car and complained to the police about

the assault. Needless to say, the police could not prosecute the driver. The driver told them the girl was the willing party. I may add the girl does not touch alcohol in any form.

I think the reason why the girl did resist on the second occasion was that she must have recovered sufficiently from the effect of the drug to realize what was going on, after her short sleep.—I am, etc.,

Liverpool, 18.

H. J. PRATAP.

Abuse of Antibiotics

SIR,—I was very glad to read in Dr. S. Henry C. Clarke's letter (*Journal*, October 13, p. 883) the reference to moniliasis resulting from the use of antibiotics. It is all too often overlooked that the suppression, not only of pathogenic bacterial flora but also of the normal bacterial saprophytes in the mouth and intestine, encourages the growth of *Candida (Monilia) albicans*.

From the viewpoints of the allergist one often notices nowadays that allergic conditions such as asthma, rhinitis, and in some instances eczema, migraine, or colitis appear for the first time or become more severe after a course of antibiotic therapy. Many such cases will be found to have developed an allergic sensitivity to *Candida albicans* which is detectable by intradermal testing with the appropriate extract to give the immediate (15–20 minutes) raised wheal reaction. Fortunately for these patients, specific desensitization (hyposensitization) is usually very effective treatment to overcome so grave a sequela of antibiotic usage.—I am, etc.,

London, N.W.10.

F. H. MILNER,
Director,
C. L. Bencard Ltd.

Pharmaceutical Advertisements

SIR,—Many pharmaceutical firms have tried to meet the problem of usefully presenting literature to the profession by publishing loose-leaf books, card indices, etc., giving essentially practical facts—but, of course, for their own products only. There does not, however, seem to be any standardization between the pharmaceutical firms on the form of presentation. I envisage a committee to be formed of the medical representatives of the firms and representatives of the medical profession which could publish a loose-leaf file to which all firms could subscribe the brief important facts about all the products available on the market (and not, as has been sometimes done, the products issued in the last so many years and in "current use").

I suggest that the details of each product could be printed with a space for notes and headed with its name and a one- or two-word description of its action and the disease(s) in which it is useful. Underneath should be the logical headings with a short bibliography at the bottom. It would be very useful to have a distinctive mark if prescribable on E.C.10. The full details would have to be thought out, but the products of each firm could be easily grouped together and all printed in the particular firm's colour, incorporating a thumb index for each. The firms could be arranged alphabetically. The first part of the file should be a comprehensive therapeutic index (fully cross-referenced) of all products available.

This project would not prevent firms sending out any amount of literature as they do now, but doctors would be able to throw all the advertisements out in the sure knowledge that they all have a complete brief description of each product available. It would be interesting to read views about this idea from various firms and colleagues.—I am, etc.,

London, W.12.

JOHN D. W. WHITNEY.

Medical Education

SIR,—The writers of two letters in the *Journal* of October 20 (p. 940) concern themselves with the question of education within medicine. Recently I was privileged to hear an excellent paper by the headmaster of a well-known grammar school read to a mixed gathering of legal and

medical graduates, the former being our kind and generous hosts. The paper, for the most part, dealt with the preparation and selection of promising youths—which it was meant to do. It was quite splendid within its terms of reference. As at one point some extraneous matter was introduced, or so I thought, by another speaker, I had the temerity to venture a few words on the subject broached by Dr. R. J. Knight and Dr. H. Stewart Moore.

These few words were simply a suggestion that anyone interested in (1) education in medicine, (2) education in general, could do no better than procure copies of the several lectures on the subject given by Sir Francis Walshe, consulting neurologist to University College Hospital and to the National Hospital for Nervous Diseases, Queen's Square. I take the liberty of quoting the titles in my possession, with the names of the publishers: *Humanism, History and Natural Science in Medicine* (Linacre Lecture, 1950, Livingstone, Edinburgh); *The Structure of Medicine and its Place Among the Sciences* (Harveian Oration, 1948, Livingstone, Edinburgh); "Teachers of Medicine" (*Lancet*, 1947, 2, 817); "On Clinical Medicine" (*Lancet*, 1950, 2, 781); "The Arts of Medicine and Their Future" (*Lancet*, 1951, 2, 895); *Thoughts Upon the Equation of Mind with Brain* (Hughlings Jackson Lecture, 1952, Macmillan, London).—I am, etc.,

Cheslyn Hay, Staffs.

L. DILLON MALONE.

Increase in Scabies

SIR,—In recent months there has been a significant increase in the number of cases of scabies attending outpatients. What is disturbing is that in most of these cases the diagnosis was unsuspected by the general practitioner. Ten years of almost complete absence of scabies has tended to make older practitioners forget the diagnosis, while a new generation of doctors have qualified who know not scabies. This diagnosis should always be considered in any patient who itches, particularly if the itching is worse at night. Itching in other members of the family is almost conclusive.

The causes of the epidemic variations of scabies are not really known. Increased incidence has been attributed to war, but though this may accelerate an increase it is not the primary cause, as was shown by the rising figures during the pre-1939 years. Unlike most epidemic diseases, one attack does not confer any real immunity on the individual, though he may possibly show fewer acari in subsequent attacks. Decreased incidence seems to depend on "group immunity," that is to say, on the development of active anti-scabies measures by the community. Among these I would emphasize early diagnosis by the doctor, adequate treatment, and, above all, the synchronous treatment of all members of the household and other possible contacts, whether they are obviously affected or not. It was the institution of scabies clinics to implement these latter that halted the epidemic during the war. Unless the lessons learnt during the war are remembered and we give a "booster dose" to our "group immunity," we shall probably see a steady increase in the incidence of scabies in the near future.—I am, etc.,

Leeds, 2.

F. F. HELLIER.

Sickling in an African Community

SIR,—Arguing from the same facts and assumptions, Drs. H. Lehmann and A. B. Raper and Dr. William A. Wilson arrive at very different conclusions about the possibility that a high sickling rate can be maintained solely through differential mortality from malaria. Thus the former hold (*Journal*, August 11, p. 333): "If selective death of non-sicklers from malaria was responsible for the maintenance of the 39% sickling rate in Bwamba, 10.6–24.2% of all normal homozygotes (or 6.9–15.7% of the whole child population) would have to die from malaria. Reasons are given for supposing that the actual death rate to be observed would approximate to the lower rather than the higher of the two

limits, and that such a death rate from malaria is to be expected in Bwamba." The latter states (*Journal*, August 25, p. 481): "From the available data there is still seen to be a big gap to be closed between the 24% reduction needed by the hypothesis and the 7% or so which malaria can effect." In their reply (*Journal*, October 13, p. 882) Drs. Lehmann and Raper suggest that Dr. Wilson has confused death rates on non-sicklers with rates for the whole population, and conclude, "There is indeed little 'gap' left, barely enough for Dr. Wilson to extract his 'red herring'."

The theory that persons with the sickle-cell gene are protected against death from malaria is attractive and stimulating, and it is important to determine whether the high sickle-cell trait rates found in Africa can be maintained solely by a differential mortality consistent with estimated malarial death rates. It seems worth while, then, to resolve in simple terms a conflict of opinion which is, largely, over the correct application of arithmetic.

Drs. Lehmann and Raper accept the widely held view that the sickle-cell gene is inherited as an allele of the gene for normal blood, the heterozygotes showing the trait and the sickle homozygotes the anaemia. They discuss clearly the basis for their view that virtually all the sickle homozygotes die young. They then make the tentative hypothesis that a negligible proportion of the heterozygotes die from malaria. Given this, the essential feature of their argument is that the number of deaths from malaria necessary to balance the deaths of the sickle-gene homozygotes varies with the distribution of all deaths by age. They show that to maintain a sickle trait rate of 39%, in a population where 35% of the births survive to puberty, 15.7% of the children born must die from malaria in a model where all the malaria deaths occur before the deaths from other causes, but only 6.9% if the malaria deaths take place after the other deaths. They surmise that a considerable proportion of the non-malarial mortality must occur at very early ages and that the percentage mortality from malaria required for maintenance of the sickle gene will therefore be nearer the lower than the upper of the two values.

Up to this point I think the argument is both sound and clear. The mortality of 65% before puberty is rather extreme (with such a rate the average number of children born per woman of completed fertility would have to be about eight to maintain the population size) and not conservative as the authors state, but it is not impossible. I agree that a fair proportion of child deaths would occur before the effect of deaths from malaria became considerable.

It is in the next stage that the calculations become obscure and there is a possibility of confusion. Drs. Lehmann and Raper quote death rates from malaria given by Colbourne and Edington¹ and by Duren² which are reasonably consistent. They then say that these rates imply a loss from malaria deaths of 5% to 19% of all children born. Now the rates quoted are age specific rates—that is, expressed in the form of deaths per thousand living in the population at the appropriate ages. They cannot be translated in terms of a percentage of children born without some assumptions about the age distribution of the population—that is, in reasonably stable conditions—about overall death rates. It is not stated how the percentages 5% to 10% were calculated, and I do not see how they can be derived from the malaria death rates estimated on assumptions consistent with the previous argument. If we continue this argument in a logical way we must apply the age specific malarial death rates to the forms of population implied by the alternative models. In the first model the malaria deaths occur first, so that the population at risk in each year of age does not differ much from the number born. Taking Colbourne and Edington's estimated malaria death rates of 17 per 1,000 in the first year of life and 10 per 1,000 at ages 1–5 years, of 1,000 births approximately 17 will die in the first year and 40 in the next four years, to give a mortality of 5.7% of births as compared with the 15.7% required by the model. The upper limits of Duren's rates would lead to a slightly higher mortality, but even with these, and making allowances for some deaths after the age of 5, not more than half of the necessary deaths from malaria can be accounted for. In the second model, deaths from malaria can be accounted for. In the second model, on which Lehmann and Raper lay most stress, the non-malarial mortality occurs first, and the population has been reduced to 419 in each thousand born before the malaria death rates can be applied. Colbourne and Edington's estimates then give 0.419 × applied. 57 deaths under the age of 5—that is, 2.4% of births. Again, even with ample allowances for higher rates, this does not amount to half the 6.9% required. These models are, of course, both very unrealistic, but it is easy to show that much the same relationship is obtained with intermediate cases.

It seems to me that Drs. Lehmann and Raper have neglected in their argument the fact that, although the number of deaths from malaria required to maintain the sickle gene varies with the distribution of mortality, the number of deaths due to fixed age specific rates varies in much the same way. I may be wrong in this, for the relevant portions of their calculation are not explained, but, if so, I do not see how they can reconcile the quoted malaria death rates with those required by the hypothesis they are considering.

There is a further point which, although of less importance, should not be neglected. The death rates from malaria quoted are for communities where the sickle trait rates are lower than 39% (perhaps 20% is a fair average). On the hypothesis that heterozygotes are not susceptible, 80% of the children are exposed to the risk of death from malaria in these communities but only some 60% of the Baamba. In using the same overall death rates from malaria for the latter it is being tacitly assumed that the death rates of susceptibles among the Baamba are about one-third higher than in the other communities.

On the assumptions made by Drs. Lehmann and Raper, it seems to me that the gap between recorded death rates from malaria and those required to maintain some of the high sickling trait rates found is still substantial. This does not mean that it cannot be closed. I think it is possible with other assumptions which lead to more complex models to do this, and I hope to publish something on the subject shortly with Drs. H. Foy and A. Kondi.—I am, etc.,

W. BRASS,
Department of Statistics,
Marischal College.

REFERENCES

- ¹ Colbourne, M. J., and Edington, G. M., *J. trop. Med. Hyg.*, 1954, 57, 203.
² Durca, A. N., *Ann. Soc. belge Méd. trop.*, 1951, 31, 129.

Diagnosis of Early Pregnancy

SIR.—In the *Journal* of October 27 (p. 987) there is an annotation on the diagnosis of early pregnancy with particular reference to the production of withdrawal bleeding by the administration of hormones.

I wrote a letter to the *Journal* (August 18, p. 419) expressing misgivings about the safety of such tests to the foetus. I pointed out that the disturbance of the endocrine balance of the mother and foetus early in pregnancy, when the main structures in the foetus are being laid down, might result in the production of foetal abnormalities. In a subsequent issue a case was reported (*Journal*, September 15, p. 600) of the delivery of a malformed foetus after this test had been used, although the writer was of the opinion that the association was coincidental. Your annotator completely ignores this side of the problem, but he does suggest that it is possible that in some cases the treatment may have in actual fact procured an abortion.

It is to be hoped that the widespread use of these tests will not lead to a repetition of the story of x-ray pelvimetry, for a procedure of no therapeutic value.—I am, etc.,

London, N.W.8.

H. G. BRITTON.

SIR.—I found the article by Mr. G. Douglas Matthew (*Journal*, October 27, p. 979) on the use of "orasecron" as a simple clinical test for the diagnosis of early pregnancy most interesting. When "disecron" became available I used it often as a test for early pregnancy, and now I find it simpler to use orasecron. The patients also appreciate not having to be injected and not having to come to the surgery twice for that purpose. I agree with Mr. Matthew that the oral administration of combined progesterone and oestrogen in the dosage prescribed would appear to constitute a reliable clinical method of diagnosing early pregnancy.

Now, Sir, your annotation (p. 987) on the same subject ends: "Finally, there is usually no urgency for a certain diagnosis of early pregnancy, and if the family doctor cannot make a confident diagnosis re-examination of the patient in three or four weeks' time is nearly always conclusive. Pregnancy, like murder, will out." Leaving aside those several cases seen each year in general practice where one must consider advising a therapeutic abortion, the general

practitioner will at any given time in a large practice have anything up to half-a-dozen cases on his hands of patients who are terribly anxious to know early on whether they are pregnant. I have precisely six such cases in my practice at this minute. For example, recently a patient consulted me when one week overdue. She was in a terrible state of anxiety because she has four children. I believe that she is becoming menopausal. With the aid of orasecron I shall be able to advise her one way or the other within seven to fourteen days.

It would appear that your annotator has little knowledge of this problem in general practice. It is a very real one, and orasecron is a very real help. Eight to twelve weeks of anxiety are harder to bear than one to two weeks. The grateful patient will tell you that it is so.—I am, etc.,

Ruislip, Middlesex.

T. DAVID LAMBERT.

Speech Therapy

SIR.—Following the recent correspondence on speech therapy, I should like to add a note, and may I also comment on the answer to the question on stammering ("Any Questions?" June 30, p. 1556)? It contains statements that need exploring and correcting. It is stated that over 80% of stammerers are males; this is said to be seen in no other form of psychoneurosis, and it is implied that therefore stammering is not psychological in origin. However, the majority of enuretics, delinquents, and fetishists are males; kleptomaniacs are almost entirely females, as are also sufferers from anorexia nervosa; and there are many other psychological disturbances preponderant in one sex or the other. It may be that the aggressiveness of the male is one factor in the more frequent occurrence of stammering in the male. The conditions leading to stammering are present in the first two or three years of life.

Stammering may in some cases be "cured" by speech therapy, but stammering is a symptom, and the removal of that symptom will be followed by the development of other symptoms or even by psychosomatic illness unless the whole person is treated. Speech therapy is invaluable in organic speech defects, such as cleft palate, cerebral palsy, after brain injury, etc., but the treatment of stammering is psychotherapy.—I am, etc.,

London, W.1.

BARBARA WOODHEAD.

SIR.—May I briefly express my thanks to Miss Ruth Bennett for her very able supporting letter (*Journal*, October 27, p. 1000)? In answer to her question as to male therapists I would say there is no "rule," but the point should be borne in mind whenever progress is unduly slow and there is likely to be a "transference" situation developing. As to the advice of the family doctor to leave the stammerer alone because the subject will "grow out of it," that is right in a way, since at the commencement of trouble the great thing is to avoid making the child concentrate anxious attention on his speech, since anxiety is always inhibiting. But the fact of a stammer developing is not to be ignored. It must be regarded very seriously as a sign that all is not well with the environment or handling of the child, and the family doctor should be the first in the field to hunt down the causes of stress.—I am, etc.,

Scarborough.

R. MACDONALD LADELL.

Treatment of Iron-deficiency Anaemia

SIR.—The correspondence that has followed the article by Drs. E. Cope and R. O. Gillhespy and Mr. R. W. Richardson (*Journal*, September 15, p. 638) cannot fail to confuse the practitioner who is faced with the common problem of treating iron-deficiency anaemia. It must be conceded that the observations of the three authors were not continued sufficiently long to be really conclusive, but this does not justify all the criticisms of Dr. S. Bradshaw (*Journal*, October 27, p. 996). Thus, although it is true that "as the haemoglobin level rises so does the intestinal mucosal block to iron absorption become more effective,"

it does not follow that "at a haemoglobin level of 100%, iron absorption from any oral preparation is very small—certainly too small to build up the lost iron stores in any reasonable time." If this were true, all the cases treated before the days when parenteral iron became available would have relapsed from time to time; but those of us who were brought up in those benighted times know that this was not so. We did, however, learn, albeit empirically, that, once the haemoglobin level had risen to about 80%, it was necessary to increase the dose of iron. To say that "it is probably the failure of oral iron preparations to do more than merely raise the haemoglobin level that is responsible for those many patients who return to their doctors time and time again with anaemic symptoms" is unfair to these medicaments; if relapse occurs, it is because treatment has not been continued sufficiently long and because adequate doses have not been given in the later stages. The progress that has been made in connexion with oral iron treatment is due to the production of compounds much less likely to upset the digestion than was, for instance, Blaud's pill.

It must be remembered that there is no exact method of determining that the iron stores are filled but not overfilled; that is to say that, with parenteral treatment, there is no safeguard against producing siderosis. Then again, although there are a few cases of iron-deficiency anaemia which will not respond adequately to oral iron, this is no reason for treating every case by the parenteral route, which is by no means devoid of side-effects, even if the possibility of overdosage is left out of account.

Dr. Bradshaw makes the whole subject unduly simple, but Dr. Bertha Klempman (*Journal*, October 27, p. 997) helps us to a balanced view by saying: "The haemoglobin level at which oral iron absorption is severely impaired varies with each individual." In short, the saturation of rather hypothetical iron-receptors in the intestinal mucosa is too facile an explanation, and it is probably true that parenteral iron is the treatment of choice in those rather uncommon people whose intestinal absorption of iron is severely impaired at relatively low haemoglobin levels.

I cannot enter into the question of the relative incidence of digestive upsets with the different preparations of oral iron, but I can state, without fear of contradiction, that the bits of iron from the grinding of axes are neither haemopoietically potent nor likely to clarify our views on the best line of treatment.—I am, etc.,

London, W.1.

A. PINEY.

SIR.—According to the letter from Dr. S. Bradshaw (*Journal*, October 27, p. 996), if any of us are so unfortunate as to be old enough to deplete our iron reserves, it is years before they are made up again, even if oral iron be taken. Should we deplete them again before they are made up, they may well become exhausted. Presumably women between the ages of 14 and 45 have extremely low iron reserves. Frankly, his statements are hardly credible, as 50% or more of the nation would be anaemic, or on the verge of anaemia.

He mentions "patients who return to their doctors time and time again with anaemic symptoms—each time to receive oral iron, to respond, and then to relapse again in a few weeks." The obvious remedy for this is to instruct the patient to have one iron tablet a day, either for the rest of her life or until she ceases to menstruate. She will appreciate this much more than having her hide pricked for an intramuscular or intravenous injection.—I am, etc.,

Colchester.

M. E. LAMPARD.

Future of Diagnostic Procedures

SIR.—Recently a patient of mine aged about 2 years who five days previously had swallowed a halfpenny was refused x-ray check on the progress of the coin because of the possibility of producing leukaemia. Provided the money is eventually returned without any trouble, as is usually the case, one need not be particularly concerned about the effect of such a decision on this little girl. However, this instance does draw attention to the new medical and legal situation

created by the recent work in connexion with the relationship between exposure to x rays and leukaemia. Obviously in some cases an entirely new conception of when x-ray investigation is justified must shortly come about. Also, for the time being at any rate, more reliance is going to be placed again on older methods of diagnosis, such as antenatal abdominal palpation.

If medical science is to be even partially deprived of diagnostic radiography, search will have to be made among more recent discoveries for an alternative. Possibly some elements in the ray spectrum may be found to be relatively harmless, and these might even be simply produced by filtration of existing cathode emanations. In the meantime attention will be drawn to the possibility of using modified echo sounding and radar apparatus, at least for the detection of foreign bodies in the abdomen.

Members of the public in general, as well as of the medical profession, may well wonder how many diagnostic procedures undertaken in the past with impunity will in the future prove to have been not unmixed in their blessing. It seems unlikely that intravenous dyes and the like have been harmful, but, for instance, where do we stand in relation to the use of radioactive isotopes? At what age can a patient now be said to run no risk at all in exposure to diagnostic or therapeutic radiation? What is going to be the medical and legal standard now? For instance, would a court now allow a doctor the right to use his discretion to withhold x-ray investigation where hitherto it would have found him negligent?—I am, etc.,

Eye, Suffolk.

J. SHACKLETON BAILEY.

Sampling from the Electoral Roll

SIR.—I am a little concerned lest anyone should copy the method of sampling used by Dr. I. T. T. Higgins and his colleagues in their investigation of respiratory disability in an industrial town (*Journal*, October 20, p. 904). It is biased. They wanted a sample of men aged 55 to 64 and used the electoral roll in the following way: "The procedure adopted was to sample at random from the serial numbers of individuals, to regard the selected numbers as selecting a house, and to include in the final sample all men in the chosen houses who were of the correct age." They say: "By this method the chance of selecting a house is roughly proportional to the number of its inhabitants, so that, again roughly, each individual has the same chance of being included in the sample."

This last statement is not even roughly correct. First, the chance of selecting a particular house is exactly proportional to the number of electors registered for that address—that is, the number of adults aged 21 and over. Then if all the men aged 55–64 are taken from the house selected the chance of any man found having entered the sample is still proportional to the number of adults aged 21 and over registered for his address (apart from cases where people have moved since the register was compiled this is the number of adults aged 21 and over living with him). Thus the requirements of simple random sampling that each eligible person should have an equal chance of entering the sample are far from met.

To correct for the unequal probability of selection, the results for each individual need to be given a weight inversely proportional to the number of adults registered for that address. This has not been done. The necessity for so doing could have been avoided altogether if more appropriate methods of selecting the sample had been used.

It is quite possible that in this particular case the selection of men with unequal probability has not affected the conclusions reached. We do not know. However, this biased method of sampling could lead to seriously misleading results where the attributes being studied are correlated with the number of adults living with the person selected. I hope the method will not be copied.—I am, etc.,

London, W.C.1.

REFERENCE

- ¹ Gray, P. G., Corlett, T., and Frankland, Pamela, *The Register of Electors as a Sampling Frame*, 1950. The Social Survey, London.

P. G. GRAY.

Obituary

ROBERT B. OSGOOD, M.D., F.A.C.S.
Hon. F.R.C.S.

Dr. Robert Bayley Osgood, emeritus professor of orthopaedic surgery at Harvard, died on October 2, aged 83. He was recognized throughout the world as an orthopaedic surgeon and medical teacher of great distinction.

Robert Bayley Osgood was born at Salem, Mass., on July 6, 1873, and graduated M.D. at the Harvard Medical School in 1899, the year in which he began to practise as an orthopaedic surgeon in Boston. Not long afterwards, in 1903, he published a paper on lesions of the tibial tubercle occurring during adolescence, this being the first description of the disorder which later came to be known as "Osgood-Schlatter disease." During all his professional life he was on the staff of the Massachusetts General and Children's Hospitals, being in charge of the orthopaedic service at both; and at the Harvard Medical School he was appointed John Ball and Buckminster Brown professor of orthopaedic surgery in 1922. Among the books of which he was author or part-author were *Diseases of Bones and Joints* (1909), *The Evolution of Orthopaedic Surgery* (1925), *Fundamentals of Orthopaedic Surgery in General Medicine and Surgery* (1931), and *Medical and Orthopaedic Management of Chronic Arthritis* (1934). His work brought him international renown, and he was an honorary member of numerous foreign orthopaedic associations, including the British and Australian associations. In 1925 he gave the Hugh Owen Thomas Lecture in Liverpool, and in 1943 Major-General W. H. Ogilvie (now Sir Heneage Ogilvie) conferred on him at the British Embassy in Washington the Honorary Fellowship of the Royal College of Surgeons of England. He was also an Honorary Member of the Section of Physical Medicine at the Royal Society of Medicine.

During the first world war Dr. Osgood served with the American Forces overseas, and in 1918 he was appointed a consultant to the office of the Surgeon-General in Washington. In later years he held numerous official appointments, including those of chairman of the advisory board of orthopaedic surgeons to the trustees of the Shriners' Hospitals for Crippled Children, and chairman of the advisory committee for services for crippled children at the Children's Bureau, Department of Labour, Washington. As long ago as 1921 he was president of the American Orthopaedic Association, and a few years later he became president of the New England Surgical Society.

We are indebted to Mr. H. J. SEDDON for the following appreciation:

Perhaps the most outstanding quality of Dr. Robert Osgood's, greater even than his reputation as a surgeon, was his beneficence; it embraced causes and individuals alike. His command of orthopaedics was profound, though he cared little for operative surgery; what mattered far more to him was that orthopaedics in America should be done well.

A few months ago, after I had visited two Shriners' hospitals, both in California, I happened to ask an American friend how it was that all the Shriners' hospitals I had ever visited were staffed by such excellent men. His answer was that from the first the policy had been to appoint only first-class surgeons. "Bob Osgood used to do it, you know"—that was regarded as a sufficient explanation. If we go back nearly 40 years to the minutes of the inaugural

meeting of the British Orthopaedic Association, held on February 2, 1918, we read that "Major Robert B. Osgood, of Boston, U.S.A., who had helped very considerably in the preliminary steps which had led to the formation of the Association, was present as a specially invited guest." Much lay behind this simple statement. There was a clash of powerful personalities: Osgood dealt with it.

He was interested in individuals, too. Twenty-six years ago I paid my first visit to Boston; it was just before Christmas. At the Children's Hospital I met Dr. Osgood, and, having listened to him in the course of a ward round, I realized that here was a great man. But there was nothing Olympian about him. When we had finished he asked me if I could sing. I said I could scrape up a rather cracked tenor that sounded all right in a sufficiently large crowd. He asked me to have dinner with him that evening and then go with him to a carol practice. We went to a large hall where we found Dr. Richard Cabot in his shirt-sleeves fiercely rattling a baton and trying to knock some sort of discipline into a mob of carol singers. Dr. Osgood was a respectable tenor, and I followed him rather than the score. (Dr. Philip Wilson in an adjoining group was, I think, a magnificent *basso profundo*.) On Christmas Eve we were let loose on Beacon Hill, and finished up in the snow-covered courtyard of the Massachusetts General Hospital for our last performance. Then we went back to Beacon Hill, where candles were alight in every window and where every door was open to receive us. In no house was the welcome warmer than in Dr. and Mrs. Osgood's; there was supper for everyone and presents from the Christmas tree. This was the beginning of an enduring friendship, enriched—for me—by a regular correspondence. But I was only one of scores of young men whom Robert Osgood guided with good advice, always given gently and humbly.

This cultivated Bostonian, one of the small band of outstanding men who gave their city its unique place in orthopaedics, differed from many of his contemporaries in having left few memorials of his eminence as a surgeon. A disorder of adolescence bears his name; I know of no operation that does. But all that is best in American orthopaedic surgery owes something to Robert Osgood. His noble influence is remembered too, perhaps even still felt by a few, in our own country, which he loved almost as much as he did his own.

VLADIMIR FILATOV, M.D.

Professor Vladimir Filatov, who died at Odessa on October 31 at the age of 81, was an ophthalmic surgeon of international repute and renowned for his work on corneal transplantation. He was a member of the Academy of Sciences of the U.S.S.R.

Vladimir Petrovich Filatov was born at Saransk, in the Ukraine, on February 15, 1875. He studied medicine in Moscow, graduating as a doctor in 1897. After holding hospital appointments in Moscow he moved to Odessa in 1908, and a few years later was appointed director of the ophthalmological institute there. Although best known for his work on corneal grafting, he was no narrow specialist and had written on such subjects as trachoma, malignant tumours of the eye, and the bacteriology of eye infections. The results of his research were published mainly in Russian journals, but he wrote an account of transplantation of the cornea which appeared in *Archives of Ophthalmology* (N.Y.) in 1935. During the second world war he worked at a hospital in Tashkent, where his experience of tissue grafting was applied to the treatment of war wounds. He continued working at Odessa until the time of his death, directing the Ukrainian Experimental Institute for Eye Diseases and Tissue Therapy. He was also a deputy of the Ukrainian Supreme Soviet.

We are indebted to Sir STEWART DUKE-ELDER for the following appreciation:

Vladimir Filatov was undoubtedly one of the great ophthalmologists of our generation, and many ophthalmologists in this country have regretted the fact that closer contact with him and a more personal appreciation of his ideas have been impossible. His greatest contribution was in the biology of corneal grafts and the perfecting of the surgical techniques of keratoplasty. It will be remembered that von Hippel, of Göttingen, was the pioneer who, towards the end of the last century, made this operation a clinical possibility. Filatov shares with Elschsig, of Prague, the distinction of evolving the techniques which made the operation a practical surgical procedure. As early as 1913 he was experimenting on the feasibility of total corneal grafting, transplanting the entire cornea with a margin of sclera and conjunctiva. This drastic procedure, of course, gives no clinical results of value, but the attempt illustrates his courage as a surgical enthusiast.

There are two major advances with which his name is associated in connexion with corneal grafts. The first of these concerns the use of eyes from cadavers. Some time previously Magitot, of Paris, had shown that a graft could be preserved for a period varying from one to two weeks at a low temperature in haemolysed blood. With this as a basis Filatov went further and popularized the use of a grafts removed from the eyes of cadavers; as early as 1934 he was using such eyes 41 hours after death. This, of course, opened up a vast source of graft material and is universally practised to-day with great benefit.

The second great advance he made was in the employment of lamellar grafts, not for visual purposes but with a view to obtaining a suitable bed for a final graft. In the previous century von Hippel had practised lamellar keratoplasty and Elschsig in the early 1920's had demonstrated that a corneal graft would take only if there were a sufficiency of clear cornea in the eye of the recipient; a graft inserted into a bed of corneal scar tissue invariably turned opaque. In such a cornea Filatov inserted a clear lamellar graft, and at a later stage inserted a penetrating graft for visual purposes. In work such as this he noticed that the implantation of a graft tended to clear corneal opacities which might already be present. Upon this observation he built up a theory of the stimulation of tissues by the release of "biogenic substances," a theory which became a considerable cult in Russian medicine. With this as theoretical basis, he launched a new method of therapy based on the injection, topically or systemically, of a great number of animal and vegetable substances, the products of which were assumed to stimulate the tissues of the host, and for a time this method of "tissue therapy" was widely employed in the treatment of a host of degenerative ocular diseases which responded to no other therapy—myopic chorio-retinal atrophy, primary pigmentary degeneration of the retina, optic atrophy, and so on. The most common material ultimately advocated was derived from the placenta, and the method of use was either to inject placental extract or to insert subconjunctival implants of placental tissue. Most ophthalmologists are agreed that, whatever the theoretical justification for this form of therapy, in practice it brought little or no benefit, and it has generally fallen completely out of use. However this may be, Filatov will always be remembered for his achievements in technical surgery and for the originality of his concepts.

A. FAY MACLURE, M.D., F.R.C.S., F.R.A.C.S.

Mr. A. Fay Maclure, honorary consulting surgeon to the Alfred Hospital, Melbourne, and formerly lecturer in surgery at the medical school, died at Melbourne on October 4, aged 72.

After graduating at Melbourne in 1907, Alfred Fay Maclure came to London to continue his surgical education and took the F.R.C.S. in 1911. He returned to

Melbourne to become a member of the staff of the Alfred Hospital just before the first world war, in which he served as a captain on the staff of the 3rd General Hospital at Lemnos. He was appointed O.B.E. in the 1919 New Year Honours, by which time he had attained the rank of major (temporary lieutenant-colonel). During the years that followed he became one of the best-known and most popular surgeons in Melbourne.

We are indebted to Sir GORDON GORDON-TAYLOR for the following appreciation:

Perhaps a few lines in the columns of the *British Medical Journal* may be vouchsafed to an old friend of Fay Maclure to pay tribute to his memory. Almost half a century has passed since I may have helped in some small fashion to steer him through the examinations which preceded the acquisition of the Fellowship of the Royal College of Surgeons of England which he obtained in 1911. He became a Foundation Fellow of the Royal Australasian College of Surgeons in 1927, having been elected to the surgical staff of the Alfred Hospital, Melbourne, in 1913. No lengthy saga of surgical communications can have made his name familiar to the modern generation of British surgeons, for he was a man of the scalpel rather than the pen, and even to the modern "Alfredian" he has been for a number of years little more than a legendary name, though for a quarter of a century he ranked as the foremost surgical opinion in the State of Victoria.

The hammer-blow of fate has struck hard at "The Alfred" this past year, which has lost by death Sir Alexander Stewart, for many years its president and an old Aberdeen schoolfellow of my own, whose vision and kindness of heart initiated a liaison with my own Middlesex Hospital; Sir Wilberforce Newton; and now Fay Maclure. The surgical tradition of "The Alfred" was founded by Hamilton Russell, Lister's last house-surgeon at King's College Hospital, and, if it be Hamilton Russell who brought Lister's lofty idealism to "The Alfred," it was his devoted acolytes, such as Fay Maclure and Balcombe Quick, happily still full of youthful vigour, who carried the torch that Hamilton Russell lit.

No man more truly symbolized the motto of "The Alfred"—"Service and Care"—than did Fay Maclure, and the address which he gave on the occasion of the unveiling of the honour board in the Alfred Hospital commemorating "Alfredians" who had made the supreme sacrifice in the two great wars incorporated the high traditions of "The Alfred" and was used in fact at his own funeral service, emphasizing his own life of "Service before self," and will be quoted once again by another veteran of the 1914-18 war at the memorial service at the Melbourne Shrine on Armistice Day, for "there could be no finer call to duty." Some prescient fairy may have been at Fay's christening and whispered the name "Alfred," but he was never anything except Fay to everyone, though as Fay Maclure of "The Alfred" he will long be remembered by surgeons of Victoria and throughout Australasia.

J. C. CRUICKSHANK, M.D., D.T.M.

The obituary of Professor J. C. Cruickshank was published in last week's *Journal* (p. 1061). We are indebted to Professor ROBERT KNOX for the following appreciation:

Those who knew Jack Cruickshank well know what a rare personality he had. There can be few men so free as he was from pompousness and self-seeking. Quiet and unassuming in his manner, he was a shrewd judge of men. As a teacher he was outstanding, and many of his former pupils and colleagues all over the world will always remember the energy and care with which every detail of his many teaching activities was planned and carried out. His contributions to research, both fundamental and applied, were of great value—

interestingly and clearly written with characteristic absence of wild and unprofitable speculation. Perhaps one of his best pieces of work was a thorough study of the epidemiology of typhoid fever in Devon over a period of years when he was in charge of the Public Health Laboratory at Exeter, but this is only one example of the consistently high standard of his work. He was a man of very great ability which he never used for selfish ends or personal advancement. His knowledge of his subject was both wide and deep, and both in bacteriological and in other matters too he made it readily available with characteristic generosity. Those who knew him and his family can never forget the warmth of his welcome, his simple humour, the essential sanity and the unfailing depth of his friendship. His family will have the deepest sympathy of all their many friends.

Dr. J. L. FARQUHARSON, whose death occurred at Amersham on August 24, was a much-loved general practitioner in that part of Buckinghamshire, where he had practised since 1937. The son of a well-known Southampton doctor, John Langwell Farquharson was educated at Bedales School and St. Thomas's Hospital, his medical education being interrupted by a period of service in the first world war. He qualified M.R.C.S., L.R.C.P. in 1923, and, after holding house appointments at Bristol General Hospital, spent two years as chief assistant medical officer in the Sarawak Civil Service. Returning to England in 1928, he went into general practice at Weston-super-Mare in partnership with the late Mr. Philip Martin, and, having taken his F.R.C.S.Ed. in 1929, was elected to the staff of the Weston-super-Mare General Hospital as an honorary assistant surgeon. But, although he quickly made himself a most competent general surgeon, his main interest remained in general practice. He always wished to live nearer his friends, who were mostly in the London area, and in 1937 he resigned his surgical appointment at Weston and settled in practice at Amersham, at first in partnership and later on his own. Even there, however, he did not cut himself off entirely from surgery, and up to the advent of the National Health Service still continued to operate at Chesham Cottage Hospital. But his practice was absorbing so much of his time that he reluctantly decided to give up surgery altogether. A man with strong socialist leanings, he welcomed the National Health Service wholeheartedly and gave to it his very best. He continued in active practice until illness obliged him to give up earlier this year. He leaves a widow and three children. Farquharson was not only an able doctor, he was also a great individualist and a very vital person with the most diverse interests, which included the arts, politics, sport, and, above all, his garden. Very few busy doctors can have led such a full life, and he had a wonderful capacity for communicating his enthusiasms. His engaging and dynamic personality will be sadly missed by his many friends and patients, to whom he was so often a robust mental tonic and a constant source of inspiration.—H. G. E.

The death of Dr. ETHILDA B. M. HERFORD on August 26 at the age of 84 removes one of the few remaining members of the British Psycho-Analytical Society who took part in the activities of the small group responsible for establishing a society to study psycho-analysis in England. Born in Surrey on December 6, 1872, the daughter of Mr. Edward E. Meakin, for some years editor of *The Times of Morocco*, Ethilda Budgett Meakin was educated at the North London Collegiate School and at University College, London. As a preparation for a career in medicine she worked for two years with a mission in the slums of Glasgow. She then studied at the Royal Free Hospital School of Medicine for Women and graduated M.B. from London University in 1898, taking the B.S. degree in the following year. After graduation she held appointments as assistant medical

officer at the Camberwell Infirmary and the Grove Hospital until 1902, when she went to India to become acting physician in charge of the Coma Hospital, Bombay. From 1904 to 1907 she was medical superintendent of the Victoria Hospital for Women in Calcutta. Between the years 1902 and 1912 she held postgraduate appointments at various European universities. Up to the time she left India her main interest was in gynaecology, on which she published a number of papers. Her marriage to Oscar Herford, a gifted violinist, took place in 1907 in Calcutta. They had three sons, one of whom is a doctor, and a daughter, who is herself qualified and married to a doctor. The family returned to live in England in 1917 and settled at Reading.

Dr. SYLVIA M. PAYNE writes: Dr. Ethilda Herford's interest in psycho-analysis was aroused by the early publications of Freud and extended through contacts with members of the staff of the Brunswick Square Clinic, founded by the late Dr. Jessie Murray and carried on subsequently by Dr. James Glover, Ella Sharpe, and others. She was present at the International Psycho-Analytical Congress held at The Hague in 1920. There she met Karl Abraham and went to Berlin to work with him for a few months, and subsequently with Ferenczi at Budapest. On her return to Reading she gave her time to the study and treatment of functional nervous disorders by psychotherapy and psycho-analysis in particular. She became a director of the British Hospital for Functional Nervous Disorders in Camden Town. In 1928 she published a paper on the infantile mind and its relations to social problems and mental hygiene. In 1921 she was elected an associate member of the British Psycho-Analytical Society; membership was granted her in 1934; and later she was appointed honorary physician to the Institute for the Scientific Treatment of Delinquency and the London Clinic of Psycho-Analysis. Dr. Herford's life was characterized by an outstanding interest in human nature, and a desire to use every means available to relieve human suffering. A powerful personality and the mind of a pioneer were allied to the spirit of a child moved by a sense of the wonder and beauty of creation and reverence for life. Through all difficulties she looked for what was good. With her husband she became a member of the Society of Friends and took an interest in organizations, local or international, which had the aim of promoting peace. A deep interest in education and the problems of young people led to an association with the late Howard Whitehouse in 1919 as a founder and governor of the very successful school at Bembridge, Isle of Wight. The decision to study medicine was made when this was not yet regarded as a desirable career for women, and she joined the psycho-analytical group without waiting to see if it was accepted by the medical profession as a whole, and made sacrifices to obtain psycho-analytical training with those best equipped to give it. During the years following her admission to the British Psycho-Analytical Society she practised psycho-analysis in Reading, and attended the scientific meetings regularly and was present at almost every congress. Her attitude was always receptive, and she would take from the papers and discussions the material which appealed to her and in which she believed. Towards the end of her life she did not spare herself the fatigue of travelling from Reading to attend scientific meetings in London, and she retained her keen interest in the practice of psycho-analysis to the last. Her absence will be felt by all who knew her. Her recreations were determined by her love of a simple outdoor life and lack of interest in personal possessions. She went camping with her family to the end of her life, and died in her sleep when on holiday in a caravan by the sea which had always been for her a particular joy.

Dr. S. R. ARMSTRONG, of Belfast, died on October 15 at the age of 69. Samuel Richard Armstrong was born at Manorhamilton, Co. Leitrim, on May 29, 1887, and studied medicine at Queen's University, Belfast, where he graduated M.B., B.Ch. in 1913. He then held house appointments at the Belfast Infirmary and the Belfast Maternity Hospital. During the first world war he served in France in command

of No. 10 Casualty Clearing Station and as physician-specialist with No. 8 Casualty Clearing Station. He made a special study of chest wounds, carrying out some original investigations, and for his services he was appointed O.B.E. in the 1919 Birthday Honours, having been previously mentioned in dispatches on two occasions. After the war he settled in practice at Belfast, and from 1919 to 1952 was a part-time visiting medical officer to the Belfast Union Hospital (now the City Hospital) under the old Belfast Board of Guardians. He also gave his services as honorary physician to the Ulster Society for Educating the Deaf, Dumb, and Blind. He is survived by a widow, a son, Dr. Neville Armstrong, and two daughters.

A colleague writes: I had the privilege of assisting Dr. S. R. Armstrong in general practice for two years and of knowing the warm friendship of his family circle. It has been gratefully said of him that he cared responsibly for every patient; he had a great interest in the homes and families, relatives and relationships, the occupations and welfare of each one. He gave to me and others affectionate and careful instruction. He served with distinction in the first world war, and reported the first case of encephalitis lethargica occurring in military personnel. At this time he made a lasting friendship with the late Sir William Thomson, professor of medicine in Queen's University. He was appointed to the visiting staff of the Belfast Union Hospital and continued to visit the children's medical wards there until he reached retiring age. He suffered a severe myocardial infarction at the early age of 43, and it was an index of his morale and force of character that he again took up his practice single-handed and continued, in spite of later episodes, as an essentially private family doctor, vigorously eschewing the National Health Service. He had an immense fund of experience and wisdom and set a very high standard of practice. The hallmarks of his work were painstaking attention to detail combined with a precise knowledge of the latest publications on research; he expected these qualities of those who worked with him, were they consultants or assistants. It was while holding a surgery that he suddenly died. He leaves a widow, two daughters, and a son, who qualified recently, to whom many will extend their gratitude for a life energetically poured out and their immediate sympathy in the bereavement.

D. L. W. C. writes: Dr. S. R. Armstrong was a remarkable man. His health was not good, and what would have defeated a lesser man only acted as a stimulus to him in pursuit of his work and ideals. He was largely instrumental in modernizing and transforming the old Poor Law hospital at Belfast into an up-to-date unit. He specialized in the diseases of children and organized his department most efficiently. He also planned and carried through a surgical extension to his medical wards, no mean feat under difficult and changing conditions and controls. Dr. Armstrong was a rugged individualist who was sure of what he wanted and how to get it. He did not suffer fools gladly, but was a generous colleague who did not bear malice or spite and had a saving sense of humour. The Belfast City Hospital owes much to his efforts, and the Dufferin and Ava Children's Hospital is his enduring memorial.

Mr. ARTHUR BURTON, honorary consulting surgeon to Cromer Hospital, died at Cromer on October 23 at the age of 86. Arthur Burton was born in London on March 24, 1870, and was educated at Marlborough College and at King's College, Cambridge, where he obtained a second-class in the Natural Sciences Tripos in 1891. He went on to St. George's Hospital to receive his clinical training, being awarded a prize for proficiency in his third year, and qualified by taking the London Conjoint diploma in 1894. In the following year he obtained the degrees of M.B., B.Chir. and four years later proceeded to the M.D. He was elected F.R.C.S.Ed. in 1912. After qualification he held the appointment of junior house-physician at the old North-Eastern Hospital for Children, now the Queen's Hospital for Children, and then became house-physician at Adden-

brooke's Hospital, Cambridge, a post he held for two years. He was also house-physician and physician to out-patients at the General Lying-in Hospital, York Road, and clinical assistant at the old London Throat Hospital, in Golden Square, and at the Westminster Ophthalmic Hospital. Going to South Africa as a civil surgeon attached to the Army Medical Department, he later became a surgeon-captain in the South African Constabulary and medical superintendent of Grey's Hospital, Pietermaritzburg. On his return from war service he settled in general practice at Cromer in partnership with the late Dr. H. C. Dent. Soon afterwards he was appointed honorary surgeon to the Fletcher Convalescent Home at Cromer, and subsequently became honorary surgeon (later consulting surgeon) to the Cromer Cottage Hospital and honorary consulting surgeon to Kelling Sanatorium. During the first world war he served as a captain in the R.A.M.C. For many years he was divisional surgeon in the St. John Ambulance Brigade, and in 1941 was appointed an officer of the Venerable Order of St. John of Jerusalem. He and Mrs. Burton helped to found the Cromer orchestra in 1908. He is survived by a son and a daughter.

Dr. MALCOLM McLELLAN, who practised at Friockheim, Angus, died suddenly on October 25, aged 47. By his death the community has lost a very good family physician and a charming personality. Malcolm McLellan studied medicine at Glasgow, graduating M.B., Ch.B. in 1933. After holding the posts of house-physician at the Royal Infirmary and house-surgeon at the Royal Samaritan Hospital for Women, Glasgow, he went into practice at Airdrie. During the war he served in the R.A.F., attaining the rank of squadron-leader. Further promotion was in his reach, but he preferred to remain in a clinical rather than an administrative capacity. Coming to Friockheim after the war, he developed this rural practice by his keen interest in the community and his good service, both in his professional and in his social capacities. He was chairman of the Angus Division of the B.M.A. and joint secretary of the local medical committee. In country dancing he achieved worldwide renown, especially in the music of this art. A team trained by him has been asked to go to Moscow and may yet accept this invitation. He was interested in sport and also was an elder of the Church. As a family doctor his interest in his patients was both real and personal, and by them his death will be felt as that of a friend.—D. M.

Dr. G. E. FRIEND, who was medical officer of Christ's Hospital, Horsham, for over thirty years, died at Reading on October 26, at the age of 81. Gerald Edward Friend was born at Reading on May 19, 1875, the son of the Rev. Martin T. Friend, and was educated at Bradfield College and at Keble College, Oxford. He received his clinical training at St. George's Hospital, qualifying M.R.C.S., L.R.C.P. in 1905. After qualification he held appointments at the Victoria Hospital for Children, the Chelsea Hospital for Women, and Brompton Hospital, before becoming medical superintendent of St. George's Hospital in 1908. He was editor of *St. George's Hospital Gazette* from 1904 to 1908. He left St. George's in 1913 to take up the appointment of school medical officer at Christ's Hospital, holding the post until 1946, when he retired. In the Medical Officers of Schools Association he served on the council and on the editorial committee, and held in turn the offices of honorary secretary, treasurer, and president, and on retiring from Christ's Hospital was elected an honorary life member. His keen interest is shown in the association's records, which contain the papers he read and his many contributions to discussions. A firm believer in the improvement of health by dietary measures, he was a member of the B.M.A.'s Nutrition Committee from 1932 to 1938, and during the second world war he acted as honorary general secretary of the Food Education Society.

Dr. T. L. SCOTT writes: In 1913 Gerald Friend went to Christ's Hospital as resident medical officer from St. George's

Hospital, where he was medical superintendent. He remained at Christ's Hospital until his retirement in 1946. He is remembered by all who knew him as a fatherly man, with a gruff voice and rough exterior covering a firm but very kindly disposition—a man who showed a real interest in the medical welfare of his patients, sparing no effort when they were ill, but showing clearly his disapproval of the shirker or slacker. His keen interest in feeding and his regular weighing and measuring of the boys provided the material for his well-known book, *The Schoolboy—A Study of His Nutrition, Physical Development and Health*. He believed that regular weighing was of supreme importance and expected boys and staff to share that belief. He is reputed to have said of a boy who had misbehaved, "Well, then, I shan't weigh him," as though this were the severest punishment he could receive. To his successor he left an organization and administration easy to follow, one which had stood the test of time and needed little change to meet modern requirements. The staff of Christ's Hospital remember him as a family man, the father of four sons who filled the house with young life and activity in which father took a lively part. His house was an important focus of Christ's Hospital society. His enthusiasm for his garden and his skill at croquet provided, at his home, his relaxation from medical duties. A keen interest in the theatre dating from the Oxford University Dramatic Society was kept alive by the frequent demands that he should practise his skill in the art of make-up for school and house plays. Those who knew him speak of him with respect, and relate that he liked to think for himself and would express himself vigorously when roused. To all who knew him he will ever be remembered as a kindly man, a painstaking doctor, and above all as a real friend.

Medical Notes in Parliament

Prescription Charges

Dame IRENE WARD (Tynemouth, Con.) asked the Chancellor of the Exchequer on November 1 if he would state the basis and machinery on which the new charges for prescriptions would be reimbursed to those who could not meet the charges without hardship, and who, though outside the National Assistance scales, had a personal budget which on a small fixed income could not meet further charges without hardship. Mr. R. H. TURTON, Minister of Health, who replied, said that repayment would be made on the same basis as at present to any person who could show that his resources were insufficient by National Assistance standards to meet the charge. The machinery for claiming, and making, repayment would be on similar lines to that which was already well established and had proved satisfactory, but he was reviewing it in consultation with the National Assistance Board and other bodies concerned in order to see if it could be improved at any point. Mr. Turton added, in reply to further questions, that there would be two categories of patients, as now: those who were already on National Assistance, and those for whom hardship was created which brought them on to the National Assistance standard. Last year there were nine million applications in respect of prescription charges. Of these, 30,000 were from persons not in receipt of National Assistance, and in 95% of these the claim was upheld.

Mr. G. RIPPON (Norwich, South, Con.) asked the Minister of Health whether he would provide for those on National Assistance, and others for whom payment for drugs and appliances would constitute hardship, to have their prescriptions written on a special coloured form which would exempt them from payment and thus would enable them to avoid the inconvenient process of seeking reimbursement. Mr. TURTON said the suggestion would be administratively impracticable. Moreover, it would mean asking doctors and chemists to exercise a test of means, which they could not possibly carry out.

Miss M. HERBISON (North Lanarkshire, Lab.) asked the Secretary of State for Scotland on October 30 what were the regulations with regard to the number of items which could be put upon one prescription form. Mr. J. STUART stated that there were no regulations on the subject. Doctors had been asked, and it was their normal practice, not to write more than two prescriptions on one form.

Mr. S. SWINGLER (Newcastle-under-Lyme, Lab.) asked the Minister if he would exempt diabetic persons from the proposed increase in charges for prescriptions. Miss PAT HORNSBY-SMITH said no, but any person who, on application to the National Assistance Board, showed that he would suffer financial hardship in accordance with the board's standards would be able to obtain a refund. Dr. EDITH SUMMERSKILL (Warrington, Lab.) asked for a statement from the Minister that would relieve the anxiety of these and other chronic patients. Miss HORNSBY-SMITH said she could not give an undertaking, but would pass on the suggestion to the Minister.

Replying to Mr. HENRY PRICE (Lewisham West, Con.), she said the length of a prescription for diabetics and chronic cases was entirely a matter for the doctor. The Ministry was advised that there would be no practical obstacle in the way of supplying it up to three months when treatment was stabilized.

Cost of Drugs

Major TUFTON BEAMISH (Lewes, Con.) asked the Minister of Health for a table consolidating the conclusions reached in the two official investigations into the comparative costs of national formulary and proprietary preparations ordered on Health Service prescriptions, simply showing the total number of proprietary preparations costed, and what total percentages of these were cheaper than their standard equivalents, had the same cost, or had no equivalents. Mr. TURTON provided the following table and footnotes to it:

Date of Statement	No. of Proprietary Preparations Costed	Cheaper than Standard Equivalent ¹	Same Cost as Standard Equivalent	No Equivalent ²
May, 1955	312	22%	24%	47%
April, 1956	326	20%	2%	51%

¹ In the great majority of these cases the ingredient cost of the proprietary preparation is higher than that of the standard preparation. The lower total cost is due to the basis on which chemists' dispensing fees are distributed.

² A few of these preparations have been classified by an independent advisory committee as of proved therapeutic value, but not yet standard, and a few have not yet been considered. The majority have been classified as not therapeutically superior to standard preparations.

Atmospheric Pollution

Mr. N. DODDS (Erith and Crayford, Lab.) on October 30 put several questions to the Minister of Housing and Local Government on progress made in protecting the people against the harmful effects of smog this winter. Mr. DUNCAN SANDYS stated that the only sure protection against the ill effects of smog was prevention of air pollution. This could not be accomplished all at once, but would require a sustained effort by all sections of the community over a number of years. Since last winter progress had been marked by the passing of the Clean Air Act, which provided the legislative framework for an intensive attack on pollution by smoke, grit, and dust from all sources. Government Departments and other bodies concerned, including the Medical Research Council, the Department of Scientific and Industrial Research, and the fuel industries, were actively co-operating. An Order under the Act would shortly be laid before Parliament specifying the appointed day for those provisions which related to smoke control areas, new furnaces, the height of chimneys, the appointment of Clean Air Councils, and certain other matters. It was intended that the remaining provisions of the Act, which dealt with emissions of dark smoke, grit, and dust from industrial premises, railway engines, and vessels, should be brought into force in the early part of 1958. Meanwhile, arrangements had again been made for warnings to be broadcast by the B.B.C. this winter, if and when persistent fog was

forecast, with advice to the public about the steps they should take. Householders and industry would be asked to take special care to minimize smoke during periods of fog.

Industrial Health Service

Mr. FREDERICK LEE (Newton, Lab.) asked the Minister of Labour on October 30 what progress had taken place in the arrangements for an Industrial Health Service. Mr. R. CARR, the Parliamentary Secretary, stated that since November, 1955, continued progress had been made. The report of the pilot industrial health survey of the town of Halifax had been completed and the Industrial Health Advisory Committee was considering that report. The pilot survey of the pottery industry was in progress in Stoke-on-Trent. Arrangements had been made to co-ordinate the work of the various departments concerned with occupational health research problems. The strength of the medical branch of the Factory Department had been increased and the other parts of the inspectorate were also to be increased.

Vaccination Certificate

Mr. S. VIANI (Willesden, West, Lab.) asked the Minister of Health on November 1 how the United Kingdom representative voted on the decision of the Ninth World Health Assembly to recommend a change in the form of the international certificate of vaccination or revaccination against smallpox; and whether it was now his policy to accede to the proposed change. Mr. TURTON told him that the decision was adopted *nemine dissidente*, but after further consideration the Government decided to reject the amended certificate on the ground that it no longer provided space for recording repeated attempts at primary vaccination.

Hong Kong Medical Staffs

Mr. JOHN RANKIN (Glasgow, Govan, Lab.) asked the Secretary of State for the Colonies why he had ruled that Hong Kong should not receive assistance from the World Health Organization for the training of urgently needed medical personnel, and whether he was aware of the difficulty that had resulted from the cancellation of fellowships that had been arranged two years ago. Mr. A. LENNOX-BOYD stated on October 31 that the governing principle was that assistance from United Nations Specialized Agencies was designed to meet technical needs which could not be met from local (or, in the case of dependent territories, metropolitan) resources. It was not intended as an alternative source of financial aid. In all the cases quoted the training could be supplied in the United Kingdom. The inclusion of these or any other fellowships in World Health Organization budgets did not imply a commitment by Her Majesty's Government to take them up.

Mr. RANKIN said it was proposed to proceed with the building of a hospital in Hong Kong with 1,300 beds, and there were 33 medical students in training this year. If the Secretary of State was going to cut off this source of financial assistance for staffing, what alternative did he intend to put in its place to make sure there were sufficient medical personnel? Mr. LENNOX-BOYD said they had to look to priorities, and the local Government knew quite well that the necessary training could be given in the United Kingdom.

Malta Commission

Mr. W. TEELING (Brighton, Pavilion, Con.) asked the Secretary of State for the Colonies for a statement on the present position of the medical profession in Malta, and why the commission from this country on medical matters had not yet left England.

Mr. LENNOX-BOYD said the subject matter of this question was one for Maltese Ministers and the Maltese Medical Officers' Union, and his concern in the matter had been confined to recommending an independent chairman, which he had done.

Food-poisoning from Frozen Eggs

Mr. A. HURD (Newbury, Con.) on October 29 asked the Minister of Health to what extent frozen eggs sampled at the ports had been found to be infected with germs likely to cause food-poisoning; from which countries the infected consignments came; whether frozen eggs in shell were suspect; and what action was being taken to safeguard consumers here more thoroughly. Mr. TURTON said that shipments of imported frozen egg were being sampled, and only batches with negative samples had been released without conditions. During the last twelve months infected samples had been found in some of the shipments from China, Australia, South Africa, and New Zealand. The degree of infection had varied widely from 1 to 30% of the samples. The sampling was continuing. The department was in close touch with the importers, and communicated with the authorities in the exporting countries as necessary. They were all concerned to maintain a high bacteriological standard. He had no knowledge of any import of frozen eggs in shell.

He stated in answer to Mr. B. JANNER (Leicester, North-west, Lab.) on October 29 that during the twelve months to the end of September 563 samples were reported by the Public Health Laboratory Service to be infected.

Doctors' Pay Increase

Lieutenant-Colonel M. LIPTON (Brixton, Lab.) asked the Minister of Health on November 5 what action he was taking on the £20m. pay increase claimed by the medical profession. Miss PAT HORNSBY-SMITH, Parliamentary Secretary, said it had already been made known that the Government would not feel justified in considering any claim for a general increase in medical remuneration in present circumstances. As to the profession's assertion that there was a contractual obligation involved, the Minister was taking legal advice on this. Lieutenant-Colonel LIPTON said that it was some time since the Minister decided to take legal advice. Could they be told what was the effect of it, and whether the Government was under a contractual obligation to concede this pay increase? Miss HORNSBY-SMITH said she could not give a reply at the moment.

Medico-Legal

COLLABORATION IN AUTHORSHIP

[FROM OUR MEDICO-LEGAL CORRESPONDENT]

Mr. R. A. R. Taylor's book entitled *Poliomyelitis and Polioencephalitis* was the subject of an action tried before Mr. Justice Glyn-Jones in the Queen's Bench Division recently.¹ Mr. Taylor claimed a declaration that the copyright in the book was his. He also asked for an injunction to restrain Miss Lorna Prior from claiming that she owned the copyright in the book or in any part of it or had any legal interest in it, and damages. Miss Prior counter-claimed against Mr. Taylor and the publishers and printers that a substantial part of the book was taken by Mr. Taylor without her consent from her unpublished thesis entitled "Clinical Observations on the Treatment of Poliomyelitis." Miss Prior's thesis had been put forward by her in connexion with her fellowship of the Chartered Society of Physiotherapists.

In 1946 Mr. Taylor, who was then Hunterian Professor of the Royal College of Surgeons, had been appointed medical superintendent of Pinderfields Hospital, Wakefield, of which Miss Prior was the superintendent physiotherapist. During the 1947 poliomyelitis epidemic Pinderfields, under Mr. Taylor, was one of the principal treatment centres, and as a result of experience during the epidemic Mr. Taylor in 1948 started to make notes for a book and Miss Prior started to make notes for her thesis.

¹ *Yorkshire Post*, October 25, 26, 27, 30.

In his judgment Mr. Justice Glyn-Jones said that, while the two works were being written, Miss Prior and Mr. Taylor were on terms of close affection and that in February, 1953, when she sent him a copy of her thesis before submitting it for the fellowship nothing had happened to disturb either that affection or the long history of collaboration between them. There were substantial passages in the book parallel to passages in the thesis, but he was confident that a very large proportion of them were written by Miss Prior for Mr. Taylor to incorporate in his book.

In the circumstances he could not hold that Mr. Taylor was not free to make use of material which Miss Prior had put at his disposal or that she had not been free to make use of any material supplied by him. In substance her thesis was her own work and she was entitled to the credit for it, but there was no breach of her copyright by Mr. Taylor or his publishers or printers. He thought that Mr. Taylor's was a work in which they both collaborated, and he did not find it possible to divide the book into parts which he wrote or she wrote.

After counsel for both parties had seen the Judge in his private room it was announced that Mr. Taylor's claim for damages and Miss Prior's counter-claim for infringement would both be dropped, and an order was made that Miss Prior should pay the costs of the action, estimated at £1,500.

Law of Copyright

Now that the multiplication of specialties in medicine has made collaboration in the authorship of books and papers increasingly common, it is as well that the broad implications of the law of copyright should be generally appreciated among aspiring authors. The Judge observed that the only result of the unhappy dispute between Miss Prior and Mr. Taylor was, he feared, that neither her thesis nor his book could profitably be published, and much was lost which might have been saved.

The common-law conception of copyright, that a man has a right of property in his artistic creation, arose out of the need to prevent the unauthorized copying of books. It is this basic right, to prevent other people from copying an author's original work, which is recognized by the existing copyright legislation. Protection is not confined to England but is extended by means of the Berne Convention to members of the Berne Union. This protection does not apply to the United States, which is not a member of the Berne Union, but Canada and most of the European nations are members.

The first owner of the copyright in a work is normally the author, and any subsequent owner must derive his title from the first owner. The copyright is a right of property which can be sold, exploited under licence, or disposed of by will and so on, like any other right of property. If prospective authors intend to collaborate it is important that they should decide and agree between themselves before creating their work what the basis of their collaboration is to be with regard to what may be a right of great value if their creation is a success. Is it to be a truly joint work, so that they are to own the copyright jointly, or is one to do the lion's share and be sole author, merely helped by collaborators whom he may pay and to whom he will no doubt make handsome acknowledgments in his preface?

The main exception to the principle that the author is first owner of the copyright is where an employee under a "contract of service" creates a work in the course of his employment. The problems involved in distinguishing between "contract of service" and "contract for services" are familiar in the field of the responsibility of hospital managements for negligence. Where there is a contract of service, as for example in the case of the editor of a periodical, it is his employer who is first owner of the copyright in the editor's leading article. "Our medico-legal correspondent's" masterpieces on the other hand are probably written under a "contract for services," so that the copyright is probably his own. But he is by no means sure.

FALSE MATERNITY CLAIM

A woman who claimed that she had given birth to twins was paid £24 in benefits by the Ministry of Pensions and National Insurance in 1955. In June this year she again said she was going to have twins and claimed similar benefits—which made a Ministry inspector suspicious, Darlington (Co. Durham) magistrates were told when she appeared before them on October 30. The woman, Mrs. Violet Laing, of Darlington, pleaded guilty to two charges of attempted false pretences and was found guilty on two further charges of false pretences. She was sent to prison for a year.

Mr. M. O'Connor, for the Ministry, said that last year Mrs. Laing submitted a claim for maternity benefit. She also got a doctor to sign and say that a child was going to be born to her. In July, 1955, she filled in a form to the effect that she had had twins, and Dr. D. W. Dawson, of Darlington, certified that she had had the twins, but he had not attended the confinement.

When interviewed, said Mr. O'Connor, Mrs. Laing told an inspector she had had a miscarriage in 1955, so did not claim any benefits. As to the 1956 claim, Mrs. Laing had said she told the inspector that she had given birth to twins but they were stillborn. She said that Dr. V. G. Crowley (a partner of Dr. Dawson's) had attended her confinement. If it had been known that she had had a miscarriage in 1955, Mrs. Laing would never have been paid £10 maternity benefit for each child, or £4 benefit for a home confinement, said Mr. O'Connor.

In evidence, Dr. Dawson said he did not attend Mrs. Laing's confinement in 1955. He probably signed the form for her, thinking that one of his partners had attended her.

Dr. Crowley said that, although he signed a certificate to the effect that he had examined Mrs. Laing, he could not say for certain whether he had done. He did not attend her when she gave birth to stillborn twins, as she had alleged. Mrs. Laing went to his surgery one night and said that she had forgotten to ask the district nurse to sign a form about her confinement. "I thought one of my partners had delivered them and I signed the form in good faith." The doctor added that Mrs. Laing had had numerous miscarriages.

Dr. F. Klauber, the third partner, said he had signed a form for welfare foods for Mrs. Laing, but he had not examined her completely. He did not attend any miscarriage or her confinement in June, 1955. She had told him that one of the twins was in Chester-le-Street and the other had died. Later he saw her with a child, which she told him was one of the twins.

Mrs. Laing said in evidence she had had a miscarriage in 1955, and she did not fill in any forms for benefits and she received no money at all. "I never got a warrant from the Ministry and I never got any money at all. I applied for a maternity grant and nothing else."

She agreed with Mr. O'Connor that she had "induced" doctors to sign forms for her by claiming she had had twins. Mrs. Laing said she had never had twins in her life, and the child that she showed Dr. Klauber was not hers.

Mrs. Laing was stated to have previous convictions. At the end of the case she intimated that she would consider an appeal.

STRESS AND CORONARY THROMBOSIS

[FROM OUR MEDICO-LEGAL CORRESPONDENT]

On November 1 Mrs. Celia Allfrey, widow of Captain Jack Allfrey, R.N., appealed to the High Court¹ from a refusal by the Pensions Appeal Tribunal to grant her a pension. Her husband had died of coronary thrombosis on July 4, 1954, at the age of 51, after 36 years' service in the Navy.

Mrs. Allfrey's case was that the condition of Captain Allfrey's coronary artery was aggravated by the stress of his job as personal secretary to Admiral of the Fleet Lord Fraser of the North Cape from 1938 to 1951. A naval officer who had been personal secretary to Admiral of the Fleet Sir Dudley Pound when he had been First Sea Lord had also died of coronary thrombosis, and so had another naval officer who had undergone great stress in an executive

¹ The Times, November 2, 1956.

position. In each case the widow had been given a pension. In addition to medical evidence in support of her case, a United States Naval Headquarters directive was produced showing that U.S. naval medical opinion regarded stress as a factor causing coronary disease in serving officers.

The case for the Minister of Pensions, supported by much medical evidence and articles on the subject by leading medical authorities on the condition, was that stress is not a factor which causes coronary thrombosis or the physical conditions which lead to it.

Mr. Justice Ormerod, in his judgment, said that before the tribunal the Medical Services Commission had reported fully to the effect that stress had no effect on the development of coronary thrombosis. He could not say that there was not ample evidence before the tribunal to justify them in deciding as they did. The appeal had therefore to be dismissed.

Vital Statistics

Week Ending October 27

The notifications of infectious diseases in England and Wales during the week included: scarlet fever 578, whooping-cough 1,552, diphtheria 9, measles 3,009, acute pneumonia 316, acute poliomyelitis 114, dysentery 568, paratyphoid fever 14, and typhoid fever 2.

Infectious Diseases

The incidence of infectious diseases increased in England and Wales during the week ending October 20. The largest rises in the numbers of notifications were 644 for measles, from 2,146 to 2,790, 112 for dysentery, from 524 to 636, 76 for whooping-cough, from 1,393 to 1,469, and 68 for scarlet fever, from 532 to 600.

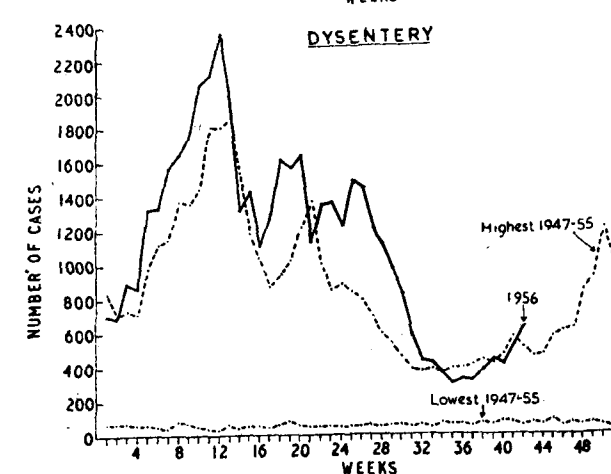
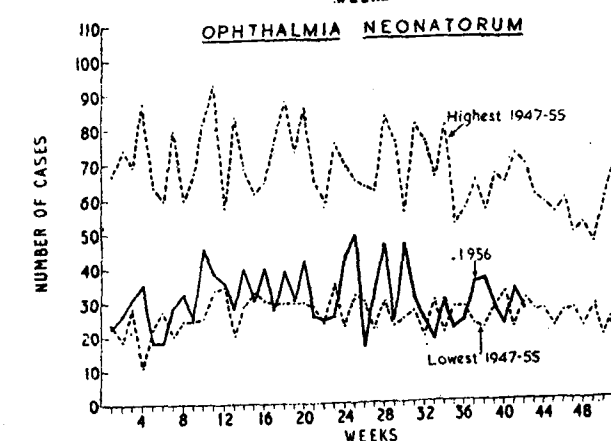
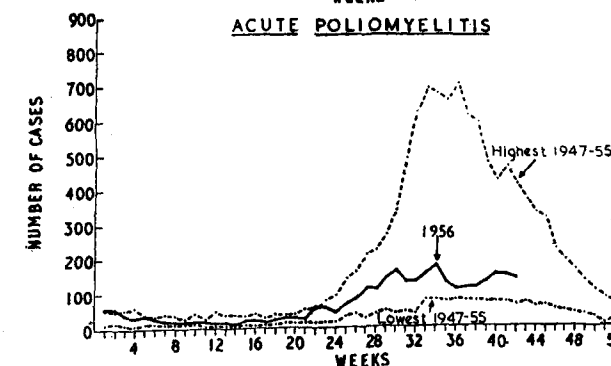
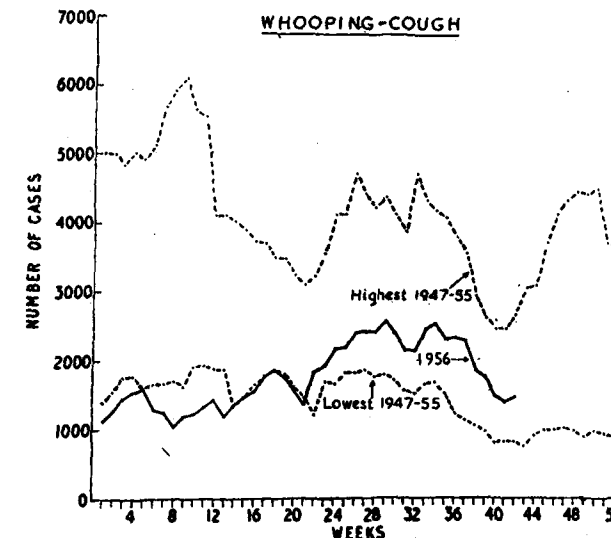
The largest rises in the incidence of measles were 279 in Lancashire, from 500 to 779, 75 in Cheshire, from 83 to 158, 63 in Cornwall, from 77 to 140, and 53 in Yorkshire West Riding, from 158 to 211; the only large fall was 73 in Middlesex, from 113 to 40. Only small fluctuations were recorded in the local trends of scarlet fever. The largest rise in the notifications of whooping-cough was 49 in Lancashire, from 178 to 227. 6 cases of diphtheria were notified, being 4 fewer than in the preceding week; 2 cases were notified in London.

The notifications of acute poliomyelitis numbered 140; there were 13 more for paralytic and 23 fewer for non-paralytic cases than in the preceding week. The largest returns were Lancashire 22 (Manchester C.B. 12, Liverpool C.B. 3, Ashton-under-Lyne M.B. 2), London 13 (Fulham 3), Middlesex 13 (Ealing M.B. 8, Harrow M.B. 2), Cheshire 12 (Stockport C.B. 5, Bucklow R.D. 3, Bebington M.B. 2, Hazel Grove and Bramshall U.D. 2); Kent 11 (Tonbridge R.D. 8).

The largest centres of dysentery were Yorkshire West Riding 147 (Rotherham R.D. 31, Leeds C.B. 21, Huddersfield C.B. 20, Tadcaster R.D. 14, Sheffield C.B. 13), Lancashire 130 (Rawtenstall M.B. 57, Liverpool C.B. 25), Yorkshire West Riding 50 (Haltemprice U.D. 45); London 46 (Wandsworth 13), Essex 38 (Ilford M.B. 23, West Ham C.B. 11), Durham 32 (South Shields 21), Leicester 31 (Leicester C.B. 31), Warwickshire 30 (Coventry C.B. 26), Staffordshire 23 (West Bromwich C.B. 10).

Graphs of Infectious Diseases

The graphs below show the uncorrected numbers of cases of certain diseases notified weekly in England and Wales. Highest and lowest figures reported in each week during the nine years 1947-55 are shown thus ————, the figures for 1956 thus ————. Except for the curves showing notifications in 1956, the graphs were prepared at the Department of Medical Statistics and Epidemiology, London School of Hygiene and Tropical Medicine.



INFECTIOUS DISEASES AND VITAL STATISTICS

Summary for British Isles for week ending October 20 (No. 42) and corresponding week 1955.

Figures of cases are for the countries shown and London administrative county. Figures of deaths and births are for the 160 great towns in England and Wales (London included), London administrative county, the 17 principal towns in Scotland, the 10 principal towns in Northern Ireland, and the 14 principal towns in Eire.

A blank space denotes disease not notifiable or no return available. The table is based on information supplied by the Registrars-General of England and Wales, Scotland, N. Ireland, and Eire, the Ministry of Health and Local Government of N. Ireland, and the Department of Health of Eire.

CASES in Countries and London	1956					1955				
	Eng. & Wales	London	Scotland	N. Ireland	Eire	Eng. & Wales	London	Scotland	N. Ireland	Eire
Diphtheria ..	6	2	4	0	5	13	5	4	1	
Dysentery ..	636	46	234	12	1	523	50	252	14	5
Encephalitis, acute	7	1		0		6	1		0	
Enteric fever:										
Typhoid ..	1	0		0		2	0	0	1	
Paratyphoid ..	7	1	3(B)	0		17	1	1	3	2(B)
Food-poisoning ..	341	46	20	3		302	26		0	
Infective enteritis or diarrhoea under 2 years ..					15	26			16	45
Measles* ..	2,790	190	173	71	96	2,116	33	30	11	20
Meningococcal infection ..	22	2	20	1	2	20	1	7	0	
Ophthalmia neonatorum ..	26	1	5	0	1	44	3	9	0	
Pneumonia† ..	284	16	124	2		304	29	139	3	
Poliomyelitis, acute:										
Paralytic ..	77	10		3	24	210	27		48	2
Non-paralytic ..	63	3	11			137	22			
Puerperal fever‡ ..	267	49	12	0		252	28	9	1	
Scarlet fever ..	600	54	90	23	26	767	55	120	24	33
Tuberculosis:										
Respiratory ..	583	62	116	21		622	59	120	22	5
Non-respiratory ..	72	4	15	3		85	6	23		
Whooping-cough ..	1,469	89	236	10	74	817	38	57	82	83

DEATHS in Great Towns	1956					1955				
	Eng. & Wales	London	Scotland	N. Ireland	Eire	Eng. & Wales	London	Scotland	N. Ireland	Eire
Diphtheria ..	0	0	0	0	0	0	0	0	1	0
Dysentery ..	1	0		0		0	0	1	1	
Encephalitis, acute		0			0		0			0
Enteric fever ..	0	0	0	0		0	0	0	0	
Infective enteritis or diarrhoea under 2 years ..	6	1	2	0	1	9	0	1	1	1
Influenza ..	5	1	0	0	0	5	0	0	0	1
Measles ..		0	0	0	0		0	0	0	0
Meningococcal infection ..		0	1				0	1		
Pneumonia ..	205	39	5	11	4	169	27	13	13	7
Poliomyelitis, acute	1	1			0	10	1			0
Scarlet fever ..		0	0	0	0		0	0	0	0
Tuberculosis:										
Respiratory ..	55	4	9	0	8	60	6	6	0	5
Non-respiratory ..	0	0	0	1	3	0	0	0	1	1
Whooping-cough ..	0	0	0	0	1	0	0	0	0	1
Deaths 0-1 year ..	203	35	23	7	16	176	24	24	9	17
Deaths (excluding stillbirths) ..	5,128	773	531	100	160	4,798	743	500	90	153
LIVE BIRTHS ..	7,455	1,104	932	192	387	7,020	1,016	935	202	318
STILLBIRTHS ..	185	27	19			173	18	13		

* Measles not notifiable in Scotland, whence returns are approximate.

† Includes primary and influenza pneumonia.

‡ Includes puerperal pyrexia.

Medical News

Retirement of Lord Malvern.—On October 31 Lord MALVERN resigned from the high office of Prime Minister of the Federation of Rhodesia and Nyasaland. Lord Malvern, perhaps better known to medical men as Sir Godfrey Huggins, statesman and surgeon, had held unbroken office as a Prime Minister for 23 years, a record never equalled in the British Commonwealth.

Wellcome Trust.—The Wellcome Trustees announce a grant of 69,000 dollars (about £25,000) to the Pennsylvania University School of Medicine, Philadelphia, to support for five years a Wellcome associate research professorship in the department of anaesthesiology under Dr. ROBERT D. DRIPPS. An American anaesthetist, Dr. HENRY L. PRICE, has been appointed to the post. This is the second research professorship in anaesthesia to be endowed in the North American continent by the Wellcome Trust. In May this year Dr. J. G. ROBSON, from King's College Medical School, Durham University, took up a five-year appointment at McGill University as Wellcome research professor of anaesthesia. The Wellcome Trustees also announce that on November 12 the office of their chairman, Sir HENRY DALE, O.M., F.R.S., and of their scientific secretary, Dr. F. H. K. GREEN, will be transferred from 24, Harley Street, to 52, Queen Anne Street, London, W.1 (telephone: WELbeck 5721/2).

Proctor Medal for British Pathologist.—Dr. NORMAN ASHTON, director of pathology at the Institute of Ophthalmology, London University, has been awarded the highest American honour in ophthalmic research—the Proctor medal. This is the first time the medal has been awarded outside America. The Proctor medal, endowed as a memorial to her husband by the widow of a Boston ophthalmologist, is presented each year by the Association for Research in Ophthalmology (of the United States) to an investigator who has made notable basic contributions to the science of ophthalmology. The presentation will take place at a banquet in New York next June, following a scientific meeting at which Dr. Ashton will address the Association for Research in Ophthalmology. Dr. Ashton's researches include studies on the pathology of retrolental fibroplasia.

Research at Harwell Gains Leukaemia Award.—Four workers from the Medical Research Council's radiobiological research unit at Harwell have jointly been awarded one of two thousand-dollar Robert Roesler de Villiers awards by the Leukemia Society Inc., of New York. The award is for research by Dr. C. E. FORD, Ph.D., Mr. J. L. HAMERTON, Dr. D. W. H. BARNES, and Dr. J. F. LOUIT, director of the unit, which was reported in a paper to *Nature* (1956, 177, 452). The citation states the award is in recognition of the "elegant and conclusive demonstration that general hematologic recovery after total body irradiation is enhanced by bone marrow cell colonization, even from a different species—a discovery of potentially great significance in the therapy of human leukemia." The demonstration depended on the use of "marked" cells from a strain of mouse with a microscopically recognizable peculiarity of its chromosomes. On his colleagues' behalf, Dr. Loutit went to New York this week to receive the award on November 7. A paper reporting an extension of the work for which the award was made was published in the September 15 issue of the *British Medical Journal* at page 626.

Antimicrobial Agents in Food.—Those wishing to submit evidence to the preservatives subcommittee of the Food Standards Committee on the use of antimicrobial agents in food must do so by December 31. The subcommittee is engaged in a review of the Public Health (Preservatives, etc., in Food) Regulations, 1925-53. Evidence should be sent to the subcommittee's joint secretary at the Ministry of Agriculture, Fisheries, and Food, Great Westminster House, Horseferry Road, London, S.W.1.

Nov. 10, 1956

MEDICAL NEWS

BRITISH
MEDICAL JOURNAL 1129

St. John Ambulance Brigade.—At the dinner during the annual surgeons' conference on November 3 and 4 at B.M.A. House,



[Photo Studios, London, W.]

Major A. C. WHITE KNOX, surgeon-in-chief and principal medical officer of the St. John Ambulance Association, was presented with his portrait to celebrate his 50 years' service with the Brigade. The portrait, here illustrated, was painted by Miss ANNA ZINKEISEN, whose wartime drawings for surgeons of clinical and pathological subjects are well known, and was the gift of 500 surgeons of the St. John Ambulance Brigade in token of their great affection and esteem for their surgeon-in-chief. Besides being a busy general practitioner, Major White Knox is an assistant commandant in the City of London's special constabulary, a low-handicap golfer, a crack shot, and an able negotiator on Government committees. He taught the Royal Family first aid during the last world war.

Royal Society of Health.—Dr. J. A. SCOTT, medical officer of health to the London County Council, has been elected chairman of the Royal Society of Health's congress, meetings, and publications committee for the ensuing year. The 1957 Congress is being held at Folkestone from April 30 to May 3, and among those who have been appointed presidents of sections or conferences at the congress are the following: *Sections.*—LORD INMAN OF KNARESBOROUGH, chairman of Charing Cross Hospital (Hospitals); Dr. J. R. REES (Mental Health); Dr. R. S. F. SCHILLING (Occupational Health); Sir WILFRED FISH (Preventive Medicine); Professor P. C. C. GARNHAM (Tropical Hygiene). *Conferences.*—Dr. J. D. KERSHAW (Medical Officers of Health).

Jenner Medal.—The Royal Society of Medicine's Jenner medal for distinguished work in epidemiological research will be presented to Dr. PERCY STOCKS, formerly chief medical statistician at the General Register Office, at a meeting of the Section of Epidemiology and Preventive Medicine on November 16. Sir CLEMENT PRICE THOMAS, the society's president, will make the presentation.

Leeds University.—Among the grants announced at the meeting of the University council last month was one of £9,000 from the Nuffield Foundation for research on the intensification of x-ray screening images in radiological diagnosis. Emeritus titles were conferred on Professor F. S. FOWWEATHER and Professor H. W. SYMONS on their retirement from the chairs of chemical pathology and clinical surgery respectively. It was reported that Professor A. M. CLAYE, professor of obstetrics and gynaecology, had received the honorary M.D. of Melbourne University while in Australia.

British Surgeons in Russia.—A party of four British surgeons, two from Scotland and two from England, are due back from a fortnight's visit to Russia on November 11. They are Sir WALTER MERCER and Professor JOHN BRUCE, respectively President and a Vice-President of the Royal College of Surgeons of Edinburgh; Mr. VICTOR RIDDELL, London director of surgical studies at St. George's Hospital, and Mr. GEORGE ARMITAGE, lecturer in clinical surgery at Leeds. Their hosts were the Academy of Medical Sciences and the Ministry of Public Health of the U.S.S.R. The visit was arranged by the British Council.

Artificial Kidney.—There have been several modifications of the "artificial kidney" devised by W. J. Kolff, of Kampen, Holland, in 1944, notably that of J. B. Merrill, of Boston. Recently French workers in the department of J. Hamburger in the Necker Hospital, Paris, have carried out further improvements, and one of these artificial kidneys is now ready for use in the Postgraduate Medical School at Hammersmith. The machine works by dialysing venous blood, which is then returned to a vein. The indications for the use of an artificial kidney are limited, but include high blood urea, high blood potassium, severe acidosis, and certain forms of poisoning.

Crash Helmets.—The British Standards Institution has published a revised British Standard (B.S. 2001:1956) for motor-cyclists' protective helmets. The tests for resistance to impact, penetration, and the effects of weather, and for the flexibility of the peak, have been made considerably more searching. Copies of the standard, price 3s., may be obtained from the British Standards Institution, 2, Park Street, London, W.1.

Sir John Stopford, F.R.S., who recently retired from the vice-chancellorship of Manchester University (see *British Medical Journal*, July 28, p. 252), was made a Freeman of the City of Manchester at a ceremony on October 16.

Surgeon Rear-Admiral S. G. Weldon has been appointed an honorary physician to the Queen.

Dr. W. S. C. Copeman has been invited by Lisbon University to deliver three lectures in the faculty of medicine this month, to mark the inauguration of an institute of rheumatology associated with the new teaching hospital of Santa Maria.

Mr. F. W. Law, senior ophthalmic surgeon at Guy's Hospital, has been re-elected Master of the Spectacle Makers' Company.

Dr. R. W. Allison, medical officer to the Australian National Antarctic Research Expedition to Mawson, 1955-6, has been awarded a Polar medal by the Queen.

COMING EVENTS

Royal Medico-Psychological Association.—As this year's Maudsley bequest a three-day refresher course in psychiatry will be held at the Royal Society of Medicine on November 12, 13, and 14, starting at 10 a.m. each day. The course will comprise 12 lectures by leading authorities, followed by questions. Open to all doctors and psychologists (tickets £2 for the course, or 15s. for a single day). Details from the Royal Medico-Psychological Association, 11, Chandos Street, London, W.1.

London Medical Exhibition.—In the New Hall, Royal Horticultural Society, Greycoat Street, London, S.W.1, November 12-16. The exhibition is open from 11 a.m. to 6.30 p.m., and on November 15 from 11 a.m. to 7.30 p.m. Professor IAN AIRD will open the exhibition at 11.30 a.m. on the first day.

Radio.—The B.B.C. presents in its series "Our Day and Age" a dramatized account of the work of the Emergency Call Service. Light Programme, November 12 at 8.30 p.m.

Marie Curie Memorial Foundation.—Annual meeting at 64, Rutland Gate, London, S.W.7, on November 14 at 4 p.m. Miss P. HORNSBY-SMITH, M.P., will address the meeting.

Faculty of Radiologists.—Sir JOHN CHARLES will deliver the Crookshank lecture at the Royal College of Surgeons on November 16 at 5 p.m. His subject will be "The Contribution of Radiology in Preventive Medicine."

James Mackenzie Lecture.—Dr. I. D. GRANT will deliver the College of General Practitioners' third James Mackenzie lecture in the Great Hall, B.M.A. House, on November 17 at 11.30 a.m. His subject will be "Family Doctors, Their Heritage and Their Future." Visitors welcome.

Institute for the Study and Treatment of Delinquency.—Annual meeting on November 19 at 5.30 p.m. at 11, Chandos Street, Cavendish Square, London, W.1. Details from the Institute, 8, Bourdon Street, Davies Street, London, W.1.

NEW ISSUES

British Heart Journal.—The new issue (Vol. 18, No. 4) is now available. The contents include:

CRIGHTON BRAMWELL. Maurice Campbell.
A CLINICO-PATHOLOGICAL STUDY OF CORONARY DISEASE. P. J. D. SNOW.
A. Morkan Jones, and K. S. Daber.
THE EFFECTS OF ADRENERGIC-BLOCKING AGENTS ON THE PULMONARY CIRCULATION IN MAN. J. Mackinnon, C. F. H. Vickers, and E. G. Wade.
MITRAL STENOSIS WITH VERY HIGH PULMONARY VASCULAR RESISTANCE AND ATYPICAL FEATURES. J. Mackinnon, E. G. Wade, and C. F. H. Vickers.
THE NATURE OF THE INCREASED PULMONARY VASCULAR RESISTANCE IN MITRAL STENOSIS. E. G. Wade, J. Mackinnon, and C. F. H. Vickers.
A CLINICAL METHOD OF STUDYING THE ELASTICITY OF LARGE ARTERIES. James Conway and K. Shirley Smith.
THE COURSE AND PROGNOSIS OF COARCTATION OF THE AORTA. Maurice Campbell and J. H. Baylis.
THE NAIL FOLD CAPILLARIES IN COARCTATION OF THE AORTA. S. Spence Meighan.
TRICUSPID ATRESIA. James W. Brown, Donald Heath, Thomas L. Morris, and William Whitaker.
CONGENITAL HEART DEFECTS FOLLOWING MATERNAL RUBELLA DURING PREGNANCY. Douglas Stuckey.
THE EFFECTS OF RESERPINE ON HYPERTENSIVE PATIENTS OVER A PERIOD OF TWO YEARS. Robert Hodgkinson.
CARDIAC AMYLOIDOSIS. Robert Benson and J. F. Smith.
ACQUIRED HEART DISEASE WITH ARGENTAFIN CARCINOMA. A. J. Goble, D. R. Hay, Reginald Hudson, and M. Sandler.
CASE REPORTS
TRUNCUS ARTERIOSUS AND A SINGLE VENTRICLE. Ian C. Cree.
THE EFFECTS OF DIGITALIS ON NODAL RHYTHM WITH RECIPROCAL BEATS. Evan Fletcher and Maude Stevenson.
BICUSPID PULMONARY VALVE IN ASSOCIATION WITH CALCIFIC AORTIC STENOSIS. J. B. Enticknap.
HOPE GOSSE. Sir Zachary Cope and Sir John Parkinson.
PROCEEDINGS OF THE BRITISH CARDIAC SOCIETY.
ABSTRACTS OF CARDIOLOGY.
INDEX.

Issued quarterly; annual subscription £2 2s.; single copy 12s. 6d.; obtainable from the Publishing Manager, B.M.A. House, Tavistock Square, London, W.C.1.

SOCIETIES AND LECTURES

A fee is charged or a ticket is required for attending lectures marked ●. Application should be made first to the institution concerned.

Monday, November 12

●INSTITUTE OF OBSTETRICS AND GYNAECOLOGY.—4.30 p.m., Professor H. C. McLaren: Pelvic Tumours Complicating Pregnancy.
UNIVERSITY COLLEGE LONDON.—At Anatomy Theatre, 5.30 p.m., Professor H. Grüneberg, F.R.S.: Genes in Mammalian Development.

Tuesday, November 13

CHELSEA CLINICAL SOCIETY.—At Rembrandt Hotel, S.W., 8.30 p.m., discussion to be opened by Dr. Macdonald Critchley and Dr. J. L. Bionstein: Medical Aspects of Boxing.
INSTITUTE OF DERMATOLOGY.—5.30 p.m., Dr. H. Haber: Anatomy and Function of Epidermis.
MANCHESTER MEDICAL SOCIETY: SECTION OF SURGERY.—At Small Theatre, Clinical Sciences Building, York Place, Manchester, 8 p.m., Mr. G. O. Jelly and Mr. R. T. Grime: Influence of Wilson Hey on Prostatectomy.
ROYAL ARMY MEDICAL COLLEGE.—5 p.m., Brigadier J. S. K. Boyd: Some Observations on Bacterial Viruses.
ST. MARY'S HOSPITAL MEDICAL SCHOOL.—At Wright-Fleming Institute Theatre, 5 p.m., Professor Dugald Baird: Influence of Social Environment on Childbearing.
WEST END HOSPITAL FOR NEUROLOGY AND NEUROSURGERY.—5.30 p.m., Dr. G. A. D. Gordon: demonstration of neuroradiology.

Wednesday, November 14

EUGENICS SOCIETY.—At Royal Society, Burlington House, W., 5.30 p.m., Dr. J. A. H. Lee: Some Problems Raised by the Regional Variations in Intellectual Ability in Britain.
INSTITUTE OF DERMATOLOGY.—5.30 p.m., Dr. R. W. Riddell: Aetiology of Ringworm Infections.
INSTITUTE OF DISEASES OF THE CHEST.—5 p.m., Dr. N. C. Oswald: Pulmonary Changes in the Reticuloses.
INSTITUTE OF UROLOGY.—4.30 for 5 p.m., Mr. D. I. Williams: Retention of Urine in Childhood.
LONDON UNIVERSITY.—At School of Pharmacy, 5.30 p.m., special university lecture in pharmacy by Brigadier-General Sir Harold Hartley, F.R.S.: Contributions of Pharmacy and Chemical Engineering to World Needs.
MANCHESTER MEDICAL SOCIETY: SECTION OF MEDICINE.—At Large Anatomy Theatre, Medical School, Manchester University, 4.30 p.m., Professor A. A. Moncrieff: Marasmus.
OXFORD UNIVERSITY.—At Radcliffe Infirmary, 5 p.m., Litchfield Lecture by Professor E. P. Sharpey-Schafer: Circulatory Reflexes in Man.
POSTGRADUATE MEDICAL SCHOOL OF LONDON.—2 p.m., Professor C. E. Dent: Cystinuria.
ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW.—5 p.m., Lock Lecture by Dr. M. G. P. Stoker: Latent Infections with Viruses and Rickettsiae.
ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE.—3.30 p.m., Dr. N. M. Goodman: Story of International Health.
ROYAL MEDICAL SOCIETY, EDINBURGH.—2.30 p.m., Industrial Visit to Chancellor Flour Mills, Edinburgh.
SOCIETY OF APOTHECARIES OF LONDON.—5 p.m., Dr. L. H. Murray: Present State of Knowledge with Regard to Vaccination Against Poliomyelitis; 6.15 p.m., Dr. W. H. Kelleher: Prevention, Early Diagnosis, and Management of Poliomyelitis.

Thursday, November 15

BRITISH INSTITUTE OF RADIOLOGY.—8 p.m., Dr. R. C. Tudway: Reliability of the Radioactive Phosphorus Test for Intraocular Malignancy; Mr. H. F. Freundlich: Some Physical Aspects of the Radioactive Phosphorus Test for Intraocular Malignancy.
BRITISH POSTGRADUATE MEDICAL FEDERATION.—At London School of Hygiene and Tropical Medicine, 5.30 p.m., Sir Russell Brock: Relation Between the Embryology and Morphology of the Heart and Cardiac Surgery.
EDINBURGH CLINICAL CLUB.—At Royal College of Physicians of Edinburgh, 8 p.m., Mr. F. J. Gillingham: Spontaneous Intracranial Haemorrhage.
HYPNOTHERAPY GROUP.—At Royal Society of Medicine, 8 p.m., Dr. A. G. Davies: Planning a Clinic for Hypnototherapy.
INSTITUTE OF CARDIOLOGY.—9.30 a.m., Sir John Parkinson: Auricular Fibrillation and Flutter.
LIVERPOOL MEDICAL INSTITUTION.—8 p.m., Mr. C. R. Helsby: Renal Calculous Disease.
LONDON UNIVERSITY.—(1) At King's College, 5 p.m., Dr. Grey Walter: Electrical Activity of the Brain. (2) At School of Pharmacy, 5.30 p.m., special university lecture in pharmacy by Brigadier-General Sir Harold Hartley, F.R.S.: Contributions of Pharmacy and Chemical Engineering to World Needs.
ROYAL EYE HOSPITAL.—5.15 p.m., Dr. T. H. Whittington: Aspects of Refraction Work—(6) Hypermetropic Patients and Presbyopes.
ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE.—At Liverpool School of Tropical Medicine, 7.30 p.m., laboratory meeting.
ST. ANDREWS UNIVERSITY.—At Physiology Department, Queen's College, Dundee, 5 p.m., Dr. N. H. Ashton: Oxygen as a Cause of Blindness in Premature Babies.
ST. GEORGE'S HOSPITAL MEDICAL SCHOOL.—5 p.m., Dr. J. H. Paterson: neurology demonstration.
UNIVERSITY COLLEGE LONDON: DEPARTMENT OF BIOCHEMISTRY.—At Physiology Theatre, 5 p.m., Dr. Dorothy Needham, F.R.S.: Biochemistry of Muscular Action.

Friday, November 16

FACULTY OF RADIOLOGISTS.—At Royal College of Surgeons of England, 5 p.m., Crookshank Lecture by Sir John Charles: The Contribution of Radiology in Preventive Medicine.
●INSTITUTE OF DERMATOLOGY.—5.30 p.m., Dr. S. C. Gold: clinical demonstration.
INSTITUTE OF DISEASES OF THE CHEST.—5 p.m., Dr. E. H. Hudson: clinical demonstration.
●INSTITUTE OF OBSTETRICS AND GYNAECOLOGY.—4.30 p.m., Mr. V. B. Green-Armlytage: Dyspareunia.
●LONDON UNIVERSITY.—At London School of Hygiene and Tropical Medicine, 6.30 p.m., Sir Charles Dodds, F.R.S.: Pharmaceutical Applications of Modern Biochemistry.
POSTGRADUATE MEDICAL SCHOOL OF LONDON.—10 a.m., Mr. D. H. Patey: Importance of Anatomy in the Surgery of the Salivary Glands; 4 p.m., Professor A. W. Woodruff: Human Filarial Infections.
ROYAL MEDICO-PSYCHOLOGICAL ASSOCIATION.—At Barnes Hall, Royal Society of Medicine, 2.15 p.m., 31st Maudsley Lecture by Dr. J. R. Rees: Psychiatry and Public Health.

Saturday, November 17

BIOCHEMICAL SOCIETY.—At Institute of Psychiatry, 2 p.m., 356th meeting. Scientific papers.
COLLEGE OF GENERAL PRACTITIONERS.—At Great Hall, B.M.A. House, W.C., 11.30 a.m., third James Mackenzie Lecture by Dr. I. D. Grant: Family Doctors. Their Heritage and Their Future.

BIRTHS, MARRIAGES, AND DEATHS

BIRTHS

Bisset.—On October 28, 1956, to Dr. Sheona Lamont, wife of Dr. H. W. Bisset, of West Hartlepool, Co. Durham—a son.
Lambley.—On October 28, 1956, at The Barratt Maternity Home, Northampton, to Joan, wife of Derek G. Lambley, F.R.C.S., of "Penshurst," Church Brampton, Northants, a brother for Richard, Julian, and Angela—Derek William Gordon.
Mansel-Jones.—On October 19, 1956, to Mair, wife of Dr. David Mansel-Jones, of "The Watersplash House," Brockenhurst, Hants, a son—Paul Adrian.
Reichenfeld.—On October 27, 1956, at Birmingham Maternity Hospital, to Ragnheidur, wife of Hans F. Reichenfeld, M.B., M.R.C.S., D.R.C.O.G., a brother for Halla and Kristin—Robert Ernst.
Sender.—On October 27, 1956, at the Canadian Red Cross Memorial Hospital, Taplow, Bucks, to Valerie (formerly Coster), wife of Dr. Neville Sender, a son—Jonathan Jerome.

DEATHS

Armstrong.—On October 15, 1956, Samuel Richard Armstrong, O.B.E., M.B., B.Ch., of 19, Malone Road, Belfast.
Barton.—On October 23, 1956, at Cromer, Norfolk, Arthur Burton, M.D., F.R.C.S.Ed., aged 86.
Cuthbert.—On October 23, 1956, at Edinburgh, Mary Isabella Shaw Cuthbert, M.B., Ch.B., D.P.H., of 16, Nethergate, Crail, Fife, and Kalimpong, Bengal, India.
Findlay.—On October 26, 1956, at Hammersmith Hospital, London, W., Louis Findlay, M.B., Ch.B., of W.H.O. and U.N.R.W.A.
Garry.—On October 27, 1956, at Ridgemoor, Englefield Green, Surrey, Thomas Gerald Garry, M.B.E., M.D., M.Ch., late of Cairo, Egypt.
Herbertson.—On October 14, 1956, at Newcastle-upon-Tyne, William Herbertson, M.D., husband of Phyllis Herbertson, M.B., B.S., J.P., and father of Basil Marriott Herbertson, M.D.
McGeagh.—On October 20, 1956, at Mona Lodge, Ramsey, Isle of Man, George Robert Denison McGeagh, M.C., M.R.C.S., L.R.C.P.
McLellan.—On October 25, 1956, Malcolm McLellan, M.B., Ch.B., of Eastgate House, Frickheim, Angus.
MacLeod.—On October 21, 1956, at Milford Lodge, Shrewsbury, Harold Hay Brodie MacLeod, M.B.E., F.R.C.S.Ed., aged 91.
Robinson.—On October 23, 1956, Bruce Ross Robinson, M.R.C.S., L.R.C.P.
Robinson.—On October 23, 1956, Jean Mary Robinson, M.B., B.S.
Todesco.—On October 24, 1956, James Massimo Todesco, M.D., D.P.H., late of Croydon, Surrey.
Tomlin.—On October 25, 1956, at Guy's Hospital, London, S.E., Edgar Ernest Dexter Tomlin, M.B., B.S., of Winchester, Hants, aged 44.

Any Questions?

We publish below a selection of those questions and answers which seem of general interest. It is regretted that it is not possible to supply answers to all questions submitted.

Spontaneous Cure in Diabetes

Q.—Is spontaneous cure or very great amelioration known to occur in diabetes mellitus, particularly after insulin therapy?

A.—Spontaneous cure is very rare in true diabetes mellitus; it may happen, however, when the diabetes is associated with a pituitary tumour in which destructive changes occur. Surgical removal of medullary and cortical adrenal tumours may also cure diabetes due to overproduction of adrenal hormones.

Insulin therapy may produce a considerable increase in carbohydrate tolerance and, in newly treated cases, especially children, this improvement may for a while simulate cure. These cases, however, almost invariably relapse within a few weeks or months. There are also other possibilities of error. The presence of a reducing substance in the urine may be due to renal glycosuria, some medicine such as aspirin, or a rare condition such as familial pentosuria. Error in diagnosis will be avoided if no patient is regarded as having, or is treated for, diabetes until there has been at least one definitely abnormal blood sugar. Infections and other illnesses may greatly aggravate a mild diabetes and increase the insulin requirement many times; infective hepatitis and coronary thrombosis are notable in this connexion. More rarely a previously high insulin dosage will, for no apparent reason, fall greatly; this is sometimes seen in diabetic girls after puberty. The importance of diet, weight, exercise, and possibly mental stress cannot be over-emphasized in relation to fluctuations in insulin requirement. Conditions such as Simmonds's disease and Addison's disease will greatly increase insulin sensitivity and therefore reduce insulin requirement. Lastly, some mild overweight patients are relatively insensitive to insulin and tolerate large doses; in such cases withdrawal of insulin may make very little difference to the control of their diabetes.

Nocturnal Frequency in Elderly Men

Q.—Why do ageing men have to rise once, twice, or more often in the night to micturate? Why are women not so affected?

A.—The difference in the incidence of gradually increasing nocturnal frequency of micturition in the two sexes is due to the great frequency with which pathological changes occur in the prostate gland.

Men in the age groups over 60 very often develop prostatic enlargement or fibrosis. Prostatic enlargement may give rise to frequency of micturition by virtue of the prostate's size and its tendency to project upwards into the bladder, thus rendering the bladder more irritable. Frequency also results from the presence of increasing amounts of residual urine which compels the patient to pass urine more often. The small fibrous prostate also results in gradually increasing frequency by causing obstruction and residual urine. Four-fifths of enlarged prostates are adenomatous or fibro-adenomatous, but one-fifth are malignant, and the percentage incidence of malignancy increases with age.

Prostatitis has an incidence in the older age groups as well as in young and middle-aged men. During the acute phase great frequency, discomfort or pain on micturition, low backache, hypogastric discomfort, and perineal pain, and

sometimes a raised temperature in the early stages, are the symptoms; even when the acute phase has passed, frequency may persist for weeks or months until the gland returns to its normal size.

These various abnormalities of the prostate are therefore responsible for most cases of nocturnal frequency in the male. Very old men with cerebrovascular disorders and those who are simply senile sometimes develop increasing nocturnal frequency of micturition in the absence of obvious clinical evidence of prostatic enlargement or obstruction such as difficulty in urination and residual urine. In such cases it is believed that the spinal centres concerned with the activity of the bladder no longer exercise their normal control over the contractions of the detrusor muscle, so that the bladder contracts and empties itself more frequently than normal both by day and by night. In such cases removal or resection of the prostate would not assist the patient.

Tuberculosis of the kidney, with which vesical tuberculosis is commonly associated, has a definite but infrequent incidence in the older age groups in the male (more than in the female), and diurnal and nocturnal frequency are the earliest symptoms of the condition; many of these cases are often wrongly diagnosed as cases of enlargement of the prostate gland.

Most of the other causes of frequent micturition at night (as well as by day), such as malignant bladder tumours, apply to both sexes, and their existence is usually revealed by symptoms other than frequency alone—for example, haematuria. Recurrent cystitis is much commoner in women than in men, but the symptoms of this condition are usually intermittent rather than continuous, except where the rare contracted bladder results as a late sequel; in the latter cases intolerable diurnal and nocturnal frequency may be present.

Aspiration of Interlobar Empyema

Q.—What is the best route for aspirating an interlobar empyema?

A.—Interlobar empyema is a collection of pus which has become lodged between the fissures of the lung. The line of the greater fissure extends from the back roughly at the level of the angle of the scapula and presents anteriorly close to the mediastinum and on the diaphragm. Pus may be shut off anywhere in the fissure, but commonly presents as a rounded swelling against the back of the chest wall; anteriorly it forms a fusiform swelling with the apex at the hilum and a broader base on the diaphragm in front. An empyema in the lesser fissure is rare.

The effusion can only be located satisfactorily by radiographs in the antero-posterior and lateral planes. Associated pleural effusion or thickening may obscure the interlobar shadow, but it can usually be determined whether the empyema is in front or behind. The site for aspiration posteriorly is about a hand's breadth from the spine in the sixth or seventh space. The fourth or fifth space in about the nipple line would be suitable for most collections anteriorly placed.

Cheeses for Reducing Diets

Q.—What types of cheese are most suitable for those on a reducing diet?

A.—If we could assume that the subject would eat equal amounts of various kinds of cheese their suitability for inclusion in a reducing diet would be inversely related to their calorie equivalents, which would in turn depend mainly on their fat contents. Thus cottage cheese, made from skimmed milk and providing only about 200 calories per 100 g., would be most suitable. Next would come Dutch and Camembert, each providing slightly under 300 calories. Cheddar and Gorgonzola, made from full-cream milk, would follow with about 400 calories. Stilton, made from

milk with extra cream, would provide about 470 calories, and cream cheese, which contains very little protein, about 800 calories. These simple conclusions, however, must be modified according to how much of the cheese is eaten, and what is eaten with it. The insipid cottage cheese will be excellent for a reducing diet if it is eaten with lettuce or watercress, but not if it is taken on bread with thickly spread butter. Possibly the subject will prefer a small portion of highly tasting cheese, such as Gorgonzola or Camembert, to a large helping of milder cheese. Camembert seems an attractive proposition in combining a strong taste with a low calorie value. A small portion of Gorgonzola may be eked out with celery or watercress. In the same way pickled onions may serve to make a slender portion of Cheddar appear more adequate.

Heredity in Pernicious Anaemia and Addison's Disease

Q.—Is there evidence of a hereditary factor in non-tuberculous Addison's disease or pernicious anaemia? In one family these diseases have occurred in siblings on two occasions each.

A.—In non-tuberculous Addison's disease a few familial cases are known, but no adequate genetic study is available. With pernicious anaemia there is undoubtedly a raised incidence of the conditions among the relatives, but no simple genetic determination, and no figures for risks to relatives, have been established. It has been claimed that unaffected relatives unduly often show achlorhydria, and it has been suggested that it is this which is genetically determined and predisposes to pernicious anaemia. Recently¹ it has been shown that pernicious anaemia is commoner among persons of blood group A.

REFERENCE

¹ *British Medical Journal*, 1956, 2, 723.

Flat Feet in Children

Q.—At what age is *pes planus* of significance in a child, and what treatment is recommended?

A.—A child's foot looks flat until the age of 2 because the arch is filled with a fatty pad which disappears after walking is learnt. A boy of 2 who appears to have flat feet when standing has therefore probably only a persisting pad of fat. If in a year or two he still appears to have a flat foot when standing, the diagnosis of flat foot would be confirmed. However, treatment is unnecessary unless the parents find that the uppers bulge inwards at the heel, in which case a wedge, about one-eighth of an inch (3.2 mm.) thick at its broad end, on the inner side of the heel may help. There is likely to be spontaneous improvement before the age of 10, and in any case such flat feet seldom cause symptoms.

Galactorrhoea

Q.—A patient weaned her second child at 6 months of age, but six months later her milk still flows slowly all day to such an extent that unless she wears pads of cotton-wool inside her brassière her clothes are soaked. I have tried really tight support to the breasts, restricted fluid intake, long and short courses of stilboestrol and even of testosterone, all without effect. The same trouble followed the birth of her first child, and was not helped by stilboestrol then. After 18 months' continued failure to check the flow of milk, my predecessor suggested a further pregnancy as a cure, and the patient took his advice. But now she does not want any more children. What investigations and treatment are advised?

A.—It is common for milk to continue to be present in the breasts after weaning, and many multiparae can express a little for some years after their last pregnancy. When the amount of milk continues so great as to soil the patient's clothes, as in this case, it may be because the woman is

unduly anxious that her breasts should dry up and manipulates them to see whether the milk has yet gone. If therefore she can be brought to ignore the problem and to avoid handling the breasts, the copious flow may abate. However, both breasts should be carefully examined for any inflammation. DeLee described the case of a woman whose breasts secreted copiously for over four years (except during two intervening pregnancies) until a small abscess in one breast was found and treated. Galactorrhoea may also occur as a feature of a pituitary tumour, usually in association with amenorrhoea (as in the Chiari-Frommel syndrome), and it would be wise to radiograph the pituitary fossa. Nevertheless it is well known for galactorrhoea to occur, albeit rarely, for no apparent reason at all, and, while its spontaneous cure may attend the resumption of menstruation, the condition may prove intractable.

Evidence to Establish Parthenogenesis in Man

Q.—In connexion with the recent claim about virgin birth, is there any test that conclusively establishes that a particular child could not possibly have been fathered, or is such a claim bound to be based on circumstantial evidence or evidence of a negative character?

A.—With one possible exception the claim of virgin birth can be based only on evidence of a negative character. For example, virgin birth is practically excluded where the child has a blood-group antigen not present in the mother. But the converse, even for all the blood types, does not prove virgin birth, since the father might have transmitted antigens similar to those present in the mother. The one possible exception is the test of skin grafting from daughter to mother. It is argued that the capacity for a skin graft to take seems to depend on so many genes that a successful graft provides convincing evidence of virgin birth. Even here, however, a remarkable coincidence of the relevant genes transmitted by the father with those present in the mother cannot completely be excluded. In the recent claim a skin graft did not take.

NOTES AND COMMENTS

Chronic Haemospermia.—Mr. C. H. CORBETT, F.R.C.S.Ed. (Pickering, N. Yorks.), writes: In your "Any Questions?" columns the question of chronic haemospermia was raised (October 20, p. 951). I had a case of interest some years ago of a police sergeant, and I was searching for literature upon the subject. A friend of mine lent me two French works upon urology and there I found what I required. Trauma was one of the causes—chronic, of course—and this heavy policeman of 40 to 50 summers rode a bicycle upon his rounds. He arranged to stop this cycle-riding and his chronic haemospermia disappeared.

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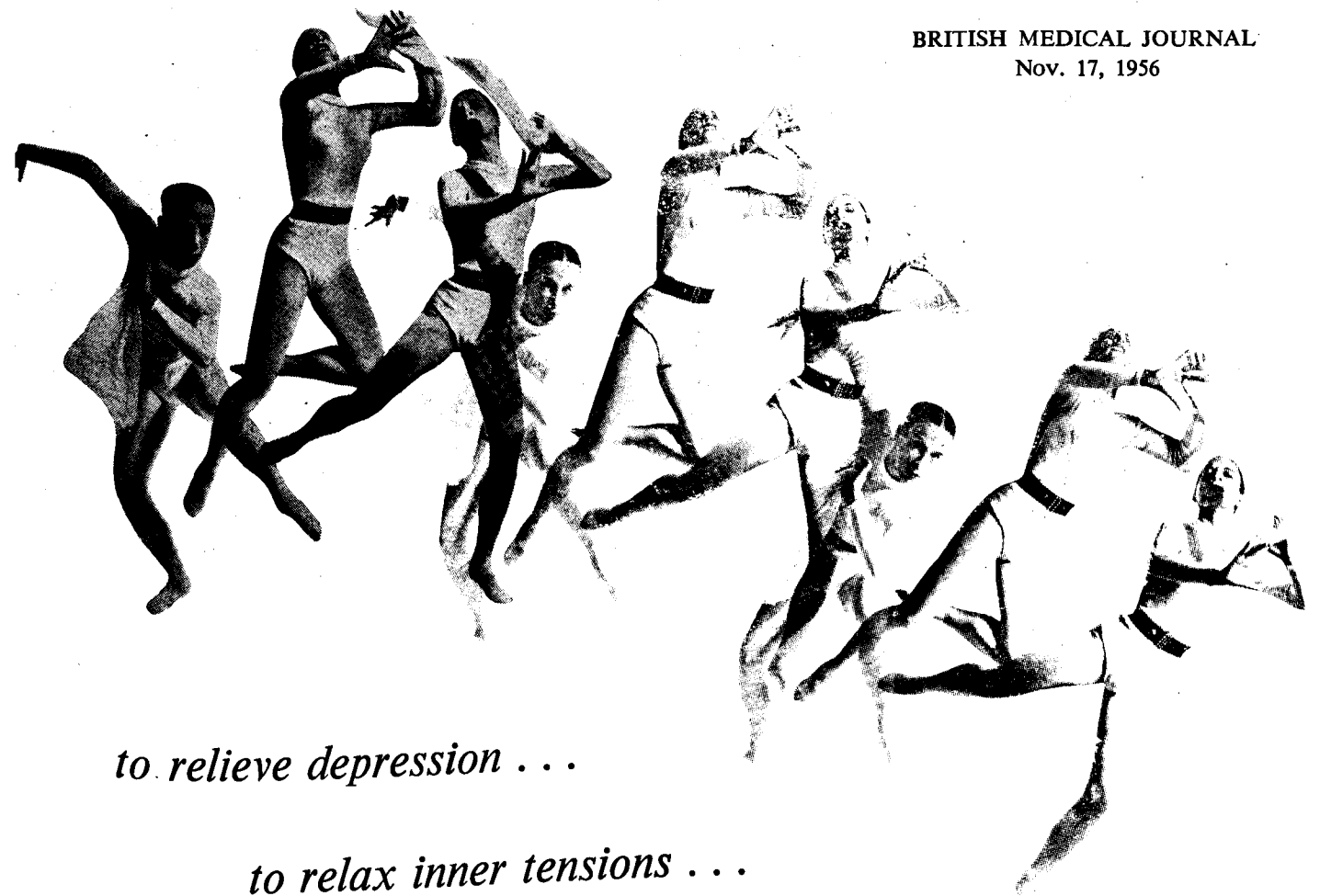
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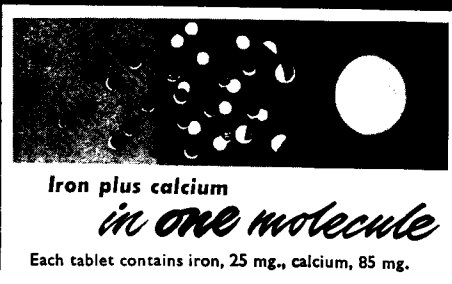
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BRITISH MEDICAL JOURNAL

LONDON SATURDAY NOVEMBER 17 1956

HYPERPARATHYROIDISM AND STEATORRHOEA

BY

D. R. DAVIES, F.R.C.S., C. E. DENT, M.D., F.R.C.P., and A. WILLCOX, M.D., F.R.C.P.

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[WITH SPECIAL PLATE]

The association of bone disease with steatorrhoea has been well known since the classic descriptions of rickets in coeliac disease (Parsons, 1927) and of osteomalacia in idiopathic steatorrhoea (Bennett *et al.*, 1932). All the descriptions, however, whether based on clinical signs, biochemical studies, or radiology or histology of bones, state that the bone disease is identical with that of classical rickets or of osteomalacia, which of the two depending on the age of the patient. The possibility, however, that parathyroid overaction may also occur in this condition has been strongly stated by Albright and Reifenstein (1948). They suggest that the changes in plasma levels of calcium and phosphorus are closely related to overaction of the parathyroid glands. Those cases of steatorrhoea which tend to have a low calcium and normal phosphorus level correspond to cases in which calcium deficiency (due to the steatorrhoea) has occurred without secondary parathyroid hyperplasia. Cases in which the plasma calcium remains at nearly normal levels but the phosphorus level is low represent the result of the same calcium deficiency, but with sufficient parathyroid hyperplasia to maintain a nearly normal calcium level. This hyperplasia then causes a fall in phosphorus level owing to increased renal excretion of phosphorus by the action of the parathyroid hormone. This interpretation has many supporters, but is disputed also by other workers, including ourselves, on the grounds that other signs of parathyroid overaction are usually absent—for instance, the bone histology, the urine calcium output, and the size and histology of the parathyroid glands when obtained *post mortem*. An alternative hypothesis, which we ourselves favour and which can equally well explain the altered levels of calcium and phosphorus and many of the other findings in steatorrhoea, assumes that, for obscure metabolic reasons, the condition mimics a deficiency of vitamin D. This then leads to increased phosphate excretion by the kidney by a direct renal action. This hypothesis does not involve the parathyroid hormone in the explanation of the lowered plasma phosphorus level.

Arguments of this kind become exceedingly involved, and in the absence of parathyroid hormone assay they are impossible to settle either way. It is the purpose of this paper to describe two cases in which we think that unambiguous radiological signs of hyperparathyroidism

have occurred in the presence of steatorrhoea, and also to suggest that steatorrhoea may sometimes be the cause of apparent cases of "primary" hyperparathyroidism.

Case 1

A midwife aged 37 was seen by one of us (A.W.) on August 6, 1952, at the request of Dr. Oswald Savage. She lived in the Channel Islands and had remained there throughout the German occupation in the war. It was during this period, in 1942, that diarrhoea started. This was intermittent, with up to seven actions of the bowel in a day, but there were long spells of freedom, and in 1945 the diarrhoea ceased. In 1950 she developed abdominal distension and was admitted to a hospital for investigation. Sprue was diagnosed, and treatment with folic acid and "anahaemin" was followed by improvement in her condition. However, she abandoned the treatment after three months. In April, 1951, acute appendicitis developed, and following appendicectomy she noticed the gradual onset of stiffness, particularly of the back and hips, and a waddling gait. She had also lost about a stone (6.4 kg.) in weight in spite of a normal appetite, and had become easily fatigued and dyspnoeic on slight effort. Menstruation was normal, bowels regular without diarrhoea, and micturition normal. There was nothing relevant in the past or family history, except that she had had "consumption of the bowels" at the age of 9 months.

She was of spare build and weighed 8 st. 10 lb. (55.3 kg.). The waddling gait was striking, as though she had bilateral osteoarthritis of the hip-joint. She was obviously anaemic, but without glossitis or stomatitis. There was, however, scaling of the skin of the hands and feet, with brown pigmentation on the neck. The abdomen was moderately distended. Blood pressure 110/60 mm. Hg. Chvostek's sign negative. Urine normal. Blood investigation a week previously showed: haemoglobin 48% (Haldane); red cells 3,200,000 per c.mm.; colour index 0.75; leucocytes 5,200 per c.mm. Radiological examination of the hands, lumbar spine, and pelvis showed decalcification. It was thought that the symptoms were due to multiple deficiencies secondary to idiopathic steatorrhoea, and, as she refused to stay in London, she was advised to return to the care of her physician in the Channel Islands.

Nothing more was heard of the patient until August, 1953, when the following letter was received from her doctor: "She has had amenorrhoea for four months, and I think she is pregnant. She is no longer anaemic, but her waddling gait is worse and she complains of excruciating pain in the sacro-iliac region which compels her sometimes to go on all fours." In view of this arrangements were made to

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Will Doctors ever rule the Earth?

Does that seem so very illogical? Is it not possible or indeed probable that in the distant future such a thing could well come about? When nation has ceased to fight nation may not a greater war begin? An all-out war on man's natural enemies. A war in which man is united against those things that mar his health and curtail his very existence? Led by the future's finest medical minds and with every resource, both physical and financial, this humane army could so speed the march of medical progress, could wield such power for good, that all other human activities would be put secondary. Sooner or later will not future man subscribe wholeheartedly to the science of life? Will he not extol those dedicated to his well-being and survival? And will they not become exalted throughout the Earth? But pause awhile and consider. What will be their weapons in this fight of fights? Surely they won't still be the stethoscope or the scalpel. Neither will they be the antibiotics of this present age. Or will they? Perhaps such "wonder drugs" as Terramycin will still be the medical man's most powerful weapon. Perhaps broad-spectrums will even then play a leading role in conquering man's afflictions. But who is so bold as to predict the future? One can only use today's foremost weapons to the extent of today's foremost knowledge to probe the future and treat the present. Medical men of another age will stand on our shoulders and see further. Will it be they who rule the Earth?

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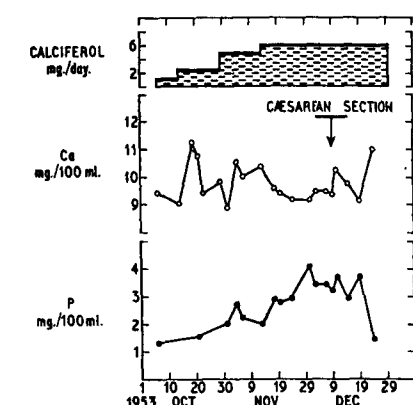
admit her to the Middlesex Hospital, where she arrived on October 3, 1953, the delay being due to her reluctance to enter hospital. She said that since August, 1952, she had taken folic acid, iron, and "multivite" tablets with improvement. The last menstrual period was in March, 1953, and with the pregnancy she had felt well but the stiffness and back pain had increased. However, she had been resting during the last two months with considerable relief of the pain. She had no further diarrhoea, but had nocturnal frequency of micturition (about four times a night).

On examination the mucosae were found to be normal; the fundus of the uterus lay half-way between the symphysis pubis and the umbilicus, and there was slight pitting oedema over the sacrum. The signs otherwise were unchanged. B.P. 120/60 mm. Hg. Chvostek's sign negative. Urine normal.

She was seen by Mr. Ian Jackson, who confirmed pregnancy. Pelvimetry showed the true conjugate measurement to be 3.7 in. (9.4 cm.) and the shape of the brim markedly android, while the subpubic angle was very narrow. The bones of the pelvis were porotic, and there was a fracture of the superior ramus of the pubis on both sides. Mr. Jackson advised caesarean section just before term, and Mr. P. H. Newman considered that weight-bearing should be avoided because of the risk of fracture of the femoral neck.

Investigations and Treatment

Owing to the pregnancy and the inability to stand, investigations were somewhat restricted. On October 6, 1953, the blood picture was as follows: Hb 9 g. per 100 ml., red cells 3,900,000 per c.mm., P.C.V. 34%, M.C.V. 87 μ , M.C.H.C. 26.5%, white cells 5,900 per c.mm.; plasma



GRAPH 1.—Case 1: Calcium and phosphorus levels.

57%; fat-balance determination showed 77% absorption. She was treated as follows: folic acid, 20 mg. daily; "cervon," 1 fl. dr. (3,552 ml.) thrice daily; one multivite tablet thrice daily; calciferol, starting with 50,000 units daily, increased to 100,000 units daily on October 15, 200,000 units daily on October 26, and finally 250,000 units daily on November 11, which was continued; calcium phosphate, 60 gr. (4 g.) thrice daily.

Progress

She was delivered of a normal boy, weighing 5 lb. 4 oz. (2.38 kg.), by caesarean section on December 8, 1953. The post-operative progress was uneventful. On December 16 she was allowed to start walking, as x-ray examination suggested that calcification had taken place in the pelvis. She left hospital on December 30. No further news of her was received till December, 1955, when she wrote to say that she continues in excellent health, without pain or stiffness, and is well able to do all her housework without getting tired. Her son is growing satisfactorily and enjoys perfect health.

Radiological Assessment

Radiographs are available of most of the skeleton dating from the first time she was seen in July, 1952, and during

her subsequent admission to the Middlesex Hospital from October to December, 1953.

In July, 1952, there were signs of osteomalacia of comparatively acute onset, for early Looser zones were present in both pubic rami and ischia, without much deformity, the bones as a whole otherwise appearing well calcified and of normal structure (Special Plate, Fig. 1a). The lumbar vertebrae were slightly biconcave and showed increased density of their upper and lower regions to give the appearance of horizontal stripes ("rugger-jersey sign"). In the hands there were very early subperiosteal erosions of the middle phalanges with erosions of the tufts of the terminal phalanges (Plate, Fig. 2a). These latter changes are diagnostic of hyperparathyroidism of either primary or secondary origin.

When examined again in early October, 1953, the skeleton revealed evidence of simultaneous progression of all the radiological signs of the disease. The pelvic fractures now showed bony displacement; the vertebral biconcavity was perhaps more marked in the lumbar region, but, more convincing, it now affected the thoracic vertebrae as well, which also showed a "rugger-jersey sign." The hyperparathyroid changes in the fingers were also more extensive (Plate, Fig. 2b).

By the end of December, 1953, after the birth of the baby and after the patient had received large doses of calciferol, many of the radiological signs had regressed. The pelvic fractures were showing a callus reaction (Plate, Fig. 1b) and the hyperparathyroid lesions in the hands were healing (Plate, Fig. 2c). The biconcavity and "rugger-jersey sign" of the lumbar vertebrae were still unchanged (Plate, Fig. 3).

Case 2*

A married woman aged 41, employed as a coil winder, was referred to one of us (C. E. D.) by Dr. M. E. Morgans on account of bone pains and associated abnormal radiological findings. When admitted to University College Hospital on January 1, 1955, she complained of pains in both thighs intermittently for ten years and a loss of height of about 4 in. (10 cm.). Over the previous five years she had lost 2½ stones (15.9 kg.) in weight, and in the last three months had developed breathlessness on walking and additionally more severe pains had appeared in the arms, ribs, and back. She had been well until 1944, when the pains in the thighs began. These were first interpreted as due to rheumatism, but as they got worse and prevented her from walking she was admitted to another hospital, where tuberculosis of the hip was diagnosed and she was put to bed with traction on the right leg. (The radiographs taken at that time are unfortunately not obtainable.) After two months she was allowed up but found she was no better, and at the end of a further three months the pains gradually lessened and she was able to return to work. However, in 1945 there was an exacerbation, this time with pain in the chest and arms as well as both buttocks, and she was readmitted to the hospital. Radiographs then showed gross decalcification; the serum calcium was 12 mg. per 100 ml., alkaline phosphatase 28 K.-A. units, and urinary calcium 200 mg. in 24 hours. She had iron-deficiency anaemia, which was satisfactorily treated with oral iron. A diagnosis of hyperparathyroidism was then considered. Of a further short admission later that year the notes state that she had a waddling gait and pain in the buttocks; serum calcium 11.5 mg. per 100 ml., phosphatase 46 K.-A. units.

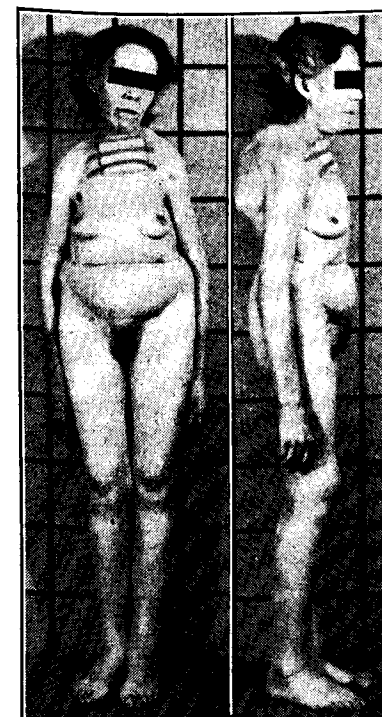
She was able to return to work soon afterwards and remained well until about two years ago, when the pains reappeared in the thighs, and more recently in the other parts of the body. She was able to work until admission, but was by that time in very great pain and could not have continued much longer. On further questioning she admitted to having occasional swelling of the ankles in the summer

*This case was described and discussed at a meeting of the Section of Endocrinology of the Royal Society of Medicine on May 23, 1956.

months. She said she was always constipated, having a bowel motion once every three or four days. Her periods were normal, and her general health was good apart from the pains.

Clinical Examination

Examination showed a short, pale woman of unusual body configuration, as can be seen from the accompanying photographs.



Case 2, showing body configuration suggesting coeliac dwarfism with additional more recent decrease in trunk length.

There was tenderness over the ribs and lower back; joint movements were full.

Laboratory Investigations

Haematological investigation showed haemoglobin 14 g. per 100 ml., red cells 4,160,000 per c.mm., colour index 1.14, M.C.D. 7.9 μ , M.C.V. 102 μ , white cells 6,000 per c.mm. (differential normal). In the bone marrow there were no definite megaloblasts, but some of the intermediate normoblasts had nuclei deficient in chromatin, suggestive of vitamin deficiency (Dr. E. Graves). Glucose-tolerance curve was flat, beginning at 96 mg. per 100 ml. and rising to a maximum of 123 mg. at 30 minutes. Plasma levels were: Ca 11.4 and P 2.0 mg. per 100 ml.; alkaline phosphatase 69 K.-A. units; Na 143, K 5.2, HCO₃ 19.2 and Cl 109 mEq per litre; albumin 4.9 and globulin 1.8 g. per 100 ml.; urea 24 mg. per 100 ml.; urea clearance 116% and 112%; maximum urea concentration 2.7 g. per 100 ml. Urine concentration and dilution test, S.G. 1020-1006 with greatly delayed excretion of water load. The urine was otherwise normal except for a very low concentration of calcium. Fat-balance studies (59 g. of fat daily) showed absorption values of 87.5% and 87.1% in two consecutive six-day collection periods.

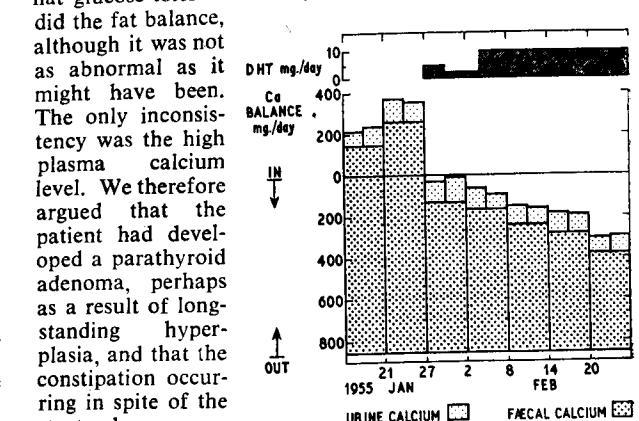
Radiological Findings

Radiographs showed the thoracic cage to be very small (Special Plate, Fig. 4). The pelvis was trefoil in shape (Plate, Fig. 5), and the lumbar vertebrae had marked biconcavity as well as showing the "rugger-jersey sign." The bones throughout had a thin cortex and prominent fuzzy trabeculae. The suspicion of hyperparathyroidism thus aroused was fully confirmed by the typical subcortical erosions of the middle phalanges and phalangeal tufts (Plate,

Fig. 6a) and the fuzzy appearance of the skull (Plate, Fig. 7). These findings were held to indicate the presence of both long-standing chronic osteomalacia and more acute severe hyperparathyroidism with osteosclerosis. The small chest and dwarfism appeared to be consistent with a diagnosis of coeliac disease continuing in mild form into adult life. There were no deformities suggesting rickets in childhood.

Course and Treatment

Our first diagnosis, based on the patient's body build and the biochemical findings, was that she had lifelong steatorrhoea. Our subsequent finding of a macrocytic anaemia in the peripheral blood and of abnormal red cells in the bone marrow, as well as of a low urine calcium output and flat glucose-tolerance curve, seemed to confirm this, as also



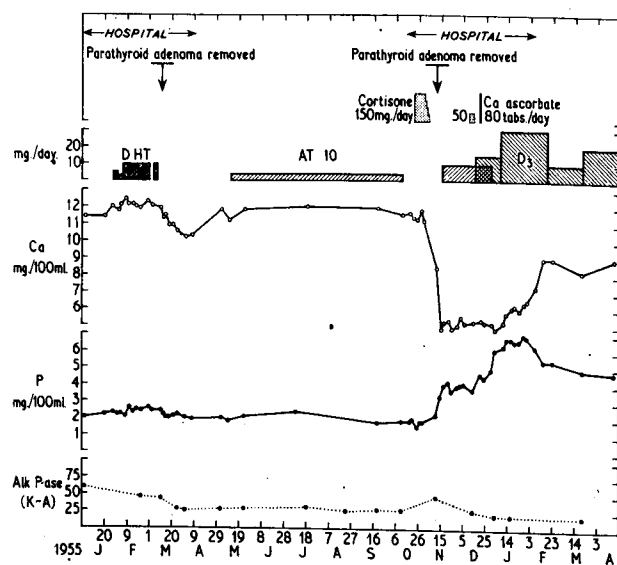
GRAPH 2.—Case 2: Calcium balance data before and after very large doses of pure dihydrotachysterol. Note negative balance before treatment, with high faecal excretion and low urinary output. A typical vitamin-D response obtained after giving the dihydrotachysterol. The response is, however, slow and small considering the large dose.

doses of dihydrotachysterol (given as pure compound) showed the changes expected of a case of steatorrhoea—namely, a very high faecal calcium level which the dihydrotachysterol treatment only slowly lowered (Graph 2). Her symptoms were partially relieved during this treatment, but there was no change in the radiological signs of hyperparathyroidism. We assumed that we were improving the osteomalacia somewhat, but that the hyperparathyroidism was not controllable by this means. While this investigation was proceeding she was given 10 mg. of folic acid twice daily, which rapidly reduced the size of the red cells.

As she was still incapacitated by pain, it was decided that surgical exploration of the neck should be undertaken for a parathyroid adenoma. The dihydrotachysterol was therefore discontinued and the neck explored on March 11, 1955, by Mr. D. R. Davies. Two of the parathyroid glands were normal; a third was large and was removed. It weighed 150 mg. and was identified as a chief-cell adenoma. The fourth parathyroid gland could not be found, so the wound was closed and the patient returned to the ward. She did well during the next few days, but subsequently developed fever with pain and swelling in the neck which proved to be due to a wound abscess. This was incised on March 25, when a great deal of pus came away. Coincident with the development of the abscess her plasma calcium level slowly fell and her aches and pains disappeared. A radiograph at this time showed definite improvement in the subperiosteal erosions in the hands.

She was sent home almost symptom-free on April 8, with only 10 mg. of folic acid twice a day as treatment. The significant biochemical findings throughout her stay in hospital and subsequently are shown in Graph 3. It may be seen that the calcium content had returned to normal, with the phosphorus still remaining at a low level. The

phosphatase level had also fallen. It was thought that the hyperparathyroidism was relieved but that more vitamin D would be needed later for the osteomalacia. It was interesting that while the plasma calcium level was falling she began to pass loose, pale stools, typical in appearance of those of steatorrhoea.



GRAPH 3.—Case 2: Main details of treatment and more important plasma changes. Note the slow fall to normal levels of plasma calcium after the first parathyroid tumour had been removed on March 11, 1955, followed by its return to abnormally high levels, and then finally the precipitous fall to tetany levels when the second parathyroid adenoma was removed on November 9, 1955. After the second (not the first) operation there was also a large rise in phosphorus level.

Out-patient Follow-up

When seen on May 2, 1955, she was well in herself but some pain had returned in the thighs. Radiographs on this date suggested some regression of the subperiosteal erosions and there was a rise in the plasma calcium level (Graph 3). In the following week her clinical condition was similar: the plasma calcium was still raised and she was definite that she had become constipated again. From then until September it seemed clear that her condition was deteriorating, the pains getting worse, and the constipation persisting. In case this was due to an increase in the osteomalacia, however, she was given five capsules a day (about 3 mg.) of "A.T.10." This had no appreciable effect on her clinical condition, and in a month or two it was obvious that the x-ray signs of hyperparathyroidism were much worse and that the phosphatase level had ceased to fall. It was therefore decided to readmit her, since the most likely explanation was that she had another adenoma in the fourth parathyroid gland, not identified at the previous operation, and that her improvement after that operation was probably due to its having been temporarily damaged at that time. This line of reasoning also suggested that if there was another adenoma it would probably be found in the neck, not in the mediastinum.

Second Admission

She was readmitted to University College Hospital on October 10, 1955. Her clinical condition was very similar to that on her first admission, and so were the biochemical findings (Graph 3). The A.T.10 treatment was stopped to see if the plasma calcium level would become normal, but it did not fall more than about 0.5 mg. per 100 ml. She was then given a ten-day course of cortisone, 150 mg. a day, to make sure that the raised plasma calcium level was not due to an overdose of A.T.10. When the calcium level is raised owing to an overdose of or sensitivity to a vitamin-D

preparation administration of cortisone in this dosage would cause it to fall, whereas this does not occur if the rise is due to a parathyroid tumour (Dent *et al.*, unpublished observations; see also Dent, 1956). As the cortisone had no effect in this case it was decided to re-explore the neck, and this was done on November 9. The two normal parathyroid glands on the right side were again identified. Thorough exploration of the left side revealed a large lump weighing 1 g. behind the clavicle near scarring due to the wound sepsis in the first operation. This was identified as a chief-cell adenoma of the parathyroid gland and was removed. The post-operative course was satisfactory, the wound healing well. However, two days after the operation she developed tetany, which continued for some time in spite of the administration of large doses of A.T.10 and of intravenous calcium gluconate. Her bone pains completely disappeared in a few days and the looseness of the bowels returned.

The biochemical changes and major treatments are shown in Graph 3. It is to be noted that after some time on A.T.10 alone she was given a short course of cortisone. This was in the hope of improving her steatorrhoea and thus perhaps her response to the vitamin D. However, her symptoms and blood chemistry remained unaffected, therefore it was discontinued. Then 15 mg. of vitamin D₃ daily was added, and for a short time a very large dose in tablet form of calcium ascorbate ("calci-C," Physiological Chemicals Co. Inc.), as this compound is alleged to be especially well absorbed from the gut. However, no significant changes in plasma level occurred during this time, suggesting that the compound was not absorbed. After two weeks on both A.T.10 and vitamin D₃ the former was stopped altogether, but there was a slight fall in the plasma calcium level, presumably because the action of the A.T.10 was dwindling faster than the vitamin D₃ action was beginning. Calcium-balance determinations during this period showed that she was retaining about 1 g. a day. The dose of vitamin D₃ was then increased to 30 mg. a day, and on this enormous dose the plasma calcium level began to rise steadily.

During her last two months in hospital the anaemia worsened. This was shown to be of iron-deficiency type with a serum iron level of only 56 µg. per 100 ml. It was treated with intramuscular injections of iron with good results.

A curious and unexpected feature of the post-operative recovery phase was the rise in plasma phosphorus level; this attained 3.3 mg. per 100 ml. a few days after the operation, then rose to about 4 mg. for a few days during the treatment with A.T.10 alone, to reach a peak of 7 mg. while the large dosage of vitamin D₃ was being given. It has fallen from these high levels since the plasma calcium has become almost normal. Her urine was occasionally analysed during this period and found to contain the usual quantities of phosphorus (400–700 mg. a day). There therefore appeared to be a definite change of kidney threshold, which would be consistent with some degree of hypoparathyroidism. We can only suggest that the function of the two remaining glands was subnormal because their blood supply had been disturbed or perhaps because our therapy was affecting them.

She was discharged symptom-free on February 6, 1956. Since then she has maintained excellent general health, and x-ray examination of her bones shows spectacular improvement (Special Plate, Fig. 6b). Final dosage and plasma levels are shown in Graph 3.

Discussion

We have described two cases of steatorrhoea in which radiological signs thought to be specific for hyperparathyroidism (Pugh, 1951; Dent and Hodson, 1954) have been found. We are not aware that this has been previously described. Biochemical reasons for supposing that there is

some degree of hyperparathyroidism in many cases of steatorrhoea have, however, been put forward many times (Albright and Reifenstein, 1948), while Salvesen and Bøe (1953) have carried the argument still further with their unusual suggestion that the hyperparathyroidism they assume to be present in steatorrhoea is the cause of the osteomalacia. We do not wish to argue whether this purely biochemical evidence is valid, or even whether it is supported by our more unambiguous findings in these two cases. It can well be argued the other way round, that, because such radiological signs are exceedingly rare in steatorrhoea, therefore the frequent occurrence of hyperparathyroidism is unlikely. We are still left with the problem of whether one is or is not convinced by the biochemical arguments as against radiological ones. It is of interest that Bennett *et al.* (1932) made no specific mention of hyperparathyroid changes in the bones in any of their 15 cases of steatorrhoea. Professor Turnbull's report of the bone histology of their Case 12 does, however, strongly suggest this, since it states that "osteoclasts are present in considerable number . . . in this portion of bone active resorption by osteoclasts is undoubtedly greater than normal."

Our first patient had a remission of the radiological hyperparathyroid changes which coincided in time with the end of her pregnancy and with the administration of large doses of calciferol. It is possible that either or both of these factors may have been responsible for the remission, but we prefer to think it was due only to the calciferol, because of data which we have on other cases but which are not complete enough to present here in detail. It is interesting that our first patient also had marked signs of osteomalacia of the more acute type (Dent and Hodson, 1954) associated with Looser zones and without gross deformities of the long bones. Her spine, however (Special Plate, Fig. 3), showed clear signs of osteosclerosis in that the upper and lower borders of each vertebra were more dense than normal to give the appearance of horizontal bands previously described as the "rugger-jersey sign" (Dent, 1955). This triple combination of hyperparathyroidism, osteomalacia, and osteosclerosis has been previously described only, so far as we know, in chronic renal failure (Crawford *et al.*, 1954). This observation is most intriguing, for the usual explanations given for the pathogenesis of renal osteodystrophy can hardly have been applicable to this patient, whose renal function as ordinarily measured was normal and whose plasma levels of calcium and phosphorus were unlike those occurring in renal failure.

The second patient we think was probably an adult survivor of coeliac disease, since she was very small in stature and of a bodily configuration similar to that found in other patients we have seen in whom coeliac disease in childhood had been adequately diagnosed. It seems clear, however, that something else happened to this patient during the last ten or more years, because her symptoms of bone pains and loss of height date from this time. It is possible that she reached adult life with some degree of dwarfism due to coeliac disease and then developed more severe osteomalacia and hyperparathyroidism. Presumably at first the latter was due to parathyroid hyperplasia, as in our first case, but after some time two of her glands became adenomatous, and from then on behaved in an uncontrollable fashion. This would lead to the rise in serum calcium level and produce the constipation which was such a paradoxical finding in a patient in whom steatorrhoea had been diagnosed on the other clinical evidence. It is interesting that in this case we have twice witnessed the disappearance of symptoms, a lowering of the plasma calcium level, and a loosening of the bowels. The first occasion was after the initial parathyroid exploration when the first adenoma was removed; the second after the removal of the second and last adenoma, which was much larger. The first operation was followed by wound sepsis, which we think must have interfered temporarily with the function of the other parathyroid adenoma, which had not then been discovered and removed.

If our interpretation is correct, hyperparathyroidism may sometimes occur in steatorrhoea. It can at first be reversed by giving vitamin D (Case 1). It may, however, become uncontrollable in this way, and then it produces a clinical picture easily confused with that of primary hyperparathyroidism (Case 2). When this happens the bone changes of hyperparathyroidism are found combined with those of osteomalacia, and the urine calcium level is low (not high, as in primary hyperparathyroidism). We strongly suspect now that one of our own cases treated for primary hyperparathyroidism in University College Hospital some years ago was indeed such a case of steatorrhoea, but we have unfortunately been unable to carry out a reinvestigation. We also have records of another case with mild steatorrhoea following partial gastrectomy, in which "primary" hyperparathyroidism is very strongly suspected on biochemical and radiological grounds. Unfortunately surgical intervention, and hence confirmation of our diagnosis, is contraindicated on other grounds. It is of interest that a case of parathyroid adenoma associated with pancreatic steatorrhoea has recently been reported (Page, 1954). It is a plausible speculation that hyperparathyroidism as described here in steatorrhoea may also occur as an occasional complication of rickets or osteomalacia due to causes other than steatorrhoea.

Summary

Two cases of steatorrhoea are described in which radiological evidence of hyperparathyroidism as well as of osteomalacia was obtained.

In one case the serum calcium level was always 9–10 mg. per 100 ml. Treatment with vitamin D led to a remission of the bone pains and of the radiological signs of osteomalacia and hyperparathyroidism.

In the second case the plasma calcium level was 11–12 mg. per 100 ml. Some relief of bone pains followed treatment with vitamin D, and the calcium balance responded in the expected way. There was, however, no change in the radiological signs of hyperparathyroidism. Symptoms were relieved and plasma calcium level and radiological signs returned towards normal temporarily after one, and permanently after a second, parathyroid adenoma had been removed.

It is concluded that in some cases of steatorrhoea a parathyroid hyperplasia occurs which is reversible with vitamin-D treatment. In other cases, however, presumably of longer duration, one or more adenomata will develop. Treatment by operation will then be required, as in primary hyperparathyroidism.

It appears that radiological signs of both osteomalacia (or rickets) and hyperparathyroidism can occur in steatorrhoea as well as in renal osteodystrophy. Both of our cases also demonstrated osteosclerosis of the vertebral bodies, as may sometimes be found in renal disease.

We wish to thank Sir Harold Graham Hodgson and Dr. Campbell Golding for help in the radiology, and Sir Charles Dadds for the biochemistry, in Case 1; also Dr. J. Hodson for help in the radiology, and Professor M. Maizels and his Department and Mr. G. Philpot for help with the biochemistry, in Case 2.

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VALUE OF RADICAL THYROIDECTOMY IN THE TREATMENT OF THYROID CANCER

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[WITH SPECIAL PLATE]

In 1939, in collaboration with Marcel Bérard, an attempt was made to remove in one block the cancerous thyroid lobe together with the muscles, the lymphatics and the veins of the neck on the same side. It was felt that such a one-stage block-dissection was justified by four indisputable pathologico-anatomical facts: (1) the high incidence of unilateral tumours of the thyroid parenchyma without involvement of the opposite lobe ; (2) the possibility of spread of the growth along the cervical aponeuroses and, more particularly, the sheaths of the infrahyoid muscles ; (3) the frequent invasion of the lymphatics and the risk of development of malignant cervical lymphadenopathy ; and (4) the frequent invasion of the venous drainage of the gland, and even of the internal jugular vein.

These, therefore, were the principles of the operation. In practice it was not often indicated. Out of 208 cases of thyroid cancer operated upon at the Lyons Centre from 1940 to 1955 block removal was performed in only 50. These 208 cases form part of a series of 237 cases of thyroid lesions operated upon during this same period. Altogether the block operation was carried out in 57 of the 237 cases, so that in 7 of them there had been a diagnostic error.

The material available in a cancer centre is not suitable for comparisons to be made with other operations. Most cases of thyroid cancer are not referred to us at the beginning, such cases being nearly always subjected to subtotal thyroidectomy or even total unilateral thyroid lobectomy in a general surgical ward in the course of treatment of nodular goitre. Quite often, also, advanced cases of generalized cancer are referred to us when they are already beyond the stage when surgery can be contemplated. We are therefore left with lesions whose malignant nature can be determined on clinical grounds—obvious characteristics of the tumour or the recurrence, the existence of cervical lymphadenopathy, and the presence of one or more metastases. Such cases, representing 24% of those seen, have been treated by radical thyroidectomy.

Comparison of our results with those reported by other workers is difficult, since the indications for this radical operation as described by Crile, Wilson, Frazell, Hayes Martin, and others are seldom stated. We can therefore only give an account of our own experience in endeavouring to determine the place of this operation in the treatment of thyroid cancer.

Extent of Operation

It is not necessary to describe anew the technique, already defined (Dargent and Bérard, 1940); extirpation of the lobe, the surrounding muscles, and all planes of the neck on the corresponding side, the internal jugular vein included, constitutes the standard operation. Ligation of the jugular veins, and, more particularly, of the internal jugular, must be done at the outside, if the risk of neoplastic embolism is to be avoided. Since 1946 we have applied the

principle of the conservation of the external branch of the spinal accessory nerve, tracing it from the upper part of the neck, and following it from top to bottom in the sternomastoid muscle, immediately after ligation of the jugulars below the clavicle. Conservation of this nerve is possible only if there are no adherent lymph nodes at the upper part of the carotid sheath.

Contrary to some workers (Hayes Martin, for example), we do not include the submaxillary region in this dissection of the neck. We have never found any lymphadenopathy or seen any recurrences in that area.

In a few cases the operation was extended to other structures. (1) In four cases both thyroid lobes were removed, in two of them leaving only a thin slice of thyroid parenchyma on one side. Total thyroidectomy was considered justifiable because of the existence of bilateral lesions in the glandular parenchyma in one of these cases, and in the parenchyma and cervical lymph nodes in the other. In this latter case bilateral radical thyroidectomy was carried out in two stages with an eight-day interval. In the other two cases there was only a unilateral lesion, but the whole gland was extirpated because there were bone metastases; these were to be treated later with radioactive iodine. (2) In one case the operation was extended to the mediastinum, in which a primary cancer had developed, whereas the affected lymph nodes were situated at the level of the neck. The tumour, which was adherent to the superior vena cava, was approached through a sternotomy. (3) In three cases the common carotid artery was resected as well. In one of these cases it was already evident that a bilateral tumour existed. (4) In one case partial and in another total resection of the trachea was performed. In one of these some of the normal tissue left was used to form a temporary tracheotomy; in the other case total laryngectomy was also necessary. (5) Twice a piece of the oesophageal wall had to be resected, continuity being immediately restored by suture. (6) In 13 cases the dissection involved the recurrent laryngeal nerve and sometimes the vagus nerve itself, owing to their invasion by tumour growth. (7) In one case the operation included the internal third of the clavicle, which was invaded by a metastasis or, more likely, by direct extension of the tumour in the muscle sheaths.

General Indications

Total radical thyroidectomy was performed in 57 cases: in 50 for cancer and in 7 for non-neoplastic lesions. In 31 of the 57 cases there was a definite thyroid tumour with one or more indications of localized malignancy without remote metastases; in 10 of the cases there was unilateral recurrent-nerve paralysis. Among these 31 cases were 7 in which an erroneous diagnosis had been made as follows. (1) Two cases of thyroid tuberculosis with homolateral cervical lymphadenopathy. (2) Three cases of pharyngolaryngeal cancer of spino-cellular type, with cervical lymphadenopathy and recently developing goitre due to a haematocoele or to ordinary congestion, in one of them accompanied by paralysis of the recurrent laryngeal nerve. In these three cases the cancers could not be seen endoscopically, but their presence was revealed by the lymphadenopathy. In one case cure was obtained after eight years, radiotherapy being given in addition to surgical treatment. (3) A case of breast cancer in which there were apparently primary supraclavicular and carotid lymphadenopathy and a very limited primary lesion with co-existing unilateral goitrous enlargement. (4) A case of achromic naevocarcinoma of the abdominal wall, with recent goitrous development, unilateral haematocoele, and paralysis of the recurrent laryngeal nerve mistakenly connected with the thyroid lesion, whereas it was an early manifestation of a metastasis at the base of the skull. The possibility of these sudden goitrous enlargements, when they coincide with a cancer arising from another site and are accompanied by cervical lymphadenopathy or paralysis of the recurrent laryngeal nerve, being mistaken for thyroid cancer cannot be too strongly stressed.

There remain in this group, then, only 24 cases of actual thyroid cancer, clinically typical, and eight of which also had paralysis of the recurrent laryngeal nerve. Of the 24 cases, 23 had a strictly unilateral tumour and lymphadenopathy.

In six cases the lesion was a recurrence of a thyroid cancer incompletely operated upon from three weeks to 45 years previously; five times out of six the recurrence was situated on the same side as the original lesion.

In 12 cases of thyroid tumour the malignant nature of the growth was signified by the existence of remote metastases. In eight cases there were bone metastases, in one of them situated in the fourth dorsal vertebra and giving rise to paraplegia, in one in the second lumbar vertebra with signs of increased density of bone, and in three in the sterno-clavicular area; in two cases there were pulmonary metastases, in one case ocular metastases, and in one diffuse lymph-node metastases. Surgical intervention was decided upon in 10 of the cases following the teaching of Léon Bérard that the presence of distant lesions does not necessarily contraindicate a radical operation on the thyroid itself. The other two cases were subjected to total thyroidectomy. The opposite lobe, even if healthy or merely adenomatous, was always removed, so that fixation of radioactive iodine by the metastases could be attempted.

In four cases what appeared to be a primary tumour of the neck was present; in three of these an attempt at concentration of radioactive iodine by the growth was unsuccessful. In three of the cases an exploratory incision showed that in each case the lesion was a lymphadenopathy secondary to a small cancer of the thyroid lobe in the early stages and of papillary type. The fourth case was even more unusual, the lesion consisting of a large neoplastic mass developing in the internal jugular vein following the irruption of a tumour in the median thyroid vein; the lobar lesion was detected only during the operation.

In one case there was a tumour of the mediastinum, which was detected only after the appearance of a left cervical lymphadenopathy and which had proved resistant to radiotherapy. This case necessitated a sternotomy in order to remove the primary lesion, and wide dissection of the neck.

In one case a large infected ulcerated tumour of the neck, including the vessels, had completely replaced the right thyroid lobe.

In one case there was an apparently idiopathic paralysis of the recurrent laryngeal nerve. After numerous clinical examinations a small, deep-seated, hardly perceptible papillary cancer was found situated close to the left side of the trachea (Special Plate, Fig. 1).

Finally, in one case there was a suspicious-looking goitre with cervical lymphadenopathy coexisting with a breast cancer. The latter had been surgically removed and histologically confirmed. Biopsy of a cervical lymph node and exploratory dissection of the neck led to the detection of a papillary cancer of the thyroid.

Types of Lesion

Histologically, there is a substantial number of papillary and of orthoplastic pleomorphic epitheliomata, as is shown in Table I. There are a few rare types of sarcoma, as a plasmocytoma and an osteosarcoma (Table I).

It may be of interest to note the number of cases in which the surgical specimen showed invasion of the venous lumina—that is, in which this was not merely apparent histologically. It has already been shown that in one case the first pathological finding was a tumour in the internal jugular vein, which proved to be an orthoplastic pleomorphic cancer. In another case the endojugular tumour contained partly calcified arteries opening into the venous circulation. This was a cancer with clear Hürthle cells (Special Plate, Fig. 2).

Lymph-node invasion is very common; it is a constant finding in case of papillary and of anaplastic cancer (Plate, Fig. 3). As has already been pointed out, this was the most

TABLE I.—*Pathological Findings in 50 Cases of Thyroid Cancer Treated with Radical Thyroidectomy*

Histological Types	No. of Cases	With Venous Invasion	With Lymph node Invasion
Orthoplastic epitheliomata	32	8	25
Vesicular	1	0	1
Trabecular	6	1	4
Papillary	10	2	9
Hürthle-cell	2	2	2
Pleomorphic (trabecular, vesicular, papillary)	13	3	9
Anaplastic epitheliomata	9	1	9
Malpighian epithelioma ..	1	0	1
Sarcomata	8	3	5
Histiocytoma	3	1	3
Haemangiosarcoma	2	0	0
Osteosarcoma	1	0	1
Lymphosarcoma	1	1	1
Plasmocytoma	1	1	1
Total	50	12	40

frequent indication for the radical operation. The figures cited in no way prejudice those for actual invasion by thyroid cancer, since the cases dealt with here are selected ones. A curious finding in a case of orthoplastic pleomorphic epithelioma was the existence of an apparent lymph-node enlargement which was in reality a fibrocytoma of the neck.

Finally, although histological invasion of the sterno-thyroid musculature is common, we saw in one case a nodule of growth in the posterior belly of the digastric muscle (Plate, Fig. 4).

The incidence of involvement of the recurrent laryngeal nerve has not yet been determined—the frequent finding of a recurrence at the site of previous trauma having clouded our judgment in this respect. On at least three occasions involvement of the nerve at its point of entry into the larynx instead of where it crosses the inferior thyroid artery was unexpectedly encountered.

Results

On the whole results (Table II) are encouraging: 16 out of 34 patients were alive after three years, 11 out of 29 after five years, and 4 out of 18 after 10 years. More detailed

TABLE II.—End-results at 3, 5, and 10 Years After Operation

Histological Types	Total Cases	At 3 Years		At 5 Years		At 10 Years	
		No. of Cases	Alive	No. of Cases	Alive	No. of Cases	Alive
Orthoplastic epitheliomata	32	21	16	18	11	10	4
Vesicular	1	1	2	1	0	1	0
Trabecular	6	3	2	3	1	1	0
Papillary	10	6	4	4	3	3	1
Hürthle-cell	2	2	1	2	1	0	0
Pleomorphic (trabecular, vesicular, papillary)	13	9	8	8	6	5	5
Anaplastic epitheliomata	9	6	0	5	0	3	0
Malpighian epithelioma	1	1	0	1	0	1	0
Sarcomata	8	6	0	5	0	4	0
Total	50	34	16	29	11	18	4

analysis shows that the results are disastrous as regards anaplastic cancer or sarcoma, and that only in cases of orthoplastic papillary or pleomorphic cancer, with relatively slow spontaneous enlargement, is there a possibility of long-term survival.

Out of the 12 cases in which there was invasion of the venous channels, seven patients were followed up for five years or more, and only three survived. This fact is extremely important, because, although two of these surviving patients were not free from eventual metastases or recurrences, one survived for eight and a half years before dying from intercurrent disease (cardiopathy).

Among the 12 patients operated upon in spite of metastases, there was one survival of four and a half years—a case of trabecular cancer with paraplegia due to metastasis

in the fourth dorsal vertebra. Radiotherapy following thyroidectomy enabled the patient to walk for two years. Another patient is alive after three years, and two others have survived two years. There is one recent cure (six months). In two cases subjected to total thyroidectomy in order to assist concentration of radioactive iodine the metastases continued inactive, though in the more favourable case of the two the patient did not survive beyond 18 months.

The failures are represented by the following.

(a) *Post-operative Deaths*.—There were three post-operative deaths: one from acute pulmonary complications on the fourth day; one from acute mediastinitis; and one after a sudden rise in temperature on the fifteenth day, probably due to a serious hormonal disturbance, since a similar episode on the eighth day had responded strikingly to A.C.T.H. therapy.

(b) *Recurrences and Early or Late Metastases*.—All patients with sarcoma had an early recurrence and died within a year. In the case of malignant plasmocytoma there was an unmistakable diffuse recurrence of the tumour on the upper lip; in that of osteosarcoma the recurrence was mainly confined to the oesophagus.

In the two cases of haemangio-endotheliosarcoma death was due to intracranial metastases. In one case these occurred at the level of the sclerotic before the operation, and continued with meningeal localization. In the second case they were also meningeal. At the fifth month the patient sought advice for a so-called "wen" of the scalp, corresponding to a loss of tissue from the vault of the skull. This was noted clinically but not controlled radiographically. The tumour consisted of blood-clot containing red cells. A few days later death occurred from meningeal haemorrhage. One of the characteristics of this type of lesion is that it gives rise to haemorrhagic metastases.

The three cases of histiocyte-sarcoma terminated in rapid death within two to three months, from cerebral metastases with acute intracranial hypertension in one case, and from mediastinal recurrence in the others. The outcome was similar in the case of lymphosarcoma.

The only case of Malpighian epithelioma also suffered local recurrences, which appeared very early in the trachea and oesophagus. This introduces the highly controversial question of the origin of these lesions; thus the growths in the trachea and oesophagus may themselves have been primary lesions. As early as 1913 Herrenschiidt referred to forms with tracheo-oesophageal invasion.

All the cases of anaplastic epithelioma had recurrences or rapid metastatic spread. In actual fact two cases out of six which had been followed up for more than three years already had metastases at the time of operation. In one recent case, in which death occurred within six months, there was an extremely painful calcifying metastasis in the second lumbar vertebrae. A radical thyroid operation, perhaps owing to the effect on the parathyroid glands, completely relieved the pain.

In cases of orthoplastic epithelioma the frequency of recurrence and of metastasis was much more varied, and long periods of survival have been, and still are being, noted.

In the one case of vesicular cancer in this series the radical operation did not prevent serious recurrences four years later. This does not indicate the real period of survival, as in this case the first operation for goitre was performed 45 years earlier, and two recurrences had already been operated upon.

Among the three cases of trabecular cancer, the patient with paraplegia due to metastasis in the fourth dorsal vertebra survived 4½ years after radical thyroidectomy. In the case of endothoracic tumour, stripping the growth from the vena cava was most difficult. In spite of favourable radiographs,

investigation of the mediastinum with radioactive iodine showed that active foci persisted. Death occurred after 2½ years, post-mortem examination revealing a malignant bud in the vena cava (see Figs. A and B; also Special Plate, Fig. 5).

In the six cases of papillary cancer the results were good. Nevertheless there were two deaths in the first three years due to pulmonary metastases. One of these two cases is interesting in that both lobes of the thyroid were involved from the outset. It was felt that the total thyroidectomy carried out in two stages accelerated the development of diffuse pulmonary metastases. In a further case there was a delayed recurrence; the patient had already been operated upon for a recurrence after partial thyroidectomy nine years previously. Another recurrence took place more than five years after the radical thyroidectomy, and since the patient was elderly and the lesion, which was adherent to the clavicle and to the veins at the base of the neck, appeared inoperable, it was decided to tie the arteries supplying the opposite lobe and give radioactive-iodine treatment. This was found to be impossible, however, as the suppression of thyroid function resulted in a severe reactivation of the local recurrences, which had remained dormant for 14 years.

In the two cases of Hürthle-cell tumour, in both of which venous invasion had been found, there was one failure due to the occurrence of pulmonary metastases at the sixth month.

Among the nine cases of pleomorphic cancer, in which it was impossible to decide whether the growth was predominantly vesicular rather than trabecular or papillary, there were few failures. Only one patient died of cancer; he had bone metastases at the time of operation, and concentration of radioactive iodine was unobtainable in spite of total thyroidectomy. This case may be added to the other, more recent, case not included in these follow-up results and already referred to.

There was one case of recurrence five years after radical thyroidectomy and ending fatally 6½ years later from mediastinal pulmonary metastasis. This, again, is a case in which operation for a recurrence was needed 16 years after an initial partial thyroidectomy and five years after reoperation for a first recurrence. As with the papillary form of cancer, local recurrence after radical thyroidectomy has always occurred on the side operated upon, in the scar, and never on the opposite side.

Finally, one patient died after ten years from diffuse bone metastases which for four years were successfully treated with radioactive iodine. He had had a left radical thyroidectomy and complementary radiotherapy. In this case there had never been a local recurrence, but six years later a functionally active right acromioclavicular metastasis developed which concentrated the isotope spontaneously. This phenomenon was utilized several times in order to treat the bone lesion.

These, then, are the actual results of radical thyroidectomy. There was never any question of complementary

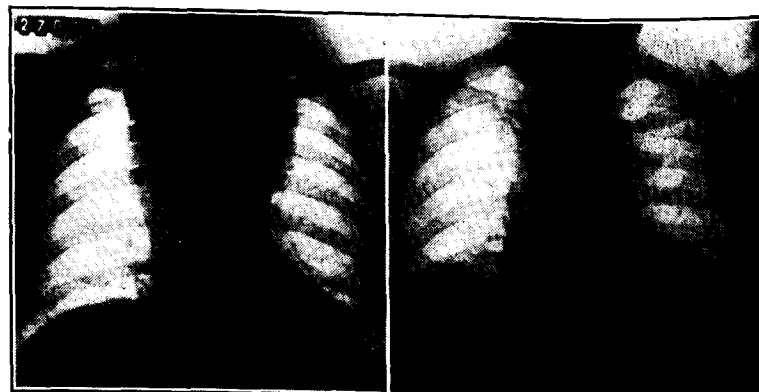


FIG. A.—Radiograph showing mediastinal thyroid tumour.

FIG. B.—Same case as Fig. A, one year later.



FIG. 1.—Case 1: Radiographs of pelvis—(a) July 31, 1952; (b) December 17, 1953. Early signs of Looser's zones present in (a). These have progressed, leading to deformity, in (b), where some callus reaction due to recent treatment is visible.

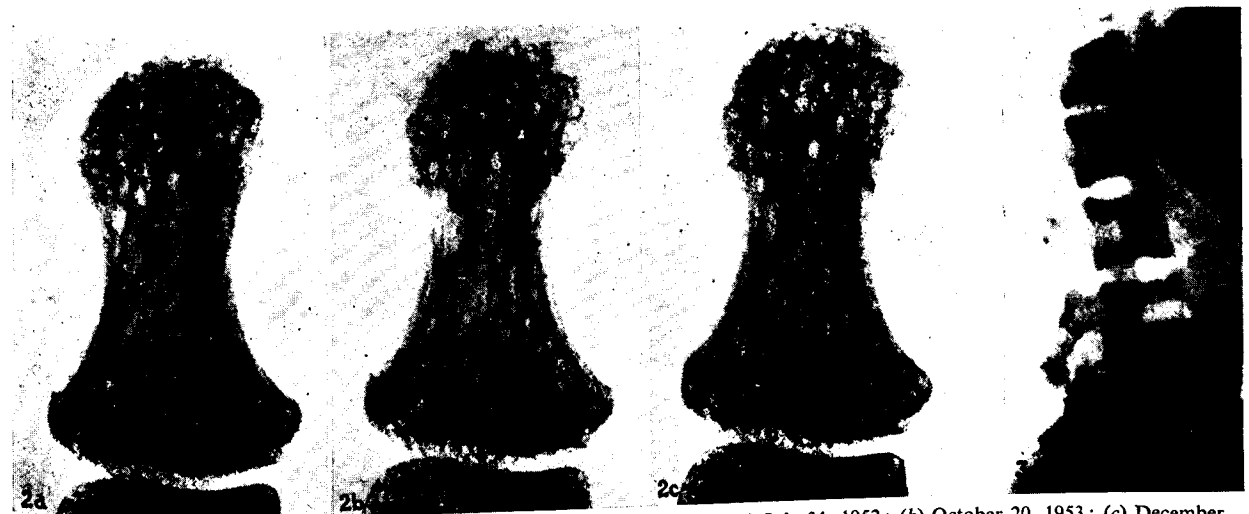


FIG. 2.—Case 1: Radiographs of terminal phalanx of right middle finger—(a) July 31, 1952; (b) October 20, 1953; (c) December 25, 1953. Note erosion of terminal tufts so highly characteristic of hyperparathyroidism. This gets much worse from (a) to (b) while disease was spontaneously progressing. In (c) tuft has re-formed to show sharp outline, corresponding to short period of calciferol treatment.

FIG. 3.—Case 1: Radiograph of lumbar vertebrae on December 17, 1953, showing marked biconcavity due to osteomalacia and increased density of upper and lower margin of each vertebral body, giving appearance of horizontal stripes—"rugger-jersey sign."



FIG. 4.—Case 2: Radiograph of chest on January 3, 1955. Note small thoracic calcifications, drooping clavicles, winged scapulae. Appearance very similar to case of proved lifelong steatorrhea shown as Fig. 5 in paper of Dent and Hodson (1954).

FIG. 5.—Case 2: Radiograph of pelvis on January 2, 1956. Note deformities of osteomalacia of fairly long standing. Looser's zones, present in pubic rami in January, 1955, now rapidly healing.

Figs. 6 and 7 overleaf



FIG. 6.—Case 2: Radiographs of index finger of right hand—(a) January 3, 1955, typical of its appearance throughout time hyperparathyroidism was operative; (b) February 3, 1956, two months after removal of parathyroid tumour. Note marked refilling of subperiosteal erosions and beginning re-formation of tuft of terminal phalanges. Improvement still continuing. FIG. 7.—Case 2: Radiograph of skull on January 3, 1955. Note typical fuzzy appearance of hyperparathyroidism. This was maintained till the second operation, two months after which it started to regress.

M. DARGENT: RADICAL THYROIDECTOMY FOR CANCER OF THYROID

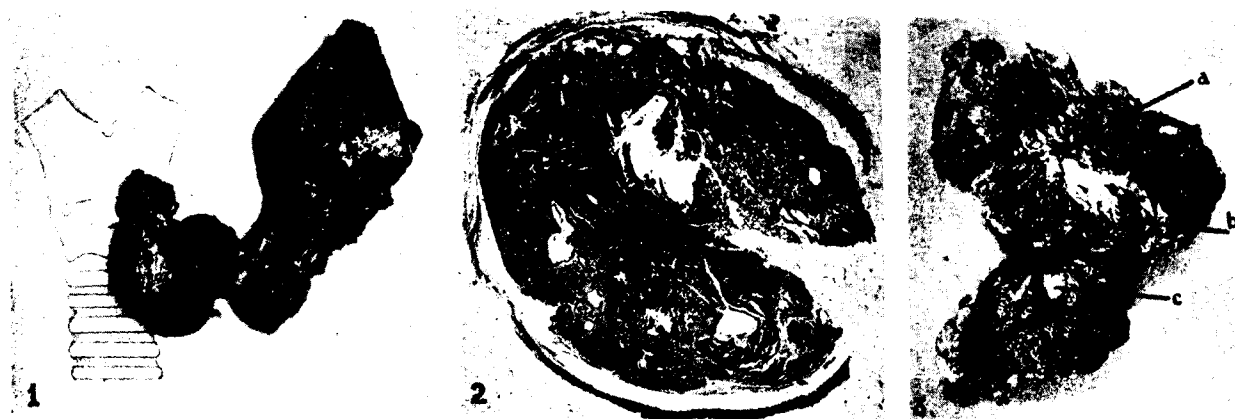


FIG. 1.—Specimen removed at radical thyroidectomy for small deep-seated cancer adherent to trachea with apparently idiopathic paralysis of recurrent laryngeal nerve. (Three-quarters size.) FIG. 2.—Low-power view of section of internal jugular vein filled with a tumour bud with calcified arteries. (Patient cured eight years.) FIG. 3.—Predominantly papillary micronodular cancer; cervical lymphadenopathy; venous invasion. a, lymphadenopathy; b, endojugular bud; c, tumour nodule. (Half size.)



FIG. 4.—Specimen removed at radical thyroidectomy with total laryngectomy for cancer, showing infiltration of muscles. a, left lobe; b, passive congestion; c, laryngeal mucosa; d, tumour nodule in omohyoid. (Half size.) FIG. 5.—Operative specimen from same patient as Figs. 4 and 5 in text. a, cervical lymphadenopathy; b, mediastinal tumour. (Half size.)

radiotherapy, but it was applied as a routine to the scar whenever there was lymph-node invasion. In the unfavourable cases it did not, however, prevent local recurrence.

Conclusions

Radical thyroidectomy has limited indications. Its elective indication is papillary or pleomorphic orthoplastic cancer of slow evolution and with cervical lymphadenopathy. In such cases it is the operation of choice and gives the possibility of a ten-year cure without recurrence. Where recurrence follows a partial thyroidectomy the radical operation should still be attempted even if it is necessary to sacrifice the carotid artery or a nerve, as has sometimes happened in cases of recurrence of papillary cancer. It should be noted that, as in the case of other relatively slow-growing cancers, there may be a fresh local recurrence in the scar.

The indication for bilateral radical thyroidectomy seems to be a particularly clear one. The sudden suppression of thyroid function, in spite of compensatory medication, does not prevent metastasis or local recurrence. Where the operation has been aimed at inactivation of the metastases it has not been successful.

It is precisely to those forms of cancer which are already metastasizing but are still limited and growing slowly that this operation can be applied, leaving intact the healthy thyroid lobe, with complementary radiotherapy and with irradiation of any metastasis or, where possible, its removal. The results of such treatment are more encouraging than those of total thyroidectomy. *A posteriori*, it is true that with some anaplastic cancers or sarcomata it has proved useless. Punch biopsy of the thyroid gland is too risky, though it may be carried out tangentially where the tumour is large, but then only rarely. Where there is a definite sarcoma it is better to abstain from surgery altogether or to limit it to a partial operation in order to free the trachea or oesophagus. But since in such cases radiotherapy is disappointing. But in other cases, even if radical thyroidectomy only serves as a palliative operation to free the respiratory and digestive tracts, it would still be worth while.

Only one point remains to be discussed: Should the operation be proposed as a matter of principle? *A priori*, the answer is No, since it would be necessary to confirm that every simple nodular goitre was malignant before dissection of the neck could be performed systematically. But when after a partial thyroidectomy for goitre it is learned that a cancer has been removed, early reoperation on the carotid sheath should be considered. Such an attitude does not often appear to be tenable, although the operation would certainly be of great value in such forms as papillary cancer. Even if it is carried out without delay after strumectomy it would still lose its character of an operation *en bloc*.

The psychological state of the patient must also be taken into account. A patient with cancer of the buccal cavity will more readily accept removal of affected lymph nodes as a matter of course, after radium treatment, than will a patient who has just been operated upon for what he had thought to be an ordinary goitre and who, a fortnight later, is asked to submit to another operation. That is why, on the whole, an expectant policy is more often adopted after subtotal thyroidectomy for early thyroid cancer. If during the operation examination by frozen section shows the existence of a

malignant lesion, a total extracapsular thyroidectomy with dissection of the recurrent laryngeal nerve should be carried out, but to subject a patient without warning to the mutilation following a block dissection of the neck is not to be advised. Here again it may be better to adopt a policy of "wait and see," particularly if probing of the carotid sheath with the finger reveals a suspicious nodule. But for the other varieties—lesions in the earliest stage, of the nodular type, operated upon for a simple goitre—this extensive prophylactic operation is not to be recommended.

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DISSECTION OF AORTA AS A COMPLICATION OF TRANSLUMBAR AORTOGRAPHY

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Percutaneous lumbar aortography introduced by dos Santos, Lamas, and Pereira Caldas in 1929 has become established as a procedure of proved value, particularly in the investigation of vascular and renal conditions. Complications, some fatal, were soon reported, and were partly responsible for the delayed acceptance of aortography in Great Britain and the United States of America. Although the nature of the contrast medium (100% sodium iodide) was responsible for some of the complications in the early cases, it was soon found that complications occurred even when less toxic substances were used.

Complications usually resulted from the injection of the whole or greater part of the contrast medium into a visceral branch of the aorta, resulting in damage to the organ supplied by the vessel, occasionally associated with thrombosis of the vessel itself. The more serious complications include gangrene of gut from superior or inferior mesenteric arterial thrombosis (Wagner and Price, 1950; dos Santos, 1955), anuria and renal necrosis from injection into renal arteries (dos Santos, 1955), hypertension with retinopathy (Miller, Wylie, and Hinman, 1954), acute pancreatitis from injection into the coeliac axis (Robinson, 1956), paraplegia (Boyarsky, 1954), rupture of the aortic wall (dos Santos, 1955), and chylothorax due to damage to the thoracic duct (Maluf and McCoy, 1955).

We wish to describe a complication—aortic dissection—in which a part or the whole of the contrast medium is injected into the media of the aorta causing a dissection (of the aorta) analogous to a spontaneous dissecting aneurysm and giving rise to a characteristic

radiographic picture. This complication is important for three reasons. It may give rise to misinterpretation in diagnosis if its true significance is not appreciated; there may be serious sequelae; and it may occur in spite of the most scrupulous technique. Furthermore, we believe that this event is not uncommon and that it offers an explanation for some of the complications of aortography usually ascribed to arterial thrombosis or to the direct toxic effect of the contrast medium.

Technique of Aortography

The technique of aortography, as used in the following cases, is described here, as it is relevant to the discussion.

Endotracheal general anaesthesia is used and the patient is placed prone on a simple cassette tunnel. A metal marker is placed on the skin over what is judged to be the spine of L1, and this is checked by a control radiograph. The aortography needle used is 16 s.w.g., 18 cm. long, and has a short bevel. A two-way tap, one opening of which is connected to a syringe containing heparin saline, and the other by means of "polythene" tubing to the syringe containing the contrast medium, is attached to the hilt of the needle. At a point about an inch (2.5 cm.) below the twelfth rib a nick is made in the skin to facilitate the introduction of the aortography needle. The needle is then inserted and directed upwards and medially towards the twelfth dorsal vertebra. After striking the vertebral body the needle is redirected in a more anterior plane until the aorta is encountered. The needle is then slowly advanced until a free reflux of blood enters the syringe containing heparin saline. No contrast injection is made unless this free reflux of blood continues after a trial injection of saline. The two-way tap is then turned so that the needle is connected to the contrast medium, when blood is seen to pulsate freely back along the transparent polythene tube. If this free reflux of blood continues it is assumed that the bevel of the needle is within the lumen, respirations are arrested by the anaesthetist, and the contrast medium is injected. In an adult approximately 30-40 ml. of 70% diodone is injected in three to four seconds by a manually operated pressure pump. The first radiograph is exposed when two-thirds of the contrast medium has been injected, and four further films are taken in the subsequent 10 to 12 seconds by means of a simple hand-change cassette tunnel.

Case 1

A 58-year-old man was admitted to hospital complaining of pain in the right calf precipitated by walking a distance of half a mile and relieved by rest. The patient occasionally experienced coldness and tingling in the toes of the right foot. The symptoms had been present for a year and had become progressively worse. The past history was non-contributory.

Examination of Lower Extremities.—There were no obvious nutritional skin changes in the foot and no appreciable diminution of skin temperature. A systolic bruit was audible over the right external iliac artery immediately above the inguinal ligament.

Pulses	Right	Left
Femoral	Present but diminished	Present
Popliteal	Doubtful	Present
Posterior tibial ..	Absent	Present
Dorsalis pedis ..	Absent	Present

A clinical diagnosis of partial occlusion of the right iliac artery secondary to atherosclerosis was made.

A percutaneous lumbar aortogram showed a picture superficially resembling thrombosis of both common iliac arteries (Fig. 1). This was clearly incompatible with the clinical condition, since both femoral pulses were palpable, although the right was slightly diminished. In addition, it was noted that the radiographs showed no evidence of any significant collateral vessels—a feature so striking in a

complete thrombosis of the aorta (Fig. 2). We were forced to the conclusion that an intramural injection of contrast medium had given rise to this unusual radiographic picture.



FIG. 1.—Case 1. Aortogram showing complete arrest of the contrast medium at the bifurcation resembling bilateral common iliac thrombosis. Note the absence of collateral vessels. Compare with Fig. 2.

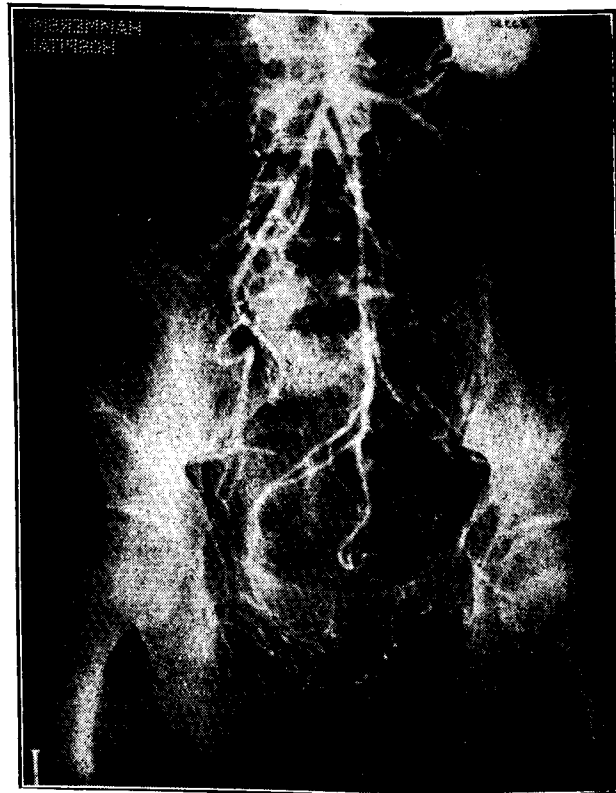


FIG. 2.—Case 1. Aortogram of a complete aortic thrombosis showing numerous collaterals. For comparison with Fig. 1.

Apart from severe backache which lasted for 24 hours there were no sequelae. There was no alteration in the peripheral pulses.

Case 2

A 62-year-old man was admitted to hospital complaining of severe pain in the right calf and thigh after walking a distance of 30 yards, which was relieved by rest. A year previously tenotomy of the right tendo Achillis had been performed with only temporary relief of pain. There were no obvious nutritional skin changes or muscle wasting in either limb. Systolic bruits were audible over both femoral and external iliac arteries, but were more pronounced on the right side.

Pulses	Right	Left
Femoral	Present	Present
Popliteal	Present	Present
Posterior tibial ..	Present	Present
Dorsalis pedis ..	Present	Present

A diagnosis of occlusive vascular disease of the iliac arteries was made.

The aortogram, which was performed without difficulty, appeared to show a complete thrombosis of the left common iliac artery with diffuse atherosclerotic changes involving the right common iliac artery (Fig. 3). Once again, however, this diagnosis was incompatible with the clinical features, since both femoral pulses were readily palpable both before and after aortography. There were no sequelae.

It seemed likely that, as in Case 1, the unusual appearances had been produced by some form of "extravasation," probably an intramural injection. This impression was strengthened as a result of examining a number of fresh human aortas, in which it was found that the wall of the aorta could be easily separated into two layers by gentle blunt dissection or intramural injection of saline. The plane of cleavage appeared to be adjacent to the intima.



FIG. 3.—Case 2. Aortogram showing non-filling of the left common iliac artery simulating thrombosis. Note the oblique translucent line across the contrast column near the tip of the needle and the "double density" near the origin of the right common iliac artery.

Experiment

In order to investigate the effects of intramural injection in more detail an experiment was designed to reproduce the conditions obtaining at aortography.

An abdominal aorta, including its bifurcation, was removed from a fresh cadaver and all its branches were ligated. This aorta was then incorporated into the circuit

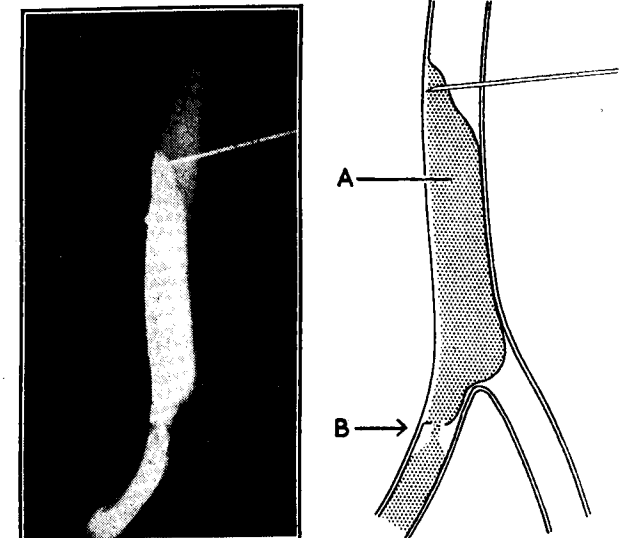


FIG. 4.—Experimental aortogram (and diagram) showing the appearances following intramural injection. Note the non-filling of the left common iliac artery, simulating occlusion of the vessel, and the jet of contrast medium entering the right common iliac artery.

of the Melrose heart-lung machine (Melrose, 1953) and blood pumped through at the same rate and pressure as occurs in the normal abdominal aorta (approximately 3,000 ml. a minute, at a pressure of 100 mm. Hg). The aortography needle was introduced into the aorta, so that the bevel of the needle lay partly within the lumen and partly within the opposite wall of the aorta. At this stage blood returned freely from the hilt of the needle. Then 30 ml. of 70% diodone was injected rapidly in three seconds by means of the pressure injection apparatus, and serial films of the "aortogram" were taken by means of a simple hand-change cassette tunnel. The experiment was repeated on a number of aortas and radiographic appearance of various degrees of intramural dissection was demonstrated. The most interesting of these experiments demonstrated the passage of the contrast medium within the wall of the aorta from the point of the needle down to the bifurcation, giving an appearance of occlusion of the left common iliac artery (Fig. 4).

This simulates exactly the appearance shown in the aortogram demonstrated in Fig. 3. A jet can be seen indicating where the contrast medium

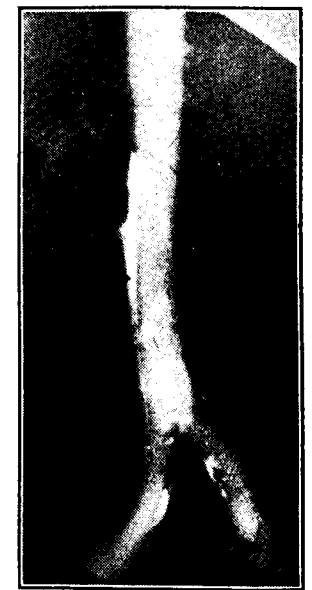


FIG. 5.—Experimental aortogram taken 12 seconds after the injection, showing that most of the intramural contrast medium has been expelled into the lumen of the aorta. A little remains in the wall (→). The irregular calcification is due to atheromatous plaques.

has re-entered the true lumen of the right common iliac artery. A film taken 12 seconds after the injection showed that only a trace of contrast medium remained in the aortic wall, the rest having been squeezed out into the main lumen by the pulsatile flow of blood inside the aorta (Fig. 5).

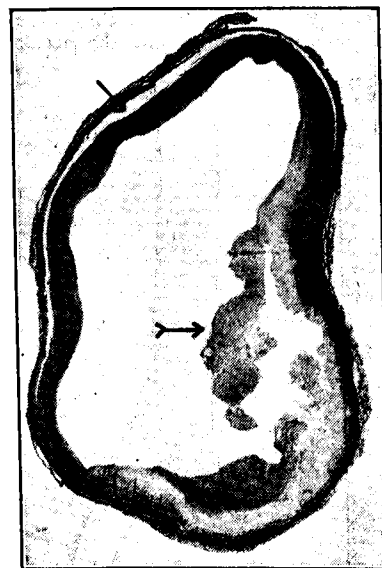


FIG. 6.—Transverse section of aorta at point A on Fig. 4. Note a dissection in the media (→) extending for two-thirds of the circumference. Atheromatous plaque (→).

The aorta was then removed from the apparatus and fixed in formol-saline. Microscopy revealed that the dissection had taken place in the media, at the junction of the outer third and inner two-thirds (Fig. 6), extending two-thirds of the way round the circumference. The tear in the intima where the contrast medium had ruptured back into the main lumen of the right common iliac artery was clearly delineated (Fig. 7). These experiments reproduced and explained the unusual appearances shown in Figs. 1

and 3, and provided histological proof of the layer in which aortic dissection takes place. Furthermore, aortic dissection affords a probable explanation of a number of complications of aortography for which no very satisfactory explanation was previously available.

Discussion

Mechanism and Possible Effects of Aortic Dissection

Ideally, during percutaneous translumbar aortography the bevel of the aortography needle should lie completely within the lumen of the aorta prior to the injection of the contrast medium. If the bevel lies partly in the wall and partly in the lumen, injection of the contrast medium will cause aortic dissection. This undesirable position of the needle cannot readily be appreciated, because blood will still flow freely from the hilt of the needle in a pulsatile stream (Fig. 8 A). Occasionally only a little of the contrast medium enters the aortic wall (Fig. 8 B) and produces an appearance as in Fig. 9. Should larger quantities be injected intramurally a progressive dissection results and the origin of small blood vessels

may be torn (Figs. 8 C and 8 D). If these small arteries are lumbar or intercostal vessels ischaemia of the cord and paraplegia may result, in the same way as has been described by Weisman and Adams (1944) in spontaneous dissecting aneurysm of the abdominal aorta. Furthermore, if the bulk of the contrast medium is injected intramurally the aortic lumen may be temporarily occluded (Fig. 8 D) and give rise to an appearance simulating thrombosis (Figs. 1 and 3).

Another way in which a major branch of the aorta may be occluded is by an extension of the dissection into the vessel itself (Figs. 8 E, F, G). An example of dissection extending from the aorta into the renal artery is illustrated in Figs. 10 and 11. This aortogram was performed for the

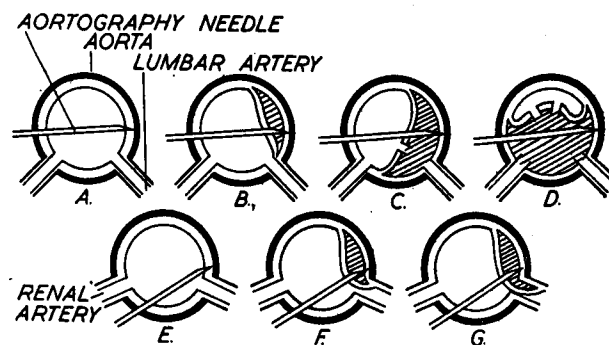


FIG. 8.—Diagram to illustrate how faulty positioning of the aortography needle (A) may result in an intramural injection and dissection of the aorta (B). A progression of this dissection may result in the tearing of the origin of small branches (C) or the occlusion of the main aortic lumen (D). Occasionally the dissection may extend into and occlude a large branch of the aorta—e.g., a renal artery (F and G). N.B.: the bevel of the aortography needle has been deliberately exaggerated for clarity.

investigation of hypertension in a patient with a non-functioning left kidney on excretion pyelogram. There was a history of severe trauma to the left loin, with haematuria several years previously, followed by recurrent attacks of left loin pain. The non-filling of the left renal artery on the aortogram was explained when left nephrectomy revealed a hydronephrotic kidney with negligible renal substance and a small atrophic renal artery.

In the past, cases of gangrene of the bowel and renal necrosis have been ascribed to the local toxic effect of the contrast medium following the injection of the bulk of the

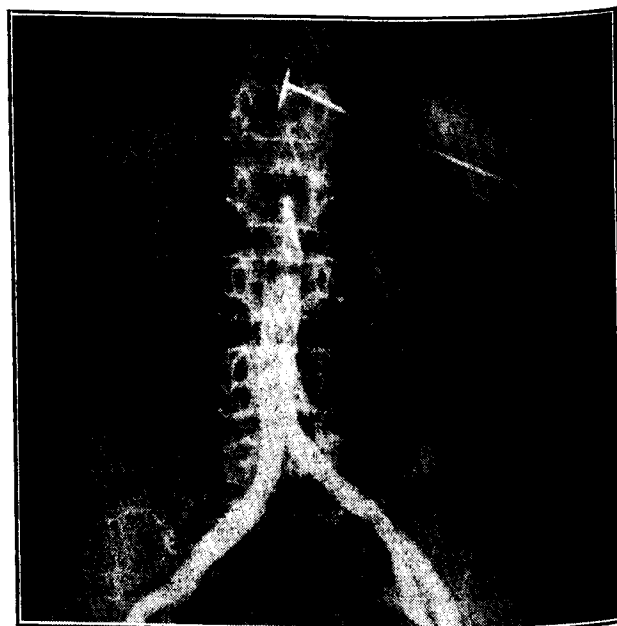


FIG. 9.—Aortogram showing minimal aortic dissection. A small quantity of contrast medium remains in the aortic wall at the tip of the aortography needle after the bulk has passed along the aorta and iliac arteries.

contrast medium into the vessel supplying the organ. This explanation is not an entirely satisfactory one, because there are numerous cases reported in the literature in which all the contrast medium has been injected into a single major branch of the aorta, such as coeliac, superior mesenteric, inferior mesenteric, or renal arteries, without any ill effects. It is more probable that in those cases in which complications have occurred part of the contrast medium

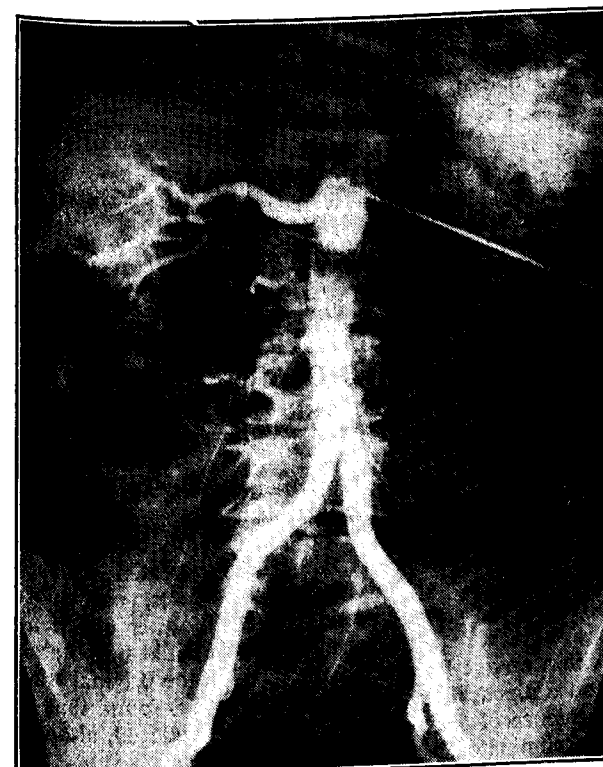


FIG. 10.—Aortogram showing dissection extending from the aorta along the right renal artery.



FIG. 11.—Aortogram taken five seconds after Fig. 10, showing retention of contrast medium in the dissection and persistent nephrogram probably due to stasis following partial occlusion of renal artery.

has entered the artery but simultaneous dissection has caused occlusion of the artery and stasis, thus allowing time for the concentrated contrast medium to exert its toxic effects on the organ.

Although we have been fortunate in that in our cases of aortic dissection there have been no serious sequelae, review of the literature reveals several reported cases in which it seems likely that dissection of the aorta has contributed towards serious complications.

Boyarsky (1954) described a case of complete motor and sensory loss below D 8 segment, occurring after aortography for demonstration of a possible aortic aneurysm. The aortogram was unsatisfactory, in that there was "uneven filling of the renal vessels, the aorta was not filled close to the point of insertion of the needle, but was outlined lower down, where it deviated to the left of the midline. The right iliac artery was filled, but the left was not," even though at clinical examination "there were no obliterative changes in the extremities." These clinical features closely resemble those described in Case 2. Boyarsky considered that the probable cause was thrombosis of the anterior spinal artery or direct toxic action of sodium acetrizate on the cord. From the description of the aortogram, however, it seems probable that aortic dissection occurred similar in type and degree to our Case 2. Some small intercostal and lumbar arteries may well have been torn and the neighbouring spinal cord damaged by interference with its blood supply, in the same way as in a spontaneous dissecting aneurysm.

Antoni and Lindgren (1949) described a case of paraplegia and paresis of the bladder and rectum following aortography. This patient later developed gangrene of the right leg, and died three months after the aortogram. The aortogram was unsatisfactory, since "contrast injection showed that only a part of the aorta down to the superior border of L 2 and vessels in the upper abdomen, became contrast-filled. The point of the needle was at the height of the inferior border of L 1. A part of the contrast medium also proved to lie perivascularly." The following morning there was complete paralysis and anaesthesia from and including the dermatomes T 12 and L 1. At necropsy three months later, the cord was completely necrotic from and including the first lumbar segment, and there were both old and fresh thrombi in the right common iliac artery. The lower intercostal arteries were dissected and examined, but it was "impossible to observe any noteworthy alterations." The cord lesions were attributed to prolonged pressure on the abdominal aorta, due to the patient lying prone with an air pillow under the abdomen—supporting Steno's experiment (Niels Stenson, 1638–86), in which compression of the abdominal aorta at the level of the renal arteries in rabbits produced motor sensory paralysis of the lower part of the body. In view of the technically unsatisfactory aortogram with some contrast medium lying perivascularly, it seems more likely that damage to the cord resulted from aortic dissection and consequent interference with the blood supply of the spinal cord. Unfortunately there was no record of the microscopical appearance of the aorta or its branches.

Dos Santos (1955) quotes a case in which intra-adventitial injection of the whole dose of 100% sodium iodide (100 g. salt in 100 ml. of solution) was followed a week later by death due to rupture of the aortic wall. The radiograph showed an extravasation which outlined the contour of the aorta up to the thorax. By description this rupture may well have resulted from intramural injection causing medial dissection and a local necrosis of the aortic wall. Unfortunately microscopical confirmation is not available.

Smith, Rush, and Evans (1951) described a case in which contrast medium was injected into the wall of the aorta and the patient died 24 days later, owing to "cardiac failure from arteriosclerotic hypertensive disease." The published radiograph shows dissection extending along one renal artery into the base of the other. They state that at necropsy "the aortic wall and peri-aortic area were without abnormality," but it should be remembered that the necropsy

was carried out at least 24 days after the injection, and unfortunately there is no report of microscopical examination.

Miller, Wylie, and Hinman (1954) described a case in which aortography was followed by severe hypertension (B.P. 230/120) with retinopathy. Aortography revealed "peri-aortic extravasation" and direct injection into the right renal artery. An examination of their published radiograph, however, shows strong evidence of aortic dissection which extends into the left renal artery. The right renal artery is unfortunately obscured by the peri-aortic extravasation of contrast medium. Excretion urography showed a non-functioning right kidney, but six weeks later both kidneys gave normal urograms and the blood pressure had returned to the former normal level (140/90). The sudden development of hypertension in this case was presumably due to renal ischaemia, the result of dissection along a renal artery producing a Goldblatt type of renal lesion.

The difficulties of ensuring that the whole of the contrast medium is injected into the lumen has been commented on by many authors, some of whom have adopted other techniques. Fariñas (1941) exposed the femoral artery and passed a catheter up into the aorta. Peirce (1951) and Lindgren (1953) introduced a technique involving percutaneous puncture of the femoral artery with a trocar and cannula, through which a polythene catheter was passed. Seldinger (1953) devised the technique of catheter replacement of a trocar.

Concerning percutaneous translumbar aortography, Lindgren (1953) has pointed out that even if a trial injection of a small quantity of contrast medium shows it all in the lumen of the vessel, some may nevertheless be injected paravascularly during the main injection. Several factors may be involved. If the injection is made with great force, purely mechanical displacement of the needle in relation to the aortic wall may occur, or the rapid injection of a very hypertonic solution may stimulate and cause contraction of the vessel, with the result that the needle tip, if close to the wall, may be displaced into its substance. Aortic pulsation and uncontrolled respiratory movement are further possible causes for displacement of the needle-tip during aortography.

Although a trial injection of a small quantity of contrast medium appears to be an additional safeguard, it should not be forgotten that there is an inevitable delay of three to five minutes for the development of the radiograph. During this time respirations must be resumed and displacement of the needle-tip may occur.

Another device which has been used to avoid intramural injection is a needle with a sealed end and two lateral openings. It is conceivable, however, that when such a needle is inserted obliquely into the aorta, while one orifice may be well in the lumen of the aorta and allow free reflux of blood, the other may lie within the wall so that subsequent injection may cause some dissection, though it is likely to be less than with an orthodox needle.

Conclusion

Fatal complications following percutaneous lumbar aortography are still being reported, in spite of refinements of technique and the exercise of great care. From our experiments it seems likely that aortic dissection could account for a number of these fatal complications. From examination of published radiographs we are convinced that minor degrees of aortic dissection are quite common, although not commented on by the authors, perhaps because the significance is not appreciated.

Summary

A complication of aortography—aortic dissection—is described in which a part or the whole of the contrast medium is injected into the media of the aorta.

Experimental evidence is produced which explains the mechanism of this aortic dissection and demonstrates that this complication is analogous to a spontaneous dissecting aortic aneurysm.

This complication is important for three reasons. It may give rise to misinterpretation if its true significance is not appreciated, since it may closely simulate arterial thrombosis. There may be serious sequelae. It may occur in spite of the most scrupulous technique.

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COMPARISON OF TETRACYCLINE WITH CHLORTETRACYCLINE IN TREATMENT OF PNEUMONIA

REPORT FROM THE CITY GENERAL
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The effectiveness of chlortetracycline ("aureomycin") is well established in the treatment of pneumonia. The Medical Research Council report (1951) indicated, however, that a proportion of patients treated with the antibiotic develop unpleasant side-effects, particularly affecting the gastro-intestinal tract. Further experience showed that satisfactory blood levels could be obtained with a dosage lower than that used in the original trials, and Finland, Grigsby, and Haight (1954) found that the incidence of toxic effects was thereby reduced, although not eliminated.

Reports from America by Finland, Purcell, *et al.* (1954) and Wood *et al.* (1954) suggested that tetracycline, closely related in its chemical structure to chlortetracycline and oxytetracycline ("terramycin"), might have certain advantages over them in that it was claimed to possess greater chemical stability and lower toxicity in a dosage producing effective blood levels. This has been confirmed by McCorry and Weaver (1955) in this country.

An opportunity arose to study the behaviour of two of the tetracycline group of drugs, tetracycline and chlortetracycline, in cases of clinical pneumonia, and the purpose of this paper is to record the response obtained in a controlled trial, with special reference to drug toxicity.

Methods

The procedure followed that outlined in the M.R.C. report (1951), in which this hospital also participated.

Type of Case.—All patients admitted with clinical pneumonia to the adult medical wards of the City General Hospital, Sheffield, were included in the series, with the exception of (1) those aged 70 years or more, (2) those already convalescent, (3) those in whom the pneumonia was associated with heart failure, and (4) those who had received treatment with an antibiotic or a sulphonamide for longer than the 24 hours preceding admission. To confirm the diagnosis a chest radiograph was taken as soon as possible after admission. In a number of cases this showed the initial clinical diagnosis to be incorrect, and these cases

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were subsequently excluded. Those patients who were judged to be so ill that they were not expected to survive for 24 hours were designated "desperately ill."

Dosage.—Two groups were established. (1) Tetracycline: Each patient received orally 0.5 g. in capsule form every six hours for three days, and subsequently 0.25 g. every six hours until it was considered safe to stop treatment. Intravenous administration was restricted to patients who were desperately ill, except for a few others in whom an initial high blood level seemed desirable. The dose in either instance was 0.5 g. (2) Chlortetracycline: Dosage as for tetracycline. The physician was at liberty to alter the treatment at any time if it was felt that this would be in the patient's interest.

Allotment to Treatment Groups.—One series of cards were prepared, half of which bore the word "tetracycline" and the other "chlortetracycline," and these were placed in and numbered envelopes in random order. When it was decided on admission that a patient had pneumonia the next envelope in the series was opened and the patient allocated to the treatment group indicated on the card.

Investigations.—On admission and before starting treatment a specimen of sputum or, failing sputum, a nasopharyngeal swab was obtained for full bacteriological examination. This included injection intraperitoneally into a mouse for the isolation of pneumococci. A blood culture was also taken before starting treatment. All pneumococci isolated were typed with antisera. Paired sera were taken, one on admission and a second about ten days later. These specimens were tested for cold agglutinins and for antibodies to the viruses of influenza A and B, and of the psittacosis/lymphogranuloma venereum group, to *Rickettsia burnetii* (Q fever), and to *Streptococcus MG*. Some of these sera were also examined for antibodies to influenza C virus and to the adeno-viruses. In addition a white blood cell count was done as soon as possible.

A radiograph of the chest was taken soon after admission and repeated weekly until either it was clear or no further improvement was expected. If the radiograph was not clear when the patient was discharged from hospital, further radiographs were taken at fortnightly intervals.

Criteria for Aetiological Diagnosis.—These followed the standard procedure, which has been adequately outlined elsewhere (M.R.C. report, 1951). As the investigations were comprehensive the aetiology was seldom in doubt; otherwise it was resolved by full clinical appraisal.

Clinical Trial

Seventy-five patients were admitted to the trial, but 19 were later rejected—6 from the tetracycline group and 13 from the chlortetracycline group. Thus 56 were suitable for analysis, 32 and 24 in each group respectively.

The average total dose of tetracycline was 14 g. in 11 days (limits: 9–21 g. in 6–18 days). The average total dose of chlortetracycline was 12.25 g. in 10 days (limits: 4.5–23.75 g. in 4–17 days). One desperately ill patient received four intravenous injections of tetracycline (0.5 g. each) at six-hourly intervals at the beginning of treatment. Two seriously ill patients received a single initial intravenous injection of 0.5 g. of tetracycline and chlortetracycline respectively.

Comparability of Treatment Groups

Table I shows that the two treatment groups were comparable with regard to sex, day of illness on admission, and temperature on admission. There was, however, a higher proportion of patients aged 60 years or more in the tetracycline group. About half of the patients in each group had significant chronic chest disease. In the chlortetracycline group there was a strikingly lower proportion of patients with lobar consolidation compared with segmental involvement, as judged radiographically, than in the tetracycline group.

The commonest pathogenic organism encountered in both groups was the pneumococcus (Table II). In the chlortetracycline group the incidence of bacteraemia was lower and

TABLE I.—Comparability of Groups at Start of Treatment

	Tetracycline	Chlortetracycline
Males	20	15
Females	12	9
Age:		
Under 60 years	21	19
60 years and over	11	5
Average age	48.9	44.5
Anatomical distribution:		
Lobar	18	5
Segmental	12	17
Bronchopneumonia	2	2
Average day of illness on admission	3.6	3.0
Average temperature on admission (°F.)	101.1	100.9
Patients desperately ill on admission	2	0
Total in group	32	24

TABLE II.—Aetiology of Pneumonia

	Tetracycline	Chlortetracycline
Pneumococcus	25 (78%)	16 (67%)
Types I–VIII	20	11
Types IX–XXVIII	9	2
With positive blood culture	5	5
Types IX–XXVIII	0	0
With positive blood culture		
<i>Staphylococcus aureus</i>	3	2
<i>Friedländer's bacillus</i>	0	1
<i>Haemophilus influenzae</i>	0	1
Probably bacterial	4	4
Pneumonia with cold agglutinins	1	2
Influenza A	0	1
Influenza B	0	3
Influenza C	1	2
Adeno-viruses	0	3
Significant titres for		
Total patients	32	24

the pneumococci isolated were type IX or higher in a greater proportion of cases than in the tetracycline group. In no case was a positive blood culture obtained when the causal pneumococcus was of a higher type than type VIII. Most cases labelled "probably bacterial" were thought to be pneumococcal in that they conformed clinically to the pneumococcal pattern, but, bacteriological examination being incomplete, the aetiological agent was not identified.

It will be seen that the two treatment groups are reasonably comparable with regard to aetiology, but that the tetracycline group consisted of patients who, on the average, were slightly older, had more extensive consolidation, and were more seriously ill as judged by demonstrable bacteraemia. In addition, this group contained the two patients who were desperately ill on admission.

Results of Treatment

Table III sets out the results of treatment in the two groups. The criteria for recording a normal temperature were that it should have remained at or under 99° F. (37.2° C.) for 24 hours. Clinically the lungs were regarded as clear, either when no abnormal physical signs could be elicited or when it was thought that any residual signs were the result of associated chronic chest disease or of pleural thickening. In the same way the chest radiograph was regarded as clear either when it had returned to normal or when any abnormality was considered to represent past disease or pleural thickening.

The number of deaths and of patients who required a change of treatment were similar in the two groups. The patients who received tetracycline fared as well as those who received chlortetracycline, despite the fact that the tetracycline group contained a greater proportion of patients who were older and more seriously ill (Table III). It may be concluded that tetracycline is at least as effective as chlortetracycline in the treatment of bacterial pneumonia.

The complications of pneumonia were few in each group but affected a higher proportion of patients in the tetracycline group (Table IV). Secondary fungal infection of the lung occurred in two patients, both of whom were in the tetracycline group.

Deaths.—There were three deaths in the tetracycline group and two in the chlortetracycline group. Four of the patients had chronic bronchitis and emphysema; four were over 60, and the fifth was 59 years old; four were male and one was female. No death occurred within 24 hours of admission. One of the patients who died while receiving tetracycline had a pneumococcal bronchopneumonia complicated by pulmonary aspergillosis. Further reference is made to this case. Pneumococcal bronchopneumonia was also present in the second, but necropsy showed in addition evidence of old and recent tuberculous infection of the upper lobes. The last patient had a pneumococcal pneumonia complicated by a severe dry pleurisy and pericarditis. She was desperately ill on admission and also had Huntington's chorea, an iron-deficiency anaemia, and chronic hypertensive and ischaemic heart disease. A single intramuscular injection of penicillin was administered to her before death. In the chlortetracycline group the pneumonia was due to pneumococci in one patient and to Friedländer's bacilli in the other. The latter was given a single intramuscular injection of streptomycin shortly before death. Both cases were complicated by terminal peripheral circulatory failure, in addition to chronic chest disease.

Desperately Ill Patients.—There were two such patients; both had pneumococcal lobar pneumonia and both received tetracycline. One made a satisfactory recovery, and the other, mentioned above, died after an initial response to the antibiotic.

TABLE III.—Results of Treatment

	Tetracycline	Chlortetracycline
Total in group	32	24
Deaths	3	2
Relapses (No. of cases)	0	0
Change of drug or addition to treatment (No. of cases)	4	2
No. of cases failed (in one or more of the above categories) and excluded from analysis below	5	3
Temperature:		
No. with normal temperature after:		
3 days' treatment	19 (73%)	18 (86%)
6 " " "	22 (85%)	21 (100%)
Median day on which temperature became normal	2.5	2.2
Physical signs clear:		
No. after 15 days' treatment	17 (63%)	16 (76%)
25 " " "	20 (74%)	17 (81%)
Median day on which physical signs became normal	14.3	11.8
Radiograph clear:		
3 weeks after admission	13 (48%)	10 (56%)
6 " " "	24 (89%)	16 (94%)
Day patient up:		
No. up after 10 days' treatment	19 (73%)	12 (60%)
20 " " "	26 (100%)	19 (95%)
Median day on which patient first allowed up	9.9	9.8
Day patient discharged:		
No. discharged after 20 days' treatment	20 (74%)	18 (86%)
No. discharged after 30 days' treatment	23 (85%)	20 (95%)
Median day on which patient was discharged	15.6	15.4

In a few instances full information was not recorded. These cases have also been excluded from the above analysis.

TABLE IV.—Complications of Pneumonia After Admission

	Tetracycline	Chlortetracycline
Sterile pleural effusion	5 (15.6%)	3 (12.5%)
Empyema with lung abscess	1	0
Auricular flutter	1	0
Thrombophlebitis	1	0
Peripheral circulatory failure	4	0
Initial	1	2
Terminal	3	0
Toxic mental confusion	2	0
Initial	1	0
Terminal	1	0
Pericarditis	1	0
Fungal infection of lung	2	0
Total patients with complications	14 (44%)	6 (25%)
"treatment started" (after)	10 (31%)	5 (21%)

Change of Treatment

Apart from those patients who received treatment for fungal infections of the lungs and those who received a single dose of another antibiotic before death, two others required a change of treatment. One patient with pneumococcal pneumonia developed a lung abscess with empyema while receiving tetracycline. Open drainage was performed, but the infection was not controlled until the antibiotic had been changed to intramuscular penicillin. The other patient with bronchopneumonia due to *H. influenzae* showed no response after seven days' treatment with chlortetracycline, but made a prompt and uninterrupted recovery when intramuscular streptomycin was substituted.

All the pathogenic bacteria isolated from the patients in the trial were sensitive *in vitro* to the antibiotics used. The Friedländer's bacillus isolated from the lung at necropsy, however, had become resistant to chlortetracycline but was sensitive to streptomycin.

Toxic Effects and Other Complications of Antibiotic Therapy

The incidence of toxic effects from the antibiotic was similar in the two groups. Table V shows that they were experienced by 9 of the 32 patients who received tetracycline and by 8 of the 24 patients who received chlortetracycline. Three patients became seriously ill—one from

TABLE V.—Drug Toxicity and Other Complications of Antibiotic Therapy

	Tetracycline	Chlortetracycline
Total patients in treatment groups	32	24
" " " with toxic symptoms	9 (28%)	8 (33%)
Nausea	2 (5; 6-8)*	0
Mild	2	0
Severe	0	0
Flatulence	0	1 (4-5)
Vomiting	1 (11)	2 (1-3; 3)
Mild	1	0
Severe	0	0
Diarrhoea	3 (2-3; 6-8; 7)	2 (2-18; 2)
Mild	2 (3; 19-31)	0
Severe	1	0
Rashes	0	2 (2-5; 11-18)
Erythema	0	1 (21-24)
Urticaria	0	1
Drug fever	0	1 (11-18)
Red or sore mouth or tongue	3 (12; 14-18; 14-18)	4 (2-4; 3; 11-18; 14)
Fungal infection of lung:		
Monilia	1 (13-)	0
Aspergillus	1 (15-)	0

* Days in brackets—day 1 being day of admission.

staphylococcal enteritis, two from fungal infection of the lung; each received tetracycline. In the other cases the toxic effects were mild and treatment was not altered.

In 13 patients the effects occurred singly, in 4 they were multiple, there being no significant difference between the groups. Upper gastro-intestinal symptoms caused little discomfort. Two patients who received tetracycline had mild nausea without vomiting on days 5 and 6-8 respectively; one also had slight diarrhoea. Vomiting occurred in one patient in the tetracycline group on day 11, and in two patients in the chlortetracycline group on days 3 and 1-3 respectively. In the last case it was thought to be partly caused by coughing, as it had been present before the start of treatment.

Mild diarrhoea occurred in three patients who received tetracycline and two who received chlortetracycline. Neither staphylococci nor yeasts were isolated from their stools. The two patients with severe diarrhoea were both in the tetracycline group. In the first it occurred only on day 3 and responded to symptomatic measures; coagulase-negative staphylococci and *E. coli* were cultured from the stools. The second developed a severe enteritis with 20 loose watery stools daily on the nineteenth day after admission. He was then convalescent from pneumonia, for which he had received 15 g. of tetracycline in the first 11 days. *Staphylo-*

coccus aureus (coagulase-positive) and yeasts were present in the stools. He became seriously ill, but the condition was controlled with morphine and kaolin and a course of phthalylsulphathiazole; his diarrhoea subsided by the thirty-first day.

The three patients who developed a drug rash received chlortetracycline. In two instances it consisted of a generalized erythema, and in the third a mild angioneurotic oedema and urticaria developed; one of these patients had a moderate fever for seven days. Four patients were observed to have a red and sore tongue, and two patients complained of slight sore throat, but pharyngeal injection and tonsillar exudate was present in only one and no significant organisms were isolated from either. Another patient showed angular stomatitis.

No patient developed black tongue, scrotal irritation, vaginitis, or fungal infection of a muco-cutaneous surface. Any mental symptoms which occurred were considered to be the result of initial or terminal anoxia or toxæmia in elderly patients. No local or other adverse effects followed intravenous administration of the antibiotics.

Fungal Infection of the Lungs

Two male patients who had chronic chest disease developed fungal lung infections. Both received tetracycline and one died.

The first patient was aged 64 years. He had chronic bronchitis and emphysema and was admitted seriously ill with consolidation of the posterior segment of the left upper lobe and the basal segments of the left lower lobe. Pneumococci type III were isolated from the sputum, but blood culture was sterile. His temperature fell slowly over the first week but rose again on the eleventh day; two days later a heavy growth of *Candida albicans* was obtained from the sputum. Tetracycline was stopped and potassium iodide was administered in increasing doses. Serial radiography showed partial collapse of the left lung, but bronchoscopy revealed only excessive bronchial secretions from which *C. albicans* was grown. Potassium iodide was continued for five weeks and the disease gradually resolved, leaving residual fibrosis in the left upper lobe.

The second patient was aged 63 and had suffered from chronic bronchitis and emphysema for a number of years. He had been ill for 18 days before admission and had received sulphonamides for the first seven days, but the received improvement had not been maintained. A chest radiograph on admission showed patchy bronchopneumonia of the right upper and lower lobes. Pneumococci type XXVII were isolated from his sputum by mouse inoculation, but were isolated from his sputum by mouse inoculation, but without obvious clinical response to oral tetracycline, and serial radiographs showed progressive consolidation in the right lung and later a spread to the left lung. Chloramphenicol was substituted on the seventeenth day, and at this time his sputum was brown, later changing to black frothy mucus. Aspergillosis was suspected. His condition deteriorated despite treatment with oral potassium iodide and intramuscular pentamidine, and he died on the nineteenth day. *Aspergillus fumigatus* was isolated from the sputum two days before death, and necropsy revealed diffuse bronchopneumonic areas in both lungs with multiple small abscesses. The latter areas were shown to be lined by the fungus, which was also isolated from the spleen.

It was concluded in each instance that the fungal infection was the result of antibiotic therapy.

A further analysis of the total dose of antibiotic received by the patients who developed toxic effects showed that their average total dose was the same as the average total dose for all patients in the two groups. On the other hand, the patients who developed late toxic effects—namely, severe diarrhoea, sore tongue, and fungal lung infections—received at least the average dose and in some instances 1 to 3 g. more. Six other patients, however, received a total dose of 17 g. or more of tetracycline without ill effect.

Discussion

The treatment of pneumococcal pneumonia with tetracycline was reviewed by Dowling (1955). The response of the 132 cases reported in the literature in 1954 was generally good; deaths occurred only in the older age groups, and usually serious complicating diseases were present. The death rate of 4.7% was similar to that experienced with penicillin, chlortetracycline, and oxytetracycline. Further reports by Frei *et al.* (1955), Gruner (1955), January *et al.* (1954-5), McCorry and Weaver (1955), and Wilson (1955) confirmed these results, but in bronchopneumonia with chronic chest disease the outcome was not so uniformly satisfactory. The present trial shows that tetracycline possesses similar antibacterial activity to chlortetracycline, in the same dosage. A number of seriously ill elderly patients who also had chronic chest disease were successfully treated; deaths were confined to this group.

Putnam *et al.* (1953) found that effective blood levels of tetracycline were slow to develop in the first 12 hours of oral treatment with 0.25 g. six-hourly, whereas with 0.5 g. six-hourly they were achieved after the second dose. McCorry and Weaver (1955) showed that an early and sustained therapeutic blood level of the antibiotic could be obtained when an oral loading dose of 1 g. was followed by 0.25 g. six-hourly. In the present trial the dosage used was 0.5 g. six-hourly for the first three days of treatment, followed by 0.25 g. six-hourly, as it was thought that the poor-risk cases treated in hospital would benefit from the slightly higher blood levels thereby attained. The analysis of the results shows that this was achieved.

With this dosage the toxic effects of tetracycline and chlortetracycline were similar and occurred in a third of the patients in each group; they were severe in only three cases. It may be argued that the dosage of antibiotic was excessive for the average uncomplicated case of pneumonia, and that this accounts for the relatively high incidence of side-effects. McCorry and Weaver (1955) remarked that a variation of 3-30% in the incidence of side-effects had been noted in reports of treatment with the tetracycline analogues. They suggested that one discrepancy might be in the definition of diarrhoea. In the present trial, however, all diarrhoea consisted of frequent watery stools, and neither loose but infrequent nor bulky stools were observed. Perhaps a further source of error has been the difficulty in deciding whether to attribute the effects to the toxic action of the antibiotic or to the disease and its complications. In a number of cases they may not be disturbing enough to warrant attention, but in this report, even the most trivial of the recognized side-effects of antibiotic therapy have been recorded.

Perhaps by coincidence the one case of staphylococcal enteritis and the two cases of fungal lung infection followed tetracycline therapy. Both the latter had severe complicating chronic chest disease.

In conclusion it would seem that tetracycline is at least as effective as chlortetracycline in antibacterial activity, but it is no less likely to produce toxic effects.

Summary

Thirty-two patients were treated with tetracycline and 24 with chlortetracycline ("aureomycin") in a controlled trial of the two antibiotics in clinical pneumonia. The dosage was 0.5 g. orally six-hourly for three days, followed by 0.25 g. six-hourly in either case. Desperately ill patients received initial intravenous administration of the drugs.

The patients who were given tetracycline were slightly older and more of them had lobar consolidation and a positive blood culture than those who received chlortetracycline, but otherwise the two groups were comparable. In most cases the pneumonia was pneumococcal and about half of the patients in each group had chronic chest disease.

The results show that tetracycline is as effective as chlortetracycline in the treatment of bacterial pneumonia. Deaths were few and were confined to elderly patients with serious complicating diseases.

The incidence of side-effects amounted to about 30% with each antibiotic, although most of these effects were mild. This does not confirm the reported lower toxicity of tetracycline.

The only serious complications followed tetracycline therapy, that is, one case each of staphylococcal enteritis, pulmonary moniliasis, and aspergillosis; in the last case the patient died.

Tetracycline suffers from the same disadvantages as other broad-spectrum antibiotics and should be used only with appropriate care and consideration.

The tetracycline ("achromycin") and the chlortetracycline used in this study were supplied by Dr. A. T. Mennie, of Lederle Laboratories. Our thanks are also due to Dr. K. J. G. Milne, under whose care a number of patients were treated, and to the house-physicians and members of the nursing and technical staff of the hospital for their help.

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MANAGEMENT OF ACUTE RESPIRATORY OBSTRUCTION

WITH REPORT OF A CASE

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Acute respiratory obstruction is one of the few remaining otolaryngological emergencies with a high risk of catastrophe, and when it occurs in a small child who has previously been well the failure of treatment is tragic. The case discussed here showed certain unusual features and problems of management.

Case History

A boy aged 3 years and 5 months was admitted to hospital on September 15, 1955. He had been well until five months previously, when, following a short illness manifest by pyrexia and dyspnoea, he had shown undue dyspnoea on exercise. Several (presumptive) upper respiratory infections had occurred in the interim, and whooping-cough had been diagnosed some seven weeks before admission. He had been immunized against diphtheria about 18 months previously.

On the day of admission he had appeared quite well on rising. About 10.30 a.m. he complained of difficulty in breathing, and during a short walk severe dyspnoea developed. At mid-day his parents noticed that his colour had a "blue tint" [*sic*] and this was followed by two bouts

of convulsions. About 3.45 p.m. he would not answer his name and appeared to be unrousable. All through this period his breathing had become increasingly rapid and more laboured. There was no history of hoarseness or of a foreign body being either inhaled or swallowed.

He arrived in hospital at 4.40 p.m. He was sitting hunched forward in bed, with eyes staring and pupils fixed, and the facies anxious. He did not react to his name being spoken. Expiratory and inspiratory stridor was pronounced; dusky cyanosis was present; and there was extreme activity of the accessory respiratory muscles, with inspiratory indrawing of the supraclavicular fossae, the intercostal spaces, and the upper abdomen. The respiratory rate was 60 a minute, temperature 99° F. (37.2° C.), and pulse 160. On auscultation no inspiratory or expiratory air movements could be heard in either lung.

A tentative diagnosis of tracheobronchitis was made, but the possibility of an unsuspected foreign body with super-added infection was considered. The obstruction was thought to be low in the trachea, so that, whatever its cause, laryngoscopy and bronchoscopy were indicated in preference to a primary tracheostomy, for the latter could be performed afterwards if necessary. The child being comatose, no anaesthetic was necessary.

Operation

The fauces were normal. The larynx and the immediate subglottic area were healthy and free from obstruction. The cords moved freely. A Negus child's size bronchoscope, 5 mm. diameter, was then passed through the glottis and the laryngoscope removed. The upper trachea was normal. The lower third was pinker than usual. At the level of the carina a whitish gelatinous mass was seen, completely obstructing the right main bronchus, "riding" the carina, and all but completely obstructing the left main bronchus.

During this procedure, which was carried out rapidly, oxygen was given through the suction attachment to the bronchoscope and, intermittently, by pressure through the bronchoscope itself. One of us kept a constant watch on the radial and carotid pulses.

Cupped biopsy forceps were passed in an attempt to grasp and remove the obstructing mass. This resulted only in the removal of a small piece of very tenacious material, with no relief of the obstruction. Repeated attempts gave the same result, even with a change of forceps. The size of the bronchoscope severely limited the type of forceps used. By now the pulse was irregular and just perceptible in the carotid artery.

As the use of forceps was a failure, the largest aspirating sucker was passed, and an attempt was made to suck the mass free. This succeeded in moving it a little from the left main bronchus, but the suction was just not sufficient to lift it into the trachea and bronchoscope. At this stage, approximately five minutes after the beginning of the operation, the carotid pulse could no longer be felt. The second surgeon therefore started cardiac massage through an upper abdominal incision. He found that cardiac arrest had occurred. While the massage continued, positive-pressure insufflation of oxygen was performed through the bronchoscope, which had been pushed into the left main bronchus past the obstruction. Regular spontaneous cardiac movements began again after one minute. Inflation was continued for a further minute and then another attempt at removing the obstruction by forceps and suction was made.

With oxygenation of the left lung the child's general condition improved, and it was at this stage that he himself did most to relieve the obstruction. While suction was being applied he gave a violent cough, the force of which shot the obstructing mass into the bronchoscope, completely blocking it. The bronchoscope, with the plug, was rapidly removed and oxygen under pressure was administered through a face-mask. There was an immediate further improvement in the child's general condition. After the lungs had been

inflated for a further four to five minutes the bronchoscope, from which the fleshy mass had been removed, was again passed. The mucous membrane of the main bronchi and the carina was covered with exudate and grossly inflamed, while on the right side tenacious pieces of fibrinous exudate were adherent to the walls as low as the secondary bronchi. The exudate was removed so far as was possible, and this did not cause bleeding. The changes on the left side were similar, but not so extensive.

By now spontaneous respiration had started and both sides of the chest were moving well. The pulse was regular and of good volume and force. With the bronchoscope still in place, a tracheostomy was done through the third tracheal ring, a No. 18 Jackson tracheostomy tube being inserted. The abdominal incision was closed.

Tracheostomy was considered advisable, (1) because the bronchi still contained much exudate which had to be liquefied and aspirated, and (2) because the prolonged instrumentation added the risk of subsequent glottic oedema.

Post-operative Progress

The child was conscious on return to the ward, and it was noted that the pupillary reaction to light had returned. He was nursed sitting upright in a steam-tent. The trachea and main bronchi were aspirated through the tracheostomy tube every 15 minutes for the first 24 hours, and thereafter every half-hour. "Alevaire" inhalations through the tracheostomy tube proved very effective in liquefying tenacious bronchial secretion. Streptomycin, $\frac{1}{2}$ gr. (32 mg.), twice daily, and crystalline penicillin, 500,000 units every six hours, were given by intramuscular injection. As soon as the child was able to swallow he was allowed $\frac{1}{2}$ oz. (14 ml.) of water by mouth every half-hour, and by the end of the third day he was given a semi-solid diet.

Although dyspnoea was relieved by the operative treatment, cyanosis and tachypnoea persisted, and radiography on the second day revealed a complete left pneumothorax. This was relieved by the insertion of a No. 9 Jaques catheter through the second intercostal space anteriorly. The cyanosis and tachypnoea subsided within 24 hours, complete re-expansion of the affected lung being obtained.

Post-operative progress thereafter was uneventful. Laryngoscopy on the eighth day showed no abnormality. The tracheostomy was retained, since difficulty in clearing the bronchial secretion persisted, but antibiotic therapy was stopped. The tracheostomy tube was removed on the twenty-second day without incident, and the stoma was allowed to close by granulation.

The child was able to return home on the thirtieth day after operation. When reviewed two months later the tracheal stoma had closed and there was no evidence of respiratory distress when he undertook physical activity with other children of his age.

Histology.—"The section showed much degenerate fibrinoid material in which there were bluish staining areas of bacteria. There was much infiltration by acute inflammatory granulation tissue, in which a few multinucleate cells were seen. No evidence of neoplasm was seen."

Discussion

The site of the lesion in this case coincides with that found by Briggs and Heseltine (1952). We cannot entirely agree with their view that "removal of this (tracheal) obstruction can readily be achieved by adequate and, if necessary, repeated suction." It was both frustrating and frightening to grasp the mass "firmly," only to find small pieces coming away, the larger part remaining adherent to the bronchial wall and the obstruction unrelieved. Suction did move it a little, but the progress was too slow and uncertain, and had the patient not coughed when he did the result may well have been fatal. In these severe cases of respiratory obstruction we feel it is of the utmost importance that the cough reflex should in no way be depressed

by general anaesthesia or sprays of local analgesic. The children are easy to hold, often comatose, and, while it may seem a cruel procedure at the time, it may well be life-saving. All who have passed a bronchoscope will be acquainted with the tussic force transmitted through the instrument in expelling pus, secretion, or blood clot. P. R. Allison (personal communication) has stated that, in the complete absence of a history of aspiration, a foreign body may remain in one place in the bronchial tree for months, and not give rise to cough. If, however, the foreign body is even slightly moved with a bronchoscope or forceps it will immediately give rise to a marked paroxysm of coughing.

In every instance of acute respiratory obstruction diphtheria must of necessity be excluded. Unfortunately in the above case no bacteriological examinations were made on the secretion of the "fleshy" exudate removed. Such a diagnosis is most unlikely in view of the length of history, the report of recent immunization, the clean fauces and larynx, and the absence of bleeding beneath the exudate. However, while it is true that epidemic diphtheria in this country has not been seen for some years, there is a suggestion that the immunization rate of the population is falling (See Table). Should the trend continue, the problem of a

Immunization in the City of Leeds (From Annual Report of M.O.H. for Leeds, 1954)

Year	Population	Births	No. of Persons Receiving Immunization Against Diphtheria	Relation of Number Receiving Immunization Against Number of Live Births, as a Percentage
1948	501,900	9,234	10,338	111.95
1949	504,900	8,447	8,665	102.56
1950	509,700	8,113	7,464	92.00
1951	503,030	8,044	8,154	101.24
1952	504,800	7,740	7,456	96.30
1953	505,500	7,932	6,510	82.09
1954	507,200	7,584	6,857	90.49

series of respiratory emergencies from diphtheria may occur again; in this connexion the observation of Murray (1935), that respiratory obstruction is the only complication to be feared in *Corynebacterium diphtheriae* mitis infections, is worthy of note.

In the case described an added difficulty in diagnosis was the duration of symptoms for five months. It would seem that the original illness, some five months before admission, was an acute respiratory infection, either viral or bacterial in nature. This resulted in a tracheobronchitis, with desquamation of the mucosal epithelium which, with the inspissated secretion, was never effectively expectorated. This caused segmental and even lobar collapse, as evidenced by the continued dyspnoea and intermittent pyrexia which, with a cough, led to the diagnosis of whooping-cough. A further reinfection of the bronchial tree prior to admission led to increased secretion, loss of ciliary action, and consequent swelling of the bronchial plug(s).

In the management of acute and severe respiratory obstruction the primary aim is restoration of the airway. Diagnosis of the cause of the obstruction is of secondary concern, but a knowledge of the aetiology and site of the obstruction, often only revealed by the endoscopy, is essential for further definitive treatment. If a foreign body is found it must be removed, the lung aspirated, and any associated infection treated. If bacterial or viral infection is the cause the measures mentioned above must be employed, antibiotics and any appropriate antisera given, and the patient isolated.

The use of endoscopy prior to tracheostomy in this case, regardless of the site of obstruction, emphasizes once again the long-ennunciated view of Jackson, reiterated by Morgan and Wishart (1947). Laryngoscopy and bronchoscopy should be done first; the purpose of the succeeding tracheostomy is to facilitate the aspiration of secretions from the

bronchial tree when these cannot be effectively moved by ciliary action. The unhurried tracheostomy, with a clear airway maintained by the bronchoscope, contrasts sharply in ease of performance with the difficulty found in the congested neck of a semi-asphyxiated patient.

In any case of respiratory obstruction cardiac arrest may occur. When possible, we feel that such emergencies should be managed by "two-surgeon" teams as described above. One operator watches the carotid pulse and is prepared to undertake cardiac massage at any time, while the other concentrates on the bronchoscopic work and the continuous supply of oxygen through the bronchoscope. Oxygen under pressure should also be administered at regular intervals, using the bronchoscope as an endotracheal tube. This is of the utmost importance, and should not be forgotten by the operator who is engrossed in attempting to clear the airway.

It is stressed that time should not be wasted trying to ascertain the presence of the heart beat, either by palpation at the apex or by auscultation. The time available once arrest has occurred is very limited. Greenfield (1938), quotes Gildea and Cobb in their conclusion that cortical neurones may suffer irreparable damage from five minutes of circulatory arrest. When arrest occurs in the presence of anoxia, a much shorter period would suffice. Therefore, once the carotid pulse is no longer palpable, the chest or abdomen should be opened immediately and rhythmic cardiac massage started. In the above case a trans-abdominal approach was used, as this was the route most familiar to the surgeon concerned. It is only fair to state, however, that cardiac massage through an anterior incision in the fourth left intercostal space is no more difficult or time-consuming to perform. It is easily learnt and should be within the scope of all surgeons regardless of their specialty. The thoracic approach has the added advantage of more effective "massage," since the pericardium can be incised to get more effective compression. This also allows the surgeon to observe whether the ventricles are inert or fibrillating, for, if the latter is found, an electric defibrillator as described by McMillan *et al.* (1952) should be used.

Pneumothorax as a complication of tracheostomy and neck incisions has been well described by several authors (Macklin, 1937, 1939; Neffson, 1942; Morgan and Wishart, 1947; Reading, 1949; Michels, 1951). In the present case there were three possible causes: (1) rupture of an emphysematous bulla on the left lung when this lung was inflated during the cardiac arrest; (2) injury to the bronchial wall during removal of the secretions; and (3) mediastinal emphysema with rupture into the pleural cavity, or an extrapleural spread causing an extrapleural pneumothorax secondary to suction of air through the tracheostomy wound. This last cause is the most likely, for even with the bronchoscope in position there was a degree of obstruction still remaining in the smaller bronchi due to the exudate. At no time during the post-operative period had the tracheostomy tube slipped out of the tracheal opening—the usual cause of air being sucked into the mediastinum.

The use of alevaire almost continually for the first three post-operative days was of great help in liquefying the secretions and rendering them more easily aspirated.

Summary

A case of acute and severe respiratory obstruction and its management is described.

The cause was thought to be acute tracheobronchitis added to an already present partial obstruction, this obstruction being caused by a previous respiratory infection.

Immediate treatment by bronchoscopic aspiration and tracheostomy was given. Cardiac arrest, which occurred during this treatment, was dealt with satisfactorily by cardiac massage.

The possibility of cardiac arrest occurring in these cases is stressed and its treatment discussed. This part of the management is greatly facilitated by a second surgeon being available.

Pneumothorax as a post-operative complication is discussed.

The value of alevaire in the immediate post-operative period is mentioned.

We are indebted to Dr. E. C. Allibone, under whose care the patient was admitted, for permission to publish this report. We thank Professor P. R. Allison, Dr. G. A. W. Neill, and Mr. G. S. Seed for their encouragement and their many helpful criticisms.

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A COLORIMETRIC METHOD FOR THE DIAGNOSIS OF PHAECHROMOCYTOMA

BY

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It is well known that a patient suffering from phaeochromocytoma excretes a large amount of noradrenaline in the urine. Such urine, or an extract made from it, produces a rise in blood pressure when injected into a cat (von Euler and Hellner, 1951; Burn, 1953); in our opinion this biological method is reliable for quantitative assay (Burn, 1954). However, it is expensive, and recently there has been a dearth of suitable cats. Accordingly we have developed a chemical method of estimating noradrenaline in urine with which we have been able to diagnose two cases of phaeochromocytoma.

Method

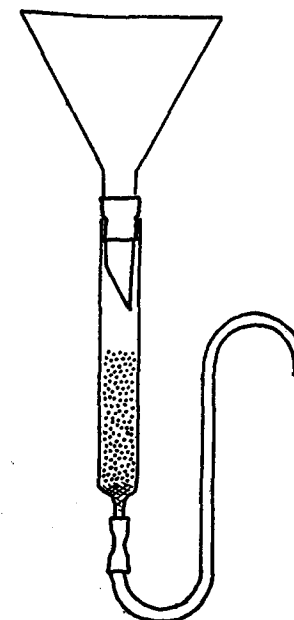
At pH 6.5 noradrenaline can be adsorbed from urine on the cation-exchange resin "amberlite IRC-50" (Bergström and Hansson, 1951), and can be eluted with excess of hydrogen ions. This stage gives a relatively large volume of solution free from the urinary pigments. Concentration of the extract is effected by adsorption on aluminium hydroxide, followed by solution in a small volume of acid and precipitation of the aluminium.

The colour reaction employed is the condensation of noradrenaline with ethylene diamine (Natelson, Lugovoy, and Pincus, 1949); the reaction produces a yellow colour with an absorption maximum of 405 m μ and a millimolar extinction coefficient of 10.

Preparation of Urine.—Urine was collected for 24 hours into a Winchester bottle containing 5 ml. of conc. HCl. An aliquot of 100 ml. was adjusted to pH 6.5 with N NaOH, using a glass electrode.

Construction of Amberlite Column.—The amberlite column was set up as shown in the Diagram. The glass tube containing the amberlite was of 18-mm. bore and about

14 cm. long. It had a constriction at the lower end, which was plugged with either glass or cotton-wool and which was connected to an S-shaped piece of glass tubing having a capillary bore. This tubing was arranged so that its outlet corresponded approximately with the level of the amberlite. The filter funnel set up above the tube could accommodate about 200 ml. To fill the column the filter funnel was removed and the apparatus was filled with water. Then 6 g. of dry amberlite IRC-50 was poured into the tube and stirred to dislodge air bubbles. The filter funnel was then replaced.



Construction of amberlite column.

Preparation of Amberlite Column.—The column was washed with successive 25-ml. portions of 2N H₂SO₄, demineralized water, N NaOH, water, 0.5 M phosphate buffer pH 6.5, water, in that order, each fluid being allowed to run through the column before the addition of the next one. The flow rate was about 2 ml. per minute. The column was used repeatedly, the washing being sufficient to clean and regenerate it.

Adsorption and Elution of Noradrenaline.—After the column had been prepared 100 ml. of urine adjusted to pH 6.5 was passed through it followed by 25 ml. water. The filtrates were discarded. The noradrenaline was eluted with 30 ml. of 2 N H₂SO₄.

Purification with Aluminium Hydroxide.—To the eluate there was added 1 ml. of 20% Al₂(SO₄)₃·18H₂O and the solution adjusted to pH 8 by the use of a glass electrode. 5 N NaOH was added until aluminium hydroxide began to precipitate and then N NaOH was added until pH 8 was reached. The precipitate was centrifuged down and the supernatant discarded. The precipitate was partly dissolved and partly suspended in 1 ml. of M H₃PO₄ by stirring with a glass rod. The mixture was transferred to a 15-ml. centrifuge tube. A further 1-ml. portion of M H₃PO₄ was used to dissolve up the remaining precipitate adhering to the large tube, and this was also transferred to the 15-ml. centrifuge tube. Complete solution of the precipitate was achieved by shaking this tube. The aluminium was precipitated as the phosphate by the addition of 1 ml. of M sodium acetate, giving a final pH of 4.5 to 5.5. The precipitate was separated by centrifugation. The supernatant was transferred to another tube calibrated at 10 ml. The aluminium phosphate precipitate was washed with 1 ml. of water by stirring with a glass rod and again centrifuged. The second supernatant was also transferred to the calibrated tube.

Colour Reaction.—To the solution in the calibrated tube there was added 0.5 ml. of ethylene diamine (redistilled under reduced pressure). The solution was adjusted to pH 11, using alizarin yellow G as an external indicator (no adjustment was usually necessary), and made up to 10 ml. with water. The precipitate of hydroxides that formed on the addition of ethylene diamine did not interfere with the colour reaction. Gaseous oxygen was bubbled through the solution for about three minutes. The solution was heated on a waterbath at 50° C. for one and a half hours and centrifuged. The extinction was determined on a "unicam" spectrophotometer at 405 m μ in a 1-cm. glass cell.

Alternative Colour Reaction.—An alternative colour reaction involves the formation of a purple complex between reduced noradrenaline (or adrenaline), ferric ion, and ethylene diamine in alkaline solution. The colour forms at

a reaction above pH 7.5. At this pH it is stable for at least one hour, but its stability diminishes with increasing pH.

To the solution obtained after precipitation of aluminium phosphate (and including the washings) was added 1 ml. of saturated potassium oxalate. The precipitate (of calcium oxalate) was centrifuged off and the supernatant was transferred to a calibrated tube. Now 0.1 ml. of conc. H₂SO₄ followed by 0.1 ml. of 5 mM ferric alum were added and mixed; 0.5 ml. of ethylene diamine was added and mixed, and the optical density was read at 550 m μ after 10 minutes. The millimolar extinction coefficient of the purple complex was 2.

Results

Recovery of Noradrenaline Added to Normal Urine.—To 100 ml. of normal urine was added 100 μ g. of noradrenaline. The urine was adjusted to pH 6.5 and subjected to the extraction procedure. A second aliquot of the normal urine to which no noradrenaline had been added was extracted as a control. A third aliquot was also extracted and 100 μ g. of noradrenaline added to the final extract; this solution served as the standard. The mean recovery in 14 experiments was 58% (S.D. 9.7%).

Normal Subjects.—Extracts of 100-ml. samples of urine from normal subjects gave extinctions of up to 0.15. If a recovery of 58% is assumed, an extinction of 0.15 corresponds to about 50 μ g. of noradrenaline. Assay of such an extract on a spinal cat showed no pressor effect (less than 5 μ g. of noradrenaline).

Diagnosis of Phaeochromocytoma.—We have examined 100-ml. samples from the 24-hour collections of 29 patients who were suspected of suffering from phaeochromocytoma. In 26 cases the extinction was less than 0.15; the mean extinction was 0.086 (S.D. 0.020). In three cases the extinction was greater than 0.15.

Case 1 gave an extinction of 0.29; a duplicate estimation gave 0.33. A duplicate extract was assayed on a spinal cat, but the extract had no pressor effect (less than 5 μ g. of noradrenaline).

Case 2 gave an extinction of 0.47. Biological assay showed that the extract contained 50 μ g. of noradrenaline. Taking account of the recovery, and of the volume of the urine, we found the excretion was 2,000 μ g. of noradrenaline per 24 hours. At operation a right adrenal tumour was removed, but the patient did not obtain a remission of his symptoms. A further sample of urine (after operation) gave an extinction of 0.65; biological assay showed the presence of 70 μ g. of noradrenaline. Subsequently a left adrenal tumour was removed.

Case 3 gave an extinction of 1.35. Biological assay showed 150 μ g. of noradrenaline; this corresponded to an excretion of 4,000 μ g. of noradrenaline per 24 hours. A phaeochromocytoma was found at operation.

The alternative colour reaction was also performed on Cases 2 and 3. The extinctions were 0.07 and 0.19 respectively (corrected for reagent blank), corresponding to 125 μ g. and 350 μ g. of noradrenaline per 100 ml. urine.

The results are shown in the Table.

Results in Three Cases

Method of Estimation of Extract	Recovery of 100 μ g. Noradrenaline from 100 ml. Normal Urine	Abnormal Urine. μ g. Noradrenaline per 100 ml. Urine		
		Case 1	Case 2	Case 3
Biological assay	50%	Nil	100	140
Colour reaction				300
405 m μ	58%	43	100	160
Alternative colour reaction 550 m μ	55%	—	125	—
				350

Discussion

Recovery.—Examination of the stages of the extraction procedure indicated that about 15% of added noradrenaline was lost on the amberlite column, that there was no appreciable loss as a result of the use of aluminium hydroxide,

and that there was a loss of 20 to 30% on the precipitation of aluminium phosphate. Both these losses can be reduced: in the first case by increasing the volume of sulphuric acid used to elute from the amberlite resin; and in the second case by repeated washing of the aluminium phosphate precipitate with sodium acetate buffer of pH 5. However, these procedures result in dilution of the extract.

Specificity.—The extraction procedure favours cations, whereas the colour reactions take place with catechols. Catecholamines possess both of these properties. Consequently the reaction is also given by "corbasil," isoprenaline, and "epinine," substances which are used medicinally and excreted in the urine in sufficient quantity unchanged. The false-positive result obtained in Case 1 was due to the administration of "neo-epinine."

Normal Values.—The values given by normal urine are thought to be due to the presence of biologically inactive catecholamines (von Euler *et al.*, 1955). Accordingly we prefer to express our results in terms of the extinction itself rather than by conversion into a quantity of noradrenaline which would give the same extinction. We have taken the value of 0.15 as the upper limit of normal.

Alternative Colour Reaction.—The alternative colour reaction with ferric ion has two advantages; it is less sensitive to pH and the colour develops rapidly at room temperature. However, the extinction coefficient is only one-fifth of that obtained by the first method. We have occasionally observed the formation of a precipitate on adding the ethylene diamine, which did not dissolve in excess of the reagent and which depressed the development of the purple colour.

Summary and Conclusion

A colorimetric method is described for the diagnosis of phaeochromocytoma.

Two cases of phaeochromocytoma have been diagnosed by this method, and the results were confirmed by biological assay.

In our opinion the chemical method can be relied upon to exclude the diagnosis of phaeochromocytoma. On the other hand, when a positive result is obtained we think it should be confirmed by biological assay.

We wish to acknowledge the help and encouragement given by Mr. J. R. P. O'Brien; we are indebted to Mr. H. W. Ling, of the department of pharmacology, for the biological assays.

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The committee for Commonwealth University Interchange has published a report on its work over the last eight years. Its object has been to facilitate the movement of university teachers and graduates within the Commonwealth. Eighty-five universities and university institutions in the United Kingdom, Canada, Australia, New Zealand, South Africa, India, Pakistan, Malta, Ceylon, Hong Kong, Malaya, Singapore, the Gold Coast, Nigeria, East Africa, and the West Indies participated in the scheme, and a total of 389 visits were arranged. The members of the university staffs whose visits have been assisted have ranged from vice-chancellors and scholars of international repute to young postgraduate workers at the outset of their academic career. About 6% of the visitors were medical or working in allied fields of science. The scheme is administered in co-operation with the British Council and financed by grants from the Commonwealth Relations Office, the Colonial Office, and the committee of Australian Vice-Chancellors. The chairman of the committee is Sir CHARLES MORRIS, Vice-Chancellor of the University of Leeds. The report may be obtained from the British Council, 65, Davies Street, London, W.1.

INTRACRANIAL HAEMATOMA CONCEALED BY LEAKAGE OF CEREBROSPINAL FLUID*

BY

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Persistent leakage of cerebrospinal fluid from the nose or ears, resulting from fractures involving the nasal air sinuses or middle ear, may greatly alter the classical clinical picture of acute intracranial haematoma and may confuse the diagnosis. The usual clinical picture of acute intracranial haematoma consists essentially of a head injury, in most cases associated with immediate loss of consciousness and followed by a lucid interval or lightening of consciousness. Later, deterioration of the state of consciousness occurs, and this is often accompanied by dilatation and inactivity of the pupil on the side of the clot and weakness of the limbs on the opposite side. In such cases it is unusual for the lucid interval to last for more than a few hours, although cases have been described in which this interval has been prolonged.

King and Chambers (1952) recorded eight cases of extradural haematoma in which operation was not required until 24 hours to 11 days after the injury. They thought that the bleeding was probably venous in origin in four cases. All their patients recovered, and they made the point that the prognosis was better when pressure symptoms were slow in developing, as compression of the brain was less rapid. None of their cases had any associated leakage of cerebrospinal fluid from the nose or the ears. Jackson and Speakman (1950) described a case of extradural haematoma which came to operation on the thirty-sixth day after the injury. In the meantime, before the case reached them and before the presence of the haematoma was determined, there had been intermittent severe headache, which had been relieved by repeated lumbar puncture and drainage of cerebrospinal fluid. They did not, of course, advocate such a dangerous procedure.

Persistent leakage of cerebrospinal fluid from the nose or ears will tend to lower intracranial tension so that the formation of intracranial blood clots may be facilitated. A large haematoma may form in this way, but while the leakage of cerebrospinal fluid continues the intracranial tension may remain within normal limits. The brain, although displaced, may not be compressed, so that its function may remain unimpaired. A large intracranial blood clot may thereby show no evidence of its presence on clinical examination. Johnson and Dutt (1947), in a paper discussing treatment of wounds involving the dura overlying the air sinuses, mention the case of a Gurkha soldier who sustained a gun-shot wound involving the right mastoid temporal region and who, when operated upon five days after the injury for dural repair to stop the leakage of cerebrospinal fluid, was discovered to have a large intracerebral haematoma which had apparently been unsuspected.

*Based upon a paper read at a combined meeting of the Association of British Neurologists and the Society of British Neurological Surgeons, 1953.

Schneider and Tytus (1955) recorded two cases with post-traumatic cerebrospinal fluid otorrhoea. The first case was that of a woman who after a fall survived for seven days with profuse drainage of blood and cerebrospinal fluid from the ear. At post-mortem examination an undiagnosed massive fronto-temporal parietal extradural haematoma and a small intracerebral haematoma were found. The second case was that of a man who after a blow on the head drained copious amounts of cerebrospinal fluid from the right ear and gradually developed signs of a haematoma in the posterior fossa without marked deterioration of consciousness. Recovery was uneventful after the evacuation of the blood clot 48 hours after the injury. They felt that in both these cases leakage of cerebrospinal fluid allowed the patients to decompress themselves and permitted expansion of the extradural haematomas without evidence of increased intracranial pressure.

Profuse leakage of cerebrospinal fluid from the nose sometimes shows little tendency to cease spontaneously, so that it is stopped only by operation to repair the dural defect as advocated by Cairns (1937). Accordingly, large intracranial blood clots are sometimes discovered only as chance findings at this type of operation: this is illustrated in Cases 1 and 2. Should spontaneous diminution or cessation of leakage of cerebrospinal fluid occur when a sizable intracranial clot is present, the patient may show evidence of a rapidly expanding intracranial lesion. This is illustrated by the two cases of traumatic cerebrospinal fluid otorrhoea (Cases 3 and 4).

Case 1

A boy aged 17 fell 30 ft. (9 m.) over an embankment while riding a motor-cycle. He was said to have been unconscious after the accident, but on admission to hospital he was able to reply to questions. There was profuse leakage of blood-stained cerebrospinal fluid from the left nostril, but no abnormal neurological signs were found. X-ray examination of the skull showed a comminuted fracture of both frontal sinuses. The profuse leakage of cerebrospinal fluid persisted, but he remained otherwise well and alert. An operation for dural repair was performed on the twenty-first day after the accident; a bifrontal bone flap was reflected, and in the left fronto-temporal region a large extradural haematoma, consisting of approximately 70 ml. of partially liquefied old black blood clot, was discovered as a surprise finding. The patient made an uninterrupted recovery.

Case 2

A man aged 27 was involved in a motor-cycle accident. On admission to hospital he answered questions quickly and rationally. There was a profuse discharge of blood and cerebrospinal fluid from both nostrils, but apart from anosmia there were no abnormal neurological signs. X-ray examination of the skull showed a wide fissure fracture of the right frontal bone involving the right frontal sinus. The patient's state of consciousness and neurological signs remained unchanged. The bleeding from the nose ceased, but he continued to leak cerebrospinal fluid from the right nostril. Lumbar puncture was performed on the thirteenth day after the accident and the pressure was only 30 mm. of water. On the fifteenth day an operation for dural repair was carried out. When a bifrontal bone flap had been reflected a large extradural haematoma, consisting of approximately 75 ml. of old black blood clot, was seen lying in the right frontal region. When this had been evacuated a further 25 ml. of old blood clot was discovered beneath this, in the subdural space. The dural defect was repaired, and after the operation the patient made an uneventful recovery.

Case 3

A man aged 49 was involved in a road accident. On admission to hospital he was drowsy but could be roused to answer questions. There was a profuse discharge of blood-stained cerebrospinal fluid from the left ear. Apart from deafness in this ear no abnormal neurological signs were discovered. X-ray examination of the skull showed multiple fissure fractures in the left temporal plate running down towards the left petrous bone. On the day after the injury his state of consciousness had returned to normal and there were still no abnormal neurological signs. He remained quite well, although the leakage of cerebrospinal fluid persisted.

On the morning of the seventh day it was noticed that the leakage of fluid from the left ear had diminished. It continued to diminish during the day, and in the afternoon it was noticed that he was becoming drowsy. On the following morning (the eighth day) the leakage of cerebrospinal fluid from the left ear had almost ceased. The patient, however, was found to be in coma, the right pupil had become widely dilated and fixed, and a left-sided hemiparesis had developed. Operation was performed under local analgesia and the right temporal region was exposed. There was a large subdural haematoma, approximately 2 cm. thick, consisting of old black blood clot with green discoloration at the edges. When this had been evacuated a laceration of the underlying temporal lobe was revealed, and further clot was evacuated from within the substance of the brain. The vessels in relation to the cortical laceration were thrombosed and there was no evidence of recent bleeding, the haemorrhage almost certainly having occurred shortly after the accident, as the result of a contra-coup lesion. Post-operatively the patient made a slow but steady recovery.

Case 4

A boy aged 19 fell approximately 40 ft. (12 m.). On admission to hospital he was drowsy but responded briskly to painful stimuli. There was a profuse blood-stained discharge from the left ear, but no abnormal neurological signs were discovered. X-ray films of the skull showed a wide fissure fracture running vertically in the left squamous temporal region towards the petrous bone. During the first two days his state of consciousness improved so that he was able to answer questions, though he remained somewhat irrational. The leakage of fluid from the left ear persisted until the third day, when it began to diminish.

On the morning of the fourth day the leakage of fluid from the left ear had ceased. His state of consciousness was approximately the same and there were no abnormal neurological signs. However, in the latter part of the day it was noticed that he was becoming increasingly drowsy, and for the first time he was discovered to have developed a well-marked right-sided hemiparesis without pupillary abnormality. A burr-hole was made in the line of the fracture in the left temporal plate and an extradural haematoma, consisting of approximately 75 ml. of solid black blood clot, was evacuated. There was no bleeding from the dural vessels underlying this, and it was thought that all bleeding had ceased some time previously. After operation, he made a good recovery.

Discussion

There can be little doubt that had there been no leakage of cerebrospinal fluid in Cases 1 and 2 both patients shortly after the accident would have required urgent operation for the evacuation of the large intracranial clots. The persistent leakage of cerebrospinal fluid through the nose, however, provided them with a decompression, so that the clots gave rise to no symptoms or signs. The possible presence of an intracranial haematoma when operations are performed for dural repair in persistent cerebrospinal fluid rhinorrhoea will be an additional reason for reflecting bifrontal bone flaps

and for carrying out an intradural repair as recommended by Cairns (1942). By this means the whole of the anterior fossa and anterior temporal regions on both sides can be inspected without difficulty.

In both the cases of cerebrospinal fluid otorrhoea (Cases 3 and 4) the operative findings showed that all the intracranial bleeding had ceased some time before operation, almost certainly soon after the injury—that is, eight days previously in Case 3 and four days previously in Case 4—yet in both, while the leakage of cerebrospinal fluid persisted, the state of consciousness remained satisfactory or improved. At that stage perhaps the only indication of the presence of a clot, short of air studies or angiography, might have been shift of the pineal body had it been calcified and visible on plain x-ray films of the skull. When the leakage of cerebrospinal fluid diminished, both patients quickly became comatose and developed severe hemiparesis with, in one case, evidence of a third-nerve lesion. Thus it seems that the intracranial blood clots, subdural and intracerebral in one case and extradural in the other, began to compress the brain only when the intracranial pressure rose as a result of the cessation of leakage of cerebrospinal fluid. Such cases, therefore, call for special observation when the leakage of cerebrospinal fluid is diminishing.

In the presence of leakage of cerebrospinal fluid, other causes of deterioration of consciousness and of the neurological state of the patient are spread of infection intracranially and epilepsy. Meningitis usually produces fever and neck stiffness before clouding of consciousness and can be diagnosed with certainty by lumbar puncture. Intracranial abscesses may produce a very similar picture to intracranial haematoma, but it is unlikely that the onset of symptoms will coincide with the cessation of leakage of cerebrospinal fluid. Epilepsy, when a fit has passed unobserved, would be suspected when the loss of consciousness had been very sudden, and, in the absence of further fits, would be followed by rapid spontaneous improvement. Treatment of the intracranial haematoma consists essentially in its evacuation. Fortunately, this is more easily performed than in the case of an acute haematoma requiring operation soon after injury, as bleeding from the vessel responsible for the formation of the clot will have ceased some time previously.

Summary

Profuse cerebrospinal fluid rhinorrhoea or otorrhoea resulting from head injury, by lowering intracranial pressure, may facilitate the formation of large intracranial haematomas.

While the leakage of cerebrospinal fluid persists there may be no deterioration of consciousness and no abnormal neurological signs to suggest the presence of a haematoma.

When the leakage of fluid diminishes there is a need for special observation, as a haematoma, if present, may begin to compress the brain and require urgent evacuation.

Four illustrative cases are described.

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MASS THERAPY WITH PIPERAZINE ADIPATE IN THE CONTROL OF THREADWORM INFESTATIONS

BY

R. D. HILL, M.B., Ch.B.

Shetland Isles

Many attempts have been made to evaluate the success of vermicides against threadworms (*Enterobius vermicularis*), notably that by Standen (1953). In recent years attention has been focused on piperazine, following the studies by Mouriquand *et al.* (1951) and Turpin *et al.* (1952). White and Standen (1953) regarded piperazine hydrate as the drug of choice for the treatment of threadworms in children. However, it seems that all these trials were made on selected populations—namely, children admitted to hospital for medical or surgical treatment. Furthermore, in each trial only individuals or, at most, families, were treated, and the tests ended at the cure of the patient. No follow-up was made to discover how soon reinfestation occurred. For these reasons the following account of an attempt at mass therapy, with a six-months follow-up of the results, may be of interest.

I am the sole medical practitioner on an island in the Shetland Isles with a total population of 866. Of these, 194 are children aged 1 to 14 years. I noticed that a number of children (18 in three months) were brought to me by their mothers suffering from the effects of "worms." In each case a threadworm infestation was found. It soon became apparent that treatment of the children individually did not eliminate the condition, owing to the rapid reinfestation which occurred. I therefore decided to undertake a form of mass therapy. This has previously been shown to be most effective in other helminthic infestations—for example, hookworm. Expense ruled out the treatment of every person on the island, so I decided to treat all the children aged 1 to 14 years. Piperazine adipate was used. A form requesting permission to do this was sent to their parents, who without exception gave their consent.

Incidence of Infestation and Symptoms

In order to estimate the frequency of infestation, 50 children living within easy access of the surgery were swabbed with adhesive "cellophane" tape swabs, and the specimens examined microscopically. A child was adjudged infested if two or more ova were found on the slide, and no child was regarded as free until five specimens had been examined. The main difference between this sample of children and the total child population of the island of the same age consisted in rather better than average housing conditions in the sample group and a higher proportion of children under 8 years of age—62% (31 out of the 50) compared with 41% for the whole island.

The age distribution of the sample group of children is shown in Fig. 1, and of those found to be infested with threadworms in Fig. 2. Thirty-two (64%) of the sample group were infested. There was a high infestation rate in those aged 2 to 11 years, while those under or above these ages were less often infested. In Fig. 3 the number of specimens necessary to obtain a positive result is given: 27 (84%) of the 32 positive results were obtained after examining three specimens. Fig. 4 shows how the percentage of infested children in a family rose with the number of children in the family. The apparently anomalous finding for families with three children is accounted for by the fact that three of the four families investigated go around persistently as a tight knot of little girls, hand in

hand, leading their younger siblings and forming a constant group comparable to a family association of nine children.

The clinical histories of the children in the sample were obtained from their mothers, who were asked: Has your child had anything wrong with him during the last two months? Has he suffered from itching or scratching of his bottom, bed-wetting, nightmares, or teeth-grinding? Have you yourself suffered lately from worms? The answers to these questions are summarized in the Table. The clinical histories were then correlated with the results of the swab examinations. Of the 34 children with no symptoms, 17 had positive swabs and 17 negative. Of the 16 children with symptoms, 15 had positive swabs and one was negative.

Details of Sample Group

	No.	Microscopical Examination	
		No. Positive	No. Negative
No. without symptoms	34	17	17
" with	16	15	1
Pruritus	6	5	1
Enuresis	6	6	0
Nightmares	1	1	0
Teeth-grinding	4	4	0

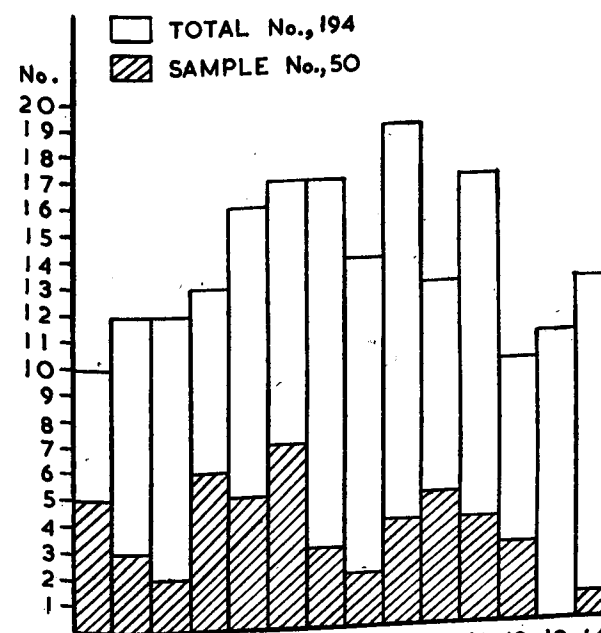


FIG. 1.—Age distribution of whole group (194 children) and of sample group (50 children).

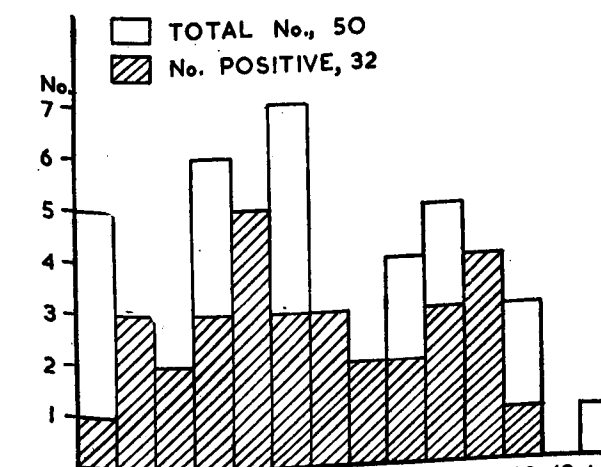


FIG. 2.—Age distribution of the 32 infested children in the sample group.

When individual symptoms were considered, it was found that five of the six children with pruritus had positive swabs and one was negative; all the six children with enuresis were positive; the one child with nightmares was positive; and all the four children exhibiting teeth-grinding were positive. (One child suffered from both pruritus and enuresis.)

Method of Mass Treatment

On the day after the last swabs had been taken every child on the island aged 1 to 14 years began a course of piperazine adipate at a daily dose of 300 mg. per year of age up to a maximum of 1.8 g. a day. The piperazine, which was in tablets containing 300 mg. of the adipate, was given for seven days, stopped for seven days, and then given for a further seven days.

Through the courtesy of the headmasters of the two schools on the island it was arranged that the school-age group should receive their vermicide at school so far as was possible. They were dosed by their individual teachers on arrival at school again at midday, and for a third time just before leaving in the afternoon. Since the courses lasted seven days, each child on leaving school on Friday was given enough tablets for Saturday and Sunday. Thus it was certain that these children (151) took their tablets for at least five out of the seven days. Since piperazine acts with maximum effect after three days' treatment (Turpin *et al.*, 1952), even five days' treatment should be effective. The piperazine for the children below school age (43) was distributed by the district nurse and myself, and the importance of its regular administration was emphasized. Mothers were instructed to pulverize the tablets if any difficulty was experienced in giving them whole. Each parent was given a form setting out basic rules of hygiene—for example, cutting the nails short, washing hands before meals, etc.—and a request to report any illness, however slight, in any child during the campaign.

Since the islanders are, in general, people of integrity, I feel sure that nearly all the children did get the treatment recommended. Only two of the sample (4%) failed to do so, and this figure is probably also representative of the island as a whole.

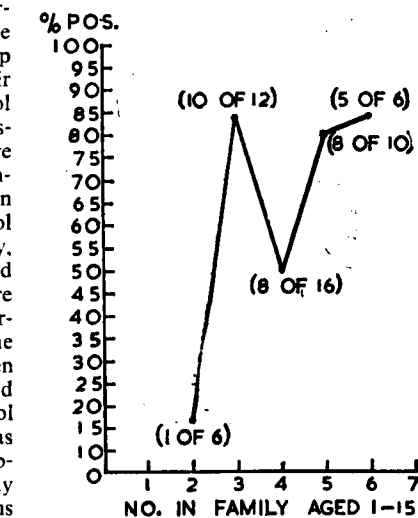


FIG. 4.—Percentage of children infested related to number of children in family.

Results of Treatment

Fourteen days after the completion of treatment the 32 children in the sample group who had been previously found to be positive were swabbed on six successive

mornings. Only two of these children, a boy aged 3 years 11 months and a girl aged 2 years 3 months, both from the same large family, were found to be still positive. On inquiry the mother confessed that, in spite of every effort, she had been unable to induce these children to take the tablets. After a further course of treatment, with the tablets made into a mixture, both children became negative.

Six months later the whole sample group was swabbed again. Twenty children were infested—that is, 40% of the group compared with the 64% who were found to be infested before treatment began. The age distribution of these 20 children was much the same as those originally infested (Fig. 5). Of the 32 originally positive, 18 had

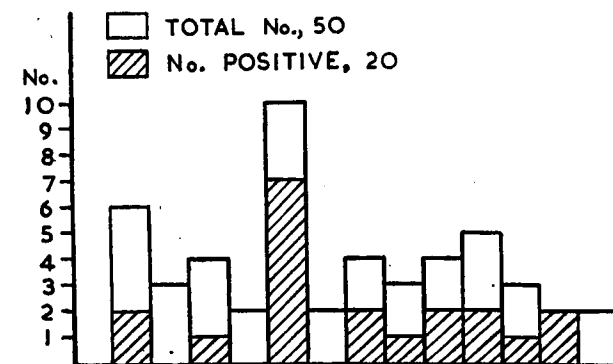


FIG. 5.—Age distribution of the 20 infested children in the sample group six months later. (See Fig. 2.)

become reinfested, and two who were originally negative had become positive. One of the latter, a boy, was originally the only one negative in a family of five children; six months after treatment all of this family were reinfested. The other, a girl, came from a family of four children, two of whom were positive originally, and two of whom had become reinfested after six months.

Originally, 12 of the 14 families in the sample were infested. Six months after treatment only six families were infested. Twenty out of the 24 children (83%) in these six families were infested on both occasions, whereas in the other eight families only 12 of the 26 children in them (46%) were infested originally and none six months later. The mothers in the six families found to be infested on both occasions were all themselves infested; five of the fathers were absent from home for at least 90% of the time, and the remaining father was not swabbed.

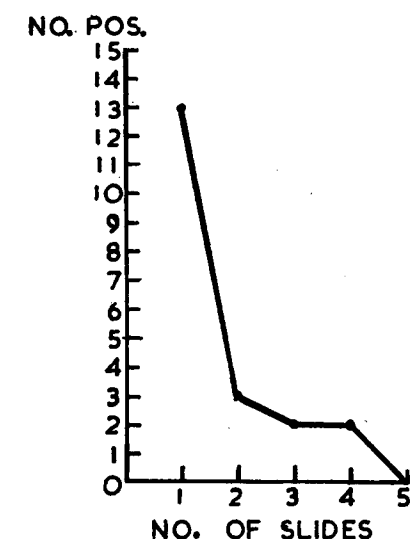


FIG. 6.—Number of specimens needed before positive result obtained in the 20 cases.

At the follow-up, positive swabs were obtained more readily than before treatment, 65% of the positives being found at the first swab and 90% by the third (Fig. 6). But it was my impression that the ova on each positive slide were much fewer than at the original swabbing. However, as counts were not done, this cannot be stated with certainty.

The original questionnaire about symptoms was repeated to each parent in the sample group six

months after treatment was completed, care being taken, so far as was possible, not to influence the replies. Of the 16 children who originally had symptoms, eight were now free of them, and one was free of one of his symptoms. Three children were relieved of pruritus, four of teeth-grinding, and one each of the nightmares and enuresis. The child who had had both pruritus and enuresis was cured of both for a time, but later the enuresis recommenced. Of the nine* children relieved of symptoms, three (one pruritus, one enuresis, and one teeth-grinding) had become reinfested. Of the eight children who were not relieved of their symptoms, five had enuresis and three pruritus. Six of these children had become reinfested; the two who were not reinfested suffered from enuresis. One of these was a boy of 2 years 7 months, the other a girl of 10 years whose father had been absent for seven years undergoing treatment for tuberculosis.

All the children in the sample who were still positive after six months were then given a further course of piperazine adipate. One month after the completion of this course they were all negative. At this date all symptoms had disappeared, except that the five children with enuresis were still as badly affected as ever.

Side-Effects

Few side-effects were experienced by the 194 children who were treated. On the first day of treatment, three girls (aged 7 years 3 months, 5 years 8 months, and 3 years 6 months) were reported to have vomited after their evening meal. The eldest of these was found to have enlarged and inflamed tonsils and a temperature of 101° F. (38.3° C.), and the piperazine was stopped. The other two were feeling quite well when seen, and, as no abnormality could be discovered on examination, their treatment was continued without further ill effects.

On the fourth day of treatment a boy aged 4 years 1 month vomited but was quite well when seen. He completed his course without further ill-effects. On the sixth and seventh days three boys in the same family (aged 11 years 2 months, 7 years 11 months, and 5 years 6 months) developed slight diarrhoea. Two other boys in the family were unaffected. The upset was so slight that I was not told about it until treatment had been completed. During the second course no side-effects were reported.

Conclusions

Piperazine adipate is an effective and safe vermicide. Of the 30 infested children in the sample who completed treatment, all were free of ova two weeks later; and, although seven cases of vomiting or diarrhoea among the 194 children treated were reported, one of these was undoubtedly caused by a concurrent infection and the remainder were of so slight a nature that the children concerned missed no time at school and when examined no abnormality could be found. No child missed a dose of vermicide because of side-effects. With piperazine adipate it is possible to disinfect a community of children by mass therapy, but unless the parents (especially the mothers) are treated at the same time reinfestation soon follows.

Although a large number of children were positive six months after treatment, their infection did not appear to be so heavy as originally. In addition, I have had only one complaint of infestation since the mass treatment, as opposed to 18 in three months before it was done.

There appears to be some relationship between the symptoms of pruritus, teeth-grinding, and nightmares and infestation with threadworms. Ten children with these symptoms were cured of them when freed from threadworms. Of six children with enuresis, however (12% of the sample), only one was cured when treated for threadworms, but she was infested at the second examination. Her cure would appear to be coincidental. In the other five the enuresis was unaffected by treatment.

*This figure includes the child in whom one of his two symptoms had been relieved.

Summary

The mass treatment with piperazine adipate of all the children aged 1 to 14 years on one of the Shetland Isles is described. The object was to rid them of threadworms. A total of 194 children were treated.

A sample group of 50 children were examined by anal swabs, and their mothers questioned about their symptoms, before and after treatment. Before treatment 32 were found to be infested with threadworms. Two weeks after treatment all 30 who completed the course were free of infestation. Six months later 20 had become reinfested, but one month after a second course of treatment all were again free. There was also amelioration in symptoms, generally ascribed to threadworm infestation, with the notable exception of enuresis.

Side-effects of treatment were few and unimportant.

It is concluded that mass treatment with piperazine adipate is effective in eradicating threadworm infestation in a community of children, but to prevent relapse parents, especially the mothers, must be treated at the same time.

My thanks are due to Dr. S. A. B. Black, medical officer of Health for Zetland, for his advice and encouragement; to Nurse Cowie, who helped to distribute the piperazine adipate; to the headmasters of Livister Primary School and Brough Secondary School for their willing co-operation; and to British Drug Houses Ltd., who generously supplied, free, the large amount of piperazine adipate required in the form of "entacyl" tablets. My thanks are also due to the mothers and children of the sample group who conducted, and submitted to, the numerous tedious and embarrassing swabbings which were necessary.

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WHIPWORM INFESTATIONS TRIAL OF FOUR PIPERAZINE COMPOUNDS

BY

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A simple satisfactory treatment for *Trichuris trichiura* (whipworm) infections in man has yet to be found. Some success in apparently light infections has been obtained with hexylresorcinol enema and papain (Jung, 1954; MacCarthy, 1954). The worm is seldom said to give rise to severe symptoms, but if a safe and easily administered drug is found to be effective against some intestinal helminths it should be tried against *T. trichiura* also. It was noted that the ova of this worm appeared irregularly in the stools in light infections, so a comparison of a quantitative nature in groups of patients was thought more likely to give a reliable indication of the efficacy of a drug than qualitative comparisons in individual patients.

The piperazine compounds are very safe and effective against roundworms and threadworms. A trial of piperazine hydrate and adipate against *T. trichiura* infections in children has been reported from Australia by

Dunn (1955), who found that the hydrate, in a dosage of 75 mg. per kg. of body weight daily for three days, cleared only 4 out of 22 (18%) children of ova; but he found the adipate cleared 28 out of 31 (90%) children of ova in dosage of 300 mg. per year of age, to a maximum of 1,800 mg. daily for three days. An opportunity to study the adipate again, and also to try other piperazine compounds, occurred in the autumn of 1955, when news was received of heavy *T. trichiura* infections among patients at a hospital for mental deficiency. An account of the clinical aspects of these is under preparation by one of us (A.G.H.). The therapeutic trial of four piperazine compounds is reported here—the phosphate, citrate, sebacate, and adipate.

Details of Trial

The patients were divided into four groups, each of 20 individuals, and all members of each group were given one of the drugs. Most of the patients were boys aged 7 and upwards, but four were adults. The stools of all the patients in each group were collected just before treatment and the number of eggs per gramme was estimated by a modification (Caldwell and Caldwell, 1926) of the Stoll method using sugar solution. We are indebted to Mr. F. R. N. Pester, of the Helminthology Department, London School of Hygiene and Tropical Medicine, and Mr. K. A. Fuller, of the Wellcome Laboratories of Tropical Medicine, for undertaking the egg counts. For the phosphate, citrate, and sebacate the dosage given was equivalent to 500 mg. of piperazine hexahydrate three times daily for seven days in all cases. The dosage of the adipate was 600 mg. (equivalent to 502 mg. of hexahydrate) three times daily for seven days. No other measures, such as starvation or purgatives, were employed. No side-effects of the drugs were noted. Two weeks after the completion of the course of treatment the stools were again collected and examined by the same observer as had examined them previously. The observers were kept in ignorance of the nature of the preparation administered to each group.

In the stools of three patients there were ova after, but not before, treatment; and in the stools of one patient there were ova before, but not after, treatment. High egg counts, up to 75,000 per gramme of faeces, were found in some cases. The difference between the number of eggs per gramme of faeces before and after treatment was calculated for each patient. In some, especially those with comparatively light infections, large differences were noted, but these tended to cancel each other out when the mean difference for each group was calculated.

Details of Four Groups

Group	Compound of Piperazine	No. of Infected Patients	Mean Egg Count per g. Faeces before Treatment	Mean Difference in Egg Count after Treatment	Standard Error of Difference	t	P
I	Phosphate	17	4,400	+1,315	±686	+1.92	0.1-0.05
II	Sebacate	17	6,600	-2,176	±2,593	-0.84	0.4
III	Adipate	18	3,900	-367	±478	-0.77	0.4-0.5
IV	Citrate	18	10,400	+456	±602	+0.76	0.4-0.5

The mean difference for each group and its standard error are shown in the Table. The application of "Student's" t test to these figures shows that none of the means was significantly different from zero. None of the compounds of piperazine, tested in doses which are effective against *Ascaris lumbricoides* and *Enterobius vermicularis*, had any action on *T. trichiura*.

Summary

A trial of the therapeutic effects of four piperazine compounds—the phosphate, sebacate, adipate, and

citrate—administered by mouth was carried out among patients heavily infected with *T. trichiura*. No therapeutic effect was observed.

We wish to thank Dr. H. E. Beasley, physician-superintendent, for his encouragement and permission to undertake the investigation, and the nursing staff of the hospital concerned for their co-operation. Brigadier J. S. K. Boyd, of the Wellcome Laboratories of Tropical Medicine, kindly supplied the drugs used, and Mr. O. D. Standen and Dr. L. G. Goodwin, of the same laboratories, have been very helpful in the preparation of the paper.

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Medical Memoranda

Torsion of the Gall-bladder

About a hundred cases of acute torsion of the gall-bladder have been reported in the literature since Wendel's case (1898). From the Scandinavian countries single cases have been reported by Hansen (1920), Arnesen (1929), Koch (1943), Ekdahl (1951), and Berg (1955). It is rare for one surgeon to see more than one of these cases during his lifetime; yet four surgeons have seen two cases and one surgeon has seen three. The latter is of the opinion that a correct pre-operative diagnosis is possible. To make the gall-bladder capable of undergoing torsion it must either have a complete mesentery or its body be free, the mesentery only fixing its neck. This state of affairs is brought about either as a congenital anomaly or as an acquired relaxation, atrophy of the connective tissue permitting increased ptosis of the gall-bladder (Maingot, 1948).

Detailed reviews of published cases have been made by Short and Paul (1934) and Bean and Symond (1953). A further case is here presented.

CASE REPORT

A 70-year-old woman was admitted to Surgical Department A of Frederiksberg Hospital at 9.30 p.m. on July 4, 1953, with a twelve-hours history of acute diffuse pain in the abdomen, later localized to the right iliac fossa. The pain was of a constant character with colicky exacerbations, and she vomited several times. There had been a normal motion twelve hours before, but no flatus had been passed since.

On examination she was noted to be a rather fat ill-looking old lady obviously in pain. Her tongue was dry, temperature 99.6° F. (37.5° C.), pulse 100, and regular. The abdomen was large with a slightly prominent right side; there was no abdominal distension, but a tender mass was felt in the right iliac fossa in the area between the iliac crest and a scar from a right pararectal incision (appendicectomy). Pelvic and rectal examination gave no information. With a provisional diagnosis of intestinal obstruction, possibly caused by a caecal tumour or a caecal torsion, a straight x-ray film of the abdomen was taken, followed by a radiograph of the colon after a barium enema. No signs of obstruction were found, but it was noted that the hepatic flexure of the colon was placed lower than usual. With the application of local heat, and fasting, the patient was observed for some hours. The temperature rose to 101.2° F. (38.4° C.), and the abdomen became slightly distended. It was noted that the tender mass in the right iliac fossa shifted somewhat in position and size. A renewed straight x-ray film of the abdomen showed some air in the small bowel but no fluid levels. At this juncture the possibility of an acute obstructive cholecystitis was discussed, but as no definite diagnosis had been reached it was decided to operate.

A laparotomy was performed through a right transrectal incision medial to the old scar. On opening the peritoneum

a moderate amount of fluid was noted, and some adhesions had to be cut. A heavy, reddish-black gangrenous gall-bladder 20 cm. long presented itself in the wound, being suspended from the liver by a small partial mesentery. It had undergone a 360-degrees anticlockwise torsion. After untwisting and isolation and ligation of the cystic duct and artery, the gall-bladder was easily removed. The wound was closed in layers with a drainage tube to the gall-bladder bed. The patient made an uneventful recovery.

The removed gall-bladder contained numerous small gall-stones, and microscopical examination showed a haemorrhagic necrosis of its wall.

COMMENT

If an old woman is seized by a sudden colicky pain of persisting character in the middle of the abdomen, right hypochondrium, or right iliac fossa, a diagnosis of gall-bladder torsion may be considered. In some cases there is a distinct zone of maximal tenderness over a small area, as pointed out by Case (1951) and Bell (1955). Furthermore, if a tender rounded tumour is found, varying in size during observation, it should be possible to arrive at the correct pre-operative diagnosis—namely, torsion of the gall-bladder. The treatment is early cholecystectomy.

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Combined Congenital Malformations of Oesophagus and Heart

It is well known that more than one congenital malformation may occur in the same patient, and that certain malformations are commonly associated together. A better knowledge of such definite combinations might help both in diagnosis and in the understanding of the causative factors. The following case had congenital malformations affecting both the oesophagus and the heart.

CASE REPORT

A 19-year-old primipara, with a normal history of pregnancy when seen at the antenatal clinic, was delivered of a severely anoxic male infant on December 21, 1954. Labour was normal, but hydramnios was present. The infant weighed 5 lb. 6 oz. (2,450 g.). In spite of repeated careful aspiration there was a continuous and copious discharge of mucus from the mouth and nose. At six hours, examination showed a deeply cyanosed infant with rattling respiration, from whose nose and mouth clear mucus was still discharging. Loud rhonchi were heard over the chest, and a loud systolic murmur maximal at the apex of the heart. An unsuccessful attempt was made to pass a tube into the stomach, and the infant died, anoxic and very deeply cyanosed, 63 hours after birth. A post-mortem radiograph showed that the upper oesophageal segment ended as a blind pouch, while the lower oesophageal segment communicated at its upper end with the bifurcation of the trachea.

Extract from Necropsy Report.—The oesophagus ended in a blind sac-like enlargement 3 cm. from its proximal end. At the point of its bifurcation the trachea communicated with the distal portion of the oesophagus, which had a diameter of 6 mm. and ended normally in the stomach. The heart was enlarged, the right ventricle being dilated and hypertrophied. The left ventricle was smaller, with thinner walls than usual. The aorta and pulmonary artery

sprang from a common trunk arising from the right ventricle, with four valves at its cardiac orifice, some of which were thicker and harder than normal. At 1.5 cm. from the cardiac origin of the trunk the right and left pulmonary arteries arose, while the aorta continued to form the arch from which rose the great arteries and also the ductus arteriosus linking the aorta with the right pulmonary artery. There was an opening, 8 mm. in diameter, in the membranous upper portion of the interventricular septum with a thickened whitish margin. The left atrioventricular ostium and bicuspid valve were corresponding. The other internal organs showed no congenital malformations. Histologically, there was perivascular fibrosis of the myocardial vessels and coronary atheroma. There was also fibrosis of the valves of the common arterial trunk.

COMMENT

Until recently there was no way of saving the lives of infants with congenital oesophageal atresia. But now a considerable number of successful operations on such cases have been reported. This has led to considerable optimism. However, the prognosis remains hopeless when there is an associated grave abnormality of the heart.

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Clinical Trial of Glycyrrhetic Acid Ointment

Glycyrrhetic acid is obtained from liquorice. There is a structural similarity between glycyrrhetic acid and cortisone, and it has been shown that liquorice extracts contain substances with deoxycortone-like activity (Molhuysen *et al.*, 1950).

Adamson and Tillman (1955) used 2% glycyrrhetic acid ointment in a variety of skin conditions, mostly eczematous, in which good results had previously been claimed for hydrocortisone. They suggested that their results were encouraging enough to indicate that glycyrrhetic acid ointment should be given a further trial.

We have carried out such a trial as follows.

METHOD

2% glycyrrhetic acid ointment and a control containing only the ointment base were used. The preparations were supplied in tubes labelled ointment A and ointment B, and it was not known until the conclusion of the trial which preparation contained the active ingredient. Two groups of patients with lesions, the majority eczematous, which might be expected to respond to local hydrocortisone were treated.

Ointment A		Ointment B	
Glycyrrhetic acid	2%	Wool fat	20%
Wool fat	20%	Liquid paraffin	25%
Liquid paraffin	25%	White soft	ad 100%
White soft	ad 100%		

Paired Comparison Group.—Twenty patients with symmetrical lesions were treated with ointment A on one side, ointment B on the other, the majority as in-patients. Precautions were taken to ensure that neither patient nor observer knew which preparation was applied to which side. The ointment was rubbed in night and morning, and the affected areas were protected with dressings. Treatment was continued for an average of seven days, and the results were assessed on the basis of objective changes in the lesions, as unchanged, improved, or deteriorated (Table I). With one exception, symmetrical lesions in individual patients behaved identically with both preparations.

TABLE I.—Paired Comparison Group (20 Cases)

Ointment	Unchanged	Improved	Deteriorated
A	7	7	6
B	8	6	6

Alternate Case Group.—Ointment A and ointment B were supplied alternately to 30 patients, who were instructed to rub in the ointment gently night and morning. After the results of this initial treatment had been assessed at the end of seven days or earlier, treatment was to be continued with the other preparation for a similar period, so that the effects of both ointments could be observed in the same individual. As the trial proceeded it was found that no fewer than 12 patients had become unsuitable for treatment with the second preparation because of deterioration in the lesions contraindicating further greasy applications, because the lesions had healed completely, or because they were unable to remain under observation. Of the 18 patients given the second treatment 3 did not report for final assessment. Thus results of treatment with both ointments are available in 15 patients (Table II) and with one ointment only in a further 15 patients (Table II). There appears to be no significant difference between the effects of ointment A and ointment B.

TABLE II.—Alternate Case Group

Ointment	Unchanged	Improved	Deteriorated
Results with both A and B (15 Cases)			
A	4	10	1
B	3	9	3
Results with either A or B (15 Cases)			
A	3	2	3
B	2	1	4

COMMENT

In neither group was any significant difference apparent between the effect of 2% glycyrrhetic acid ointment and the control base. To maintain uniformity with trials proceeding elsewhere, a greasy ointment base was used which we consider generally unsuitable for the treatment of eczematous conditions.

A substantial proportion of the lesions were intolerant of the treatment applied. This is not surprising, as the application of greasy remedies to eczematous lesions in an acute or subacute phase is usually contraindicated. Hydrocortisone is a striking exception, in that even acute weeping lesions are often improved by this remedy when applied in a greasy base. In no instance was such improvement produced by the glycyrrhetic acid preparation, which further suggests that in its present crude form this substance has little or no hydrocortisone-like effect.

These findings are at variance with the impression of Adamson and Tillman (1955) that glycyrrhetic acid preparations have a hydrocortisone-like effect. It may be that these conflicting results depend on some active constituent of liquorice which is present in varying amounts in different samples of glycyrrhetic acid as at present commercially obtainable.

Further work is necessary to elucidate the nature and therapeutic effect of the fractions of crude liquorice extracts and commercial glycyrrhetic acid. Meanwhile it appears to us premature to suggest that glycyrrhetic acid ointment is a satisfactory substitute for hydrocortisone.

We are indebted to Dr. E. V. B. Morton, of Boots Pure Drug Co. Ltd., for much helpful advice and for arranging supplies of the preparations used, and to Dr. Pamela Horne and the nursing staff for their help in carrying out the trial.

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Reviews

NEW TEXTBOOK OF ANATOMY

Textbook of Human Anatomy. By J. D. Boyd, M.A., M.Sc., M.D., Sir Wilfrid E. Le Gros Clark, M.A., M.D., D.Sc., LL.D., F.R.C.S., F.R.S., W. J. Hamilton, D.Sc., M.D., F.R.S.Ed., J. M. Yoffey, D.Sc., M.D., F.R.C.S., Sir Solly Zuckerman, C.B., M.A., M.D., D.Sc., F.R.S., and the late A. B. Appleton, M.A., M.D. Edited by W. J. Hamilton. (Pp. 1,022+xii; illustrated. £5.) London: Macmillan and Co. Ltd. 1956.

This new textbook of human anatomy is bound to arouse considerable discussion among anatomists, surgeons, and all who are concerned with the contributions which anatomy must make to the medical curriculum. It is designed primarily for the medical student in his preclinical years of study, and is a serious attempt to remove many of those difficulties of which both students and teachers have complained in the past. To correlate structure with function, to eliminate unnecessary topographical detail in descriptions of the various body systems, and to form a link with previous studies in biological subjects have been the aims of the contributors. How far have they succeeded in their purpose?

Surgeons and experts in other specialties will not like this book, because they will not find in it the detail of topographical anatomy to which they are accustomed to refer their clinical and postgraduate students, but it is only right to indicate that it does not seek to supplant the reference book as such; the latter will still be necessary for the postgraduate specialist. On the other hand, many anatomists in Great Britain, of whom the reviewer is one, will welcome this attempt to produce something worth while which can be recommended to our students.

There will be complaints that the sections appear uneven in their presentation of the subject. This is because each contributor is not only a distinguished anatomist but also a research worker of repute in his own particular field. Each is bound, therefore, to treat with his individual emphasis the topics which he has to cover. This is all to the good, and the editorial co-ordination has been done effectively but discreetly so that individuality of presentation has not been completely suppressed.

Some minor criticisms must be made, and doubtless the following points will be considered when future editions are planned. It is unfortunate that the metric and English systems of measures are used indiscriminately, even in the same chapter. The illustrations, many of them in colour—and from the competent pens of A. K. Maxwell and F. B. Price—are of a high standard in most cases. Some, however, are too complicated (e.g., Fig. 303); in some, colour has not been wisely used (e.g., Fig. 326), and the occasional error in labelling a drawing has been overlooked (e.g., Fig. 163). The publishers have produced this book to their usual high standard and are to be congratulated upon it. One can recommend it to medical students. Students of what may be called medical auxiliary subjects will find it useful, and all teachers of anatomy should possess it.

J. S. BAXTER.

BODY FLUIDS

The Body Fluids: Basic Physiology and Practical Therapeutics. By J. Russell Elkinton, M.D., and T. S. Danowski, M.D. (Pp. 626+xxii; illustrated. 80s.) London: Baillière, Tindall and Cox. 1955.

Dr. Elkinton and Dr. Danowski are well known for their pioneer work while they were together at Yale, and they are, of course, still actively engaged now, one in Philadelphia and the other in Pittsburgh. Distance has not prevented their fruitful collaboration in this book, the most ambitious of a number which have been appearing on the problems of the body fluids and their electrolytes. There are two sections—on principles, and on their application to clinical problems. The first makes heavy going at times. With some of the

material this is inevitable; the authors do not hesitate, for instance, in the opening pages, to approach the problems of the thermodynamics of the steady state, showing the trend of modern thought and also where to seek for more information. The second section provides a ready source of reference on almost any clinical question concerning the regulation of water and electrolytes in the body; a lengthy table of contents and a good index make it easy to find one's way about the voluminous text, though the style and the numerous diagrams may not appeal to some. Many chapters bring together for the first time much useful information, as on artificial dialysis and on the technique of balance studies.

The exponential growth of scientific literature makes monographs indispensable, and a major function of such works should be to provide a guide to the literature. The authors are to be congratulated on making easily available an immense amount of bibliographical material, conveniently arranged by chapters and with the titles of articles included. Even so the bibliography is not exhaustive; thus Duckworth's notable works on magnesium have been neglected. One must grant that in so large an undertaking errors inevitably creep in, and some references have in fact been inaccurately cited. Another edition will undoubtedly eliminate misprints. A by no means extensive sampling revealed them by chance in Pace's formula for the fat content of the body (p. 95) and in a table (p. 494) where the magnesium content of the body appears to have been calculated in millimols and not in milliequivalents. The book is well produced and at a reasonable price.

PAUL FOURMAN.

FLUOROSCOPY

Fluoroscopy in Diagnostic Roentgenology. By Otto Deutschberger, M.D. Introduction by Frank J. Borrelli, M.D., F.A.C.R. (Pp. 771+xvii; illustrated. £7 14s.) Philadelphia and London: W. B. Saunders Company. 1955.

This is a well-produced and beautifully illustrated radiological textbook, with a commendably systematic and scientific outlook on its subject. The first part deals with the technical and physiological aspects of fluoroscopy, and does so admirably; it is well worth the attention of any clinician who needs to use a fluoroscope, and it will serve as a splendid introduction for the radiological student embarking on his physics course. The major part of the book is devoted to the clinical applications of fluoroscopy, and also affords a great deal to praise. The section on gastroenterology is extremely well and clearly set out, and is supported by some admirable diagrams and reproductions of radiographs. The cardiological section is also well done, although the classification of congenital heart disease, which is based on anatomical and embryological considerations, would have been more useful had it followed the modern trend of classification according to the presence or absence of cyanosis and the degree of vasculature of the lung fields; and no mention seems to be made of endocardial fibro-elastosis or anomalous pulmonary venous drainage. The section on diseases of the chest suffers from the fact that the author's systematic approach has led him to devote a great deal of space to lesions in the diagnosis of which fluoroscopy plays little or no part, and little guidance is given on the indications for, or the real value of, fluoroscopy of the chest. To quote only a few examples, ten pages are devoted to the discussion and description of pulmonary tuberculosis; there are discussions on the differential diagnosis of miliary and submiliary shadows; and fluoroscopy is hardly the routine method of assessing the response of tumours to x-ray therapy. In a similar fashion, 15 pages devoted to the normal and abnormal encephalogram appear a little excessive, and the value of the book would be greatly enhanced by a more ruthless pruning and selection of material.

These criticisms apart, this book should be of great value to the clinician who has to practise fluoroscopy and to the radiological student, but it is unlikely to be of great value to the practising radiologist.

CONWAY DON.

BRITISH MEDICAL JOURNAL

LONDON

SATURDAY NOVEMBER 17 1956

ERADICATION OF CONGENITAL SYPHILIS

The marked decline in the incidence of early infectious syphilis since the war has been accompanied by a fall in the numbers of cases of congenital syphilis. In 1954, only 48 new cases of infantile syphilis were seen at venereal disease clinics in England and Wales. While the smallness of this number is a matter for congratulation, it should be noted that in the same year the clinics were also treating 638 older children and adults with congenital syphilis.¹ These patients represent the known failures of prevention, and there must be many more who are at present unrecognized. Besides the risk of physical disabilities such as interstitial keratitis and nerve deafness, the congenital syphilitic may be handicapped in other ways. A medico-social survey of 200 families of congenital syphilitics carried out on Tyneside by W. V. Macfarlane and his colleagues² has shown that illegitimacy was twice as common among these children as in their uninfected siblings and that they more often followed less skilled employment.

The greatest hope for the eradication of congenital syphilis lies in the extension of routine antenatal testing of maternal serum. In 1952 the estimated number of births in the Tyneside area was 31,705, and W. V. Macfarlane found that, out of 15,812 antenatal Wassermann tests (50%), only 491 (3%) came from general practitioners who were remunerated for the care of 15,178 pregnancies.³ If these figures are applicable to the country as a whole (and experience in at least one London laboratory undertaking routine antenatal tests suggests that they may be), this method of preventing the disease is not being used as widely as it should be. While general practitioners are understandably reluctant to risk upsetting their patients, the taking of a blood specimen for

grouping and Rhesus-testing affords a means whereby serum tests for syphilis can also be carried out without disturbing the patient, except when a positive result shows the need for further investigation. The importance of the antenatal test is emphasized by S. M. Laird's experience in the Manchester area⁴: in 139 cases of congenital syphilis attending V.D. clinics no antenatal test had been carried out in 75, and in a further 19 it was performed so late in pregnancy that effective treatment could not be given before the birth of the child. Laird also illustrates by case histories the need for repeating the test in each pregnancy.

Only a very small proportion of blood samples from pregnant women give positive results to tests for syphilis. In 1954 the figure for seven blood transfusion centres doing this work was 0.25% among primiparae and 0.32% among multiparae.¹ At one London hospital only a minority of the women whose blood gave positive results when tested antenatally were unknown cases of syphilis; the majority were known syphilitic patients who had received adequate treatment in the past. Unfortunately pregnancy may be associated with non-specific serum reactions, and the application of the treponemal immobilization test to pregnancy sera has suggested that an appreciable proportion of positive results (perhaps one-fifth) are due to such reactions, especially when the serum tests are only weakly positive or give discordant results among themselves.⁵ The doubtful test should not, however, be lightly regarded, since it may indicate infection, as in the case described by F. J. G. Jefferiss.⁶ Because of this uncertainty it is very desirable that, when an antenatal test is found positive in the absence of any corroborative evidence of syphilis, a further specimen should be submitted to full serological investigation before any action is taken. The urgency of the decision about whether to give treatment or not often renders this a counsel of perfection, but if treatment is given before the diagnosis is established both mother and child should receive the same surveillance as is given to proved cases.

Infection of the foetus is thought not to occur before the formation of the placenta, and treatment is aimed either at preventing the penetration of the placental barrier, or, if given later in pregnancy, of "curing" the infected foetus *in utero*. The use of penicillin has transformed the outlook, and if effective treatment is given early in pregnancy the birth of a non-syphilitic child is almost a certainty. The need for retreatment of the mother during subsequent pregnancies is doubtful, but many physicians feel that she should be given an "insurance" course of

¹ Report of the Ministry of Health for the year ended 31st December, 1954. Part II. *On the State of the Public Health, 1955*, H.M.S.O., London.

² Macfarlane, W. V., Johns, Hilda M., and Schofield, C. B. S., *The Background of Congenital Syphilis. A Search for a Medico-social Pattern in 200 Families*. From the Department of Venereology, Newcastle General Hospital, Newcastle-upon-Tyne.

³ Quoted by Morton, R. S., *British Medical Journal*, 1954, 1, 1470.

⁴ Laird, S. M., *ibid.*, 1956, 1, 770.

⁵ Wilkinson, A. E., and Sequeira, P. J. L., *Brit. J. vener. Dis.*, 1955, 31, 143.

⁶ Jefferiss, F. J. G., *British Medical Journal*, 1954, 2, 1200.

treatment. When the mother is seropositive, her reagin may pass through the placenta into the child's circulation and it may be found seropositive at birth, although showing no clinical or radiological evidence of syphilis. In these circumstances the infant should not be immediately stigmatized as syphilitic, but repeated quantitative serum tests should be carried out. If the positive reaction is due to a "carry over" of maternal reagin, the child's tests become negative within a few weeks; whereas if it has been infected the titre tends to rise rapidly.

Although antenatal testing gives the best means of detecting and preventing the potential case of congenital syphilis, the routine examination of school-children affords another opportunity of bringing cases to light. Although Macfarlane and his colleagues² found 29.1% of dental abnormalities among their 172 patients, they noted that none of these had been referred to the clinic by dental surgeons. The recognition of a congenital infection is also important as a focus from which contact tracing can begin: in the Tyneside survey Macfarlane and his colleagues were able to examine 534 out of a possible 1,031 family contacts, and 254 of these were found to be infected.

Congenital syphilis is a preventable disease which, with the facilities already existing, could be greatly reduced below the present small incidence, if not completely eradicated. The occurrence of a case should be regarded as a reproach to those to whom the mother has entrusted the supervision of her pregnancy.

RESPONSIBILITY FOR HOMICIDE

The text of the Government's Homicide Bill, put forward in supersession of Mr. S. Silverman's Bill to abolish the death penalty for murder, contains sweeping provisions for the reform of the law of murder while retaining the death penalty for murders falling within certain categories. One of its provisions, if it becomes law, will reduce the importance of the M'Naughton Rules in murder trials in England. The effect of Section 2 of the Bill is to introduce into English law the Scottish doctrine of "diminished responsibility," which was recommended by the B.M.A. as an alternative to the plea of insanity in its evidence before the Royal Commission on Capital Punishment in 1950.¹ Lord Justice Clerk Cooper's definition of that doctrine is: "Even if a man charged with murder is not insane, still our law [Scottish] does recognize—although it is only latterly that it has done so—that, if he was suffering from

some infirmity or aberration of mind or impairment of intellect to such an extent as not to be fully accountable for his actions, the result is to reduce the quality of his offence in a case like this from murder to culpable homicide." The Association recommended that in such a case the jury should be able to find some such special verdict as "Guilty, with diminished responsibility." This section of the Bill provides that:

"Where a person kills or is party to a killing of another, he shall not be convicted of murder if he was suffering from such abnormality of mind (whether arising from a condition of arrested or retarded development of mind or any inherent causes or induced by disease or injury) as substantially impaired his mental responsibility for his acts and omissions in doing or being a party to the killing."

The onus of establishing this defence is laid, as it is in a plea of insanity, on the defence, but, if it is established, instead of a conviction of murder there must be a conviction of manslaughter. The part of the Bill in which this section is included does not apply to Scotland and does not affect the present Scottish law. The provisions of s. 2 are clearly far wider than the M'Naughton formula, but there will no doubt be many occasions when defence counsel will find difficulty in deciding whether it will be best for his client to plead insanity, with Broadmoor as the result if the plea succeeds, or to plead diminished responsibility under s. 2 and take a chance on the sentence for manslaughter which the court may think appropriate, knowing that after conviction there is still the opportunity while in prison for his client to be certified.

In many cases diminished responsibility under s. 2 will apply although the M'Naughton Rules will not. The medical evidence will then have to establish three points to the satisfaction of the jury: first, that the accused was suffering from abnormality of the mind; secondly, that the abnormality arose from a condition of arrested or retarded development of mind or from any inherent causes or was induced by disease or injury (it would be difficult to phrase the requirement more widely); and, thirdly, that because of the abnormality his mental responsibility for his acts or omissions in relation to the killing was substantially impaired. The last point may well give rise to the same sort of difficulty as that which the application of the M'Naughton Rules has made familiar. To argue about the impairment of mental responsibility by an abnormality is to speak in terms of philosophy rather than of medical science. No doubt this is deliberate, so that the ultimate decision is left to the jury, who will have to make what they can of the medical evidence called before them.

¹ *British Medical Journal*, 1950, 1, 365.

PROFESSIONAL COHESION

The Council of the Association, whose proceedings are published in this week's *Supplement*, spent much of its one day's meeting on November 7 in discussing the profession's claim for increased remuneration. Various speakers feared that members generally might believe the Council was being inactive: members were saying that "the Government would get away with it" and would succeed in dividing the profession. There was a call for "leadership," for the holding of special meetings in the Divisions. The debate showed that members of Council, and the Council as a whole, were anxious about the present delay and determined that our negotiators should be in no doubt of the Association's support in obtaining a speedy resolution of the matter. The long delay has made medical men look beyond the present dispute to the cause of it—namely, the National Health Service. One speaker confirmed the view previously expressed in the *Journal* that criticism had extended to the Service itself and was widespread. One remarkable example of this was the recent meeting of general practitioners called by the Edinburgh Local Medical Committee¹: "Those present were firmly of the opinion that the present structure of the National Health Service was fair neither to the patient nor to the doctor." It is evident that the dissatisfaction of recent correspondents is not just the grouching of a handful of malcontents.

The pettifogging arguments about whether a food is a drug, the form-filling, the regulations, earnest discussions on whether a week's leave not taken one year can be carried on to the next, the ever-increasing intrusion of the administrator both centrally and locally—all this and much more is turning medicine into an administrator's maze where the unfortunate doctor soon loses his sense of direction and will end up by losing his sense of profession. Small wonder, then, that increasing numbers of medical men and women feel frustrated and discontented, and look hopefully at the medical services in Australia and New Zealand to see if some of the lessons learned there could be applied here at home. No one suggests that perfection has been reached in these great Dominions. But the medical profession there, not to mention Canada, seems by and large to be contented, and the public to be satisfied with the medical care it receives. The existing widespread dissatisfaction in Britain with so many aspects of the N.H.S. is something more than an expression of the prevailing discontents in the professional classes. There is a feeling that the obstacles in the way of practising "good medicine"

¹ *Supplement to the British Medical Journal*, 1956, November 10, p. 181.

increase rather than diminish; that quantity counts more than quality; that in some unexplained way virtue has gone out of the profession: and on top of this there is the ubiquitous politician.

The politician all too plainly sees the Health Service as a principal piece on his political chess-board. A Minister of Health, with his present enormous powers, may by a rare coincidence be genuinely interested in the medical services and all that these entail. More likely than not he regards his post as one of the halting points in his career. All this degrades medicine, and the clamour grows for medicine to be taken out of politics. The National Health Service is not in a healthy state. We need to close our ranks, and examine and diagnose the causes of the malaise that besets the profession. We need to concentrate effort when it comes to negotiating with the Government on the outward and visible sign of our discontent: inadequate pay for work done, and, more important, breach of contract. There are growing stresses within the profession, and this is in itself still another, and serious, manifestation of the sickness of the N.H.S. It is no service to the profession to disguise these things, or to withhold critical and honest comment on the contemporary medical scene. There are signs now that what has been called the "conspiracy of silence" is being broken down, and men are becoming outspoken in their comments on the politicians' pipe-dream, the National Health Service. The probing, it is hoped, will continue. In the meanwhile we must unite and concentrate our forces to compel the Government to keep to its promised word, and give our negotiators all the support they need for persistent, courageous, and urgent action. If the outcome is successful they will have gained something more valuable than money: they will have realized the force of professional cohesion.

CARDIAC ARREST

During surgical operations the heart may stop beating from a variety of causes. They fall into three main groups: anaesthetic factors, the surgical procedure, and cardiovascular disease in the patient. All have been the subject of detailed review.¹ B. B. Milstein's Hunterian lecture, recently published,² is an authoritative account of incidence, aetiology, and methods of resuscitation.

Cardiac arrest secondary to asphyxia is perhaps the commonest and the most readily preventable. Electrocardiographic studies³ suggest that autonomic overactivity—either sympathetic or parasympathetic—can lead respectively to ventricular fibrillation or vagal inhibition. Cardiac disorders of this kind are more likely to occur in the presence of anoxia and hypercapnia.

The danger of ventricular fibrillation is greatest with anaesthetics which sensitize the heart to adrenaline (whether of endogenous origin or injected); such agents are chloroform, cyclopropane, and trichlorethylene. Ventricular fibrillation has been encountered during hypothermia; the exact cause in this instance is a matter of conjecture. Ventricular fibrillation may also be caused by electrolyte changes, in particular a rise in serum potassium, which can result from hypercapnia. Vagal inhibition can occur reflexly from the inhalation of irritant vapours or following surgical manipulation of branches of the vagus. Atropine will prevent this effect. Cardiac arrest during hypotensive anaesthesia is perhaps surprisingly rare; a very sudden induction of hypotension, leading to an acute fall in filling pressure and in coronary perfusion, may lead to cardiac arrest. During hypotensive anaesthesia asphyxial incidents are not tolerated and may lead rapidly to total circulatory failure. Among the surgical causes, cardiac arrest may follow gross haemorrhage or shock, air or fat embolism, and, more directly, surgery on the heart. In the last instance the problems of diagnosis and access for resuscitation are notably simplified. It is not surprising that the incidence of cardiac arrest is highest in the elderly, in poor-risk patients, and in patients with cardiovascular disease.⁴ In many cases of cardiac arrest during operations acute myocardial infarction has been found at necropsy.

Some authorities⁵ maintain that accurate determination of the aetiology of cardiovascular collapse or arrest is impossible in the absence of electrocardiography. Certainly electrocardiographic tracings may show a characteristic sequence of changes, which may be a guide to the resuscitative measures most likely to succeed. In the vast majority, however, an electrocardiograph will not be running and the diagnosis of cardiac arrest must rest on simpler and more immediate evidence: absence of carotid pulse, cessation of peripheral circulation, extreme pupillary dilatation, and absence of palpable or auscultatory heart beat. Once cardiac arrest is diagnosed there must be no delay in efforts to restore a circulation by cardiac massage, for absence of circulation for longer than five minutes (at normal body temperature) will be followed by irremediable neuronal damage. The heart may be approached from the upper abdomen through the diaphragm, but more effective massage is possible via a left thoracotomy incision. Subdiaphragmatic massage does not produce an effective circulation and so cannot be recommended. Artificial respiration with oxygen is maintained throughout resuscitation. Once some circulation is restored by effective cardiac massage attention can be directed to restoration of a normal heart beat. It has recently been observed that cardiac massage can very easily maintain cerebral cortical activity (and presumably viability), as

indicated by electroencephalography during periods of cardiac arrest. Electrical defibrillation may be indicated, or, if the heart is atonic despite massage and oxygenation, then intracardiac adrenaline in moderate doses may be of benefit. In some centres an artificial pacemaker is available and may help. Measures designed to promote an effective coronary flow are probably of the greatest value in restoring the heart beat, and to this end compression of the aorta during cardiac massage has been advised. The remarkable experiments of W. B. Kountz,⁵ who was able to revive cadaveric hearts by coronary perfusion, are encouraging evidence in this connexion.

It has recently been demonstrated that with suitably raised voltage both the electrical defibrillator and artificial pacemaker can be effective by means of external electrodes applied to the unopened chest, and these methods applied in sequence have thus been used successfully for cardiac resuscitation^{6,7}; such a course of action is attractive in that it can be applied when it is not feasible to open the chest. On the other hand, electrical defibrillation may not succeed on a dilated, anoxic heart until tone has been restored by massage. With a closed chest diagnosis of the state of the heart, even with the electrocardiograph, may be uncertain, and therefore such external attempts at resuscitation must not excuse a fatal delay in performing thoracotomy.

The chances of successful cardiac resuscitation vary according to the cause of the arrest and are lessened by pre-existing cardiac disease. A recent report⁴ records a recovery rate of 50% in cases treated for cardiac arrest. Successful resuscitation occasionally follows very long periods of cardiac massage, and the question therefore arises of when to abandon resuscitative measures⁸ in a case of cardiac arrest. There is no point in continuing massage when the heart ceases to fill in diastole: under these conditions massage will no longer produce a palpable pulse or other signs of effective circulation. When the duration of total circulatory arrest is such that extensive and irreversible neuronal damage is certain—a period slightly over five minutes at normal temperatures—then there is no chance of a successful outcome.

COMPRESSION OF CAUDA EQUINA

Lesions of the intervertebral disks cause much suffering among adults of all ages. The lesions may be the result of acute or chronic trauma or they may arise in its apparent absence. The amount of damage caused to the nervous system depends on the situation of the lesion—in relation to its level and to the nature of the herniation. In the cervical region compression of roots or spinal cord may give rise to symptoms varying from local paraesthesiae to complete tetraplegia. In the thoracic region, though herniation of intervertebral disks is much less common, compression of the spinal cord can readily occur, causing exceedingly severe symptoms and signs. These compression lesions have been well reviewed by J. E. A. O'Connell¹ and were discussed in these columns last year.² Reports of the clinical aspects of compression

of the cauda equina by prolapsed intervertebral disks have appeared from B. Fairburn and J. M. Stewart,³ and recently from W. B. Jennett,⁴ whose material consisted of 25 cases treated at Oxford with the addition of another 34 reported in the literature.

Most cases of sciatica are due to more or less severe lesions of the cauda equina, but Jennett concerns himself with those in which there are signs of profound bilateral sensory or motor loss. Sacral sensory loss and loss of control of the sphincters were almost invariable, and severe motor paralysis was present in nearly half the cases. The presence of signs of severe compression does not necessarily mean that there is massive protrusion of a disk, for other cases in which paralysis was just as sudden and complete were found to have relatively small herniations. These were associated with dense adhesive arachnoiditis. Little is known about this aspect of disk pathology or the extent to which it contributes not only to pre-operative symptoms and signs but also to post-operative sequelae. The condition may be found in patients operated on for a second time in whom myelography has previously shown free passage of the contrast medium. In just under half the cases in the Oxford series, which is the largest single group so far reported, paralysis came with the first attack of pain, and in a similar number it followed within a few days of the sudden onset of pain. The chief pointers to the diagnosis are a history of bilateral symptoms, sphincter disturbance coupled with sacral sensory loss, and weakness or paralysis of muscles in the lower limbs. The importance of careful sensory testing in the perineum is sometimes overlooked. On spinal manometry all these cases were found to have partial or complete block.

The sensory fibres of the cauda equina are preganglionic and therefore do not regenerate if destroyed. Motor recovery after acute compression is slow and often incomplete. Indeed, the results of the treatment of spinal-cord compression are often better than those of compression of the cauda equina, though complete paraplegia is very unusual after injury to the cauda equina and adequate walking ability is generally attained. The more sudden and severe the compression and the longer the duration before it is relieved, the worse are the prospects of recovery. Of 14 patients described by Jennett who had total loss of bowel and bladder control, only two regained full function, though most of the others could manage with occasional incontinence. It might be expected that these severer symptoms would be found more commonly in the upper lumbar regions, but the three lower lumbar disks accounted for all but eight of the 59 cases he reviewed. These lesions may give rise to fatal complications by virtue of their far-reaching effects, and two patients in the combined group died as a result of their prolapsed disk. A third died from an unrelated disease, but death was precipitated by the condition. This work again draws attention to the risks of manipulation, particularly under anaesthesia, for sudden movements were frequently the precipitating factors in

the cases reported. Emphasis must therefore be laid on the need for early recognition of the condition in order that patients may be saved from a life of crippledness and incontinence, possibly terminated by resulting complications, for, when treated in time, there is a fair probability of recovery.

HEPARIN-LIKE ACTION OF DEXTRAN SULPHATE

Complex polysaccharides or dextrans can be produced by microbiological activity, and during recent years there has been much study of dextrans produced from sucrose by *Leuconostoc mesenteroides*. During its growth this micro-organism produces an enzyme which polymerizes the glucose portion of sucrose to form dextran. The molecular size of natural dextrans is enormous and partial hydrolysis effects a reduction. Thereafter special techniques of fractionation allow graduation of molecular sizes and make possible the selection of a dextran with the desired distribution of molecular size.^{1,2}

When dextran is sulphated it has a heparin-like action: this is a property held in common with other polysaccharide sulphuric esters. K. W. Walton³ showed that the toxicity of these substances was related to their molecular weight and that the sulphuric ester of dextrans below a certain molecular weight was non-toxic. On these principles C. R. Ricketts and K. W. Walton⁴ prepared a dextran sulphate which had anticoagulant properties but was not toxic: this material has been given a clinical trial and favourably reported on in 1953.⁵ Comparison of the effects of single intravenous doses of heparin and dextran sulphate showed that the latter had a slightly longer duration of effect. When dextran sulphate was introduced, clinicians using anticoagulant therapy had become accustomed to and experienced in the use of heparin. Because dextran sulphate, though less expensive, was thought to have a similar action to heparin it has not been widely used as a routine anticoagulant. The studies reported a fortnight ago in this *Journal* by S. M. Jeavons, K. W. Walton, and C. R. Ricketts⁶ and H. Cohen and G. R. Tudhope⁷ should revive interest in the use of dextran sulphate in anticoagulant therapy. When this substance was given by intermittent intravenous injection it was found to have a marked cumulative effect if treatment was prolonged beyond three to five days. Thereafter a single daily intravenous injection of dextran sulphate was enough to produce a therapeutically effective prolongation of the clotting time. Although this method of treatment requires a daily venepuncture, so also does the use of coumarin drugs, necessitating the estimation of the one-stage prothrombin time, especially in the earlier weeks of treatment. The reasons for this cumu-

¹ Palomera, E. S., *Surg. Gynec. Obstet., Int. Abst. Surg.*, 1952, 95, 313.

² Milstein, B. B., *Ann. roy. coll. Surg. Engl.*, 1956, 10, 69.

³ Johnstone, M., *Brit. J. Anaesth.*, 1955, 27, 566.

⁴ Briggs, B. D., Sheldon, D. B., and Beecher, H. K., *J. Amer. med. Ass.*, 1956, 160, 1439.

⁵ Kountz, W. B., *Ann. Intern. Med.*, 1936, 10, 330.

⁶ Zoll, P. M., Linenthal, A. J., Gibson, W., Paul, M. H., and Norman, L. R., *New Engl. J. Med.*, 1956, 254, 727.

⁷ Norman, L. R., and Belgard, A. H., *Circulation*, 1954, 9, 482.

⁸ Leech, B. C., *Canad. anaes. Soc. J.*, 1956, 3, 142.

¹ O'Connell, J. E. A., *Brit. J. Surg.*, 1955, 43, 225.

² *British Medical Journal*, 1955, 1, 1020.

³ Fairburn, B., and Stewart, J. M., *Lancet*, 1955, 2, 319.

⁴ Jennett, W. B., *J. Neurol. Neurosurg. Psychiat.*, 1956, 19, 109.

¹ Ricketts, C. R., Lorenz, L., and Maycock, W. D'A., *Nature (Lond.)*, 1950, 165, 770.

² Ricketts, C. R., *Proc. roy. Soc. Med.*, 1951, 44, 558.

³ Walton, K., *ibid.*, 1951, 44, 563.

⁴ Ricketts, C. R., and Walton, K. W., *Brit. J. Pharmacol.*, 1953, 8, 476.

⁵ — van Leuven, B. D., Birbeck, A., Brown, A., Kennedy, A. C., and Burt, C. C., *Lancet*, 1953, 2, 1004.

⁶ Jeavons, S. M., Walton, K. W., and Ricketts, C. R., *British Medical Journal*, 1956, 2, 1016.

⁷ Cohen, H., and Tudhope, G. R., *ibid.*, 1956, 2, 1023.

lative effect of dextran sulphate, as compared with heparin, have been investigated. The difference could not be ascribed to varying urinary excretion. It may be that the dextran has a slower rate of metabolic breakdown in the body, permitting accumulation, possibly in extravascular fluid. Cohen and Tudhope also report that treatment with dextran sulphate caused an initial fall in serum total cholesterol. When the dose was reduced to 5,000 units daily as a consequence of the cumulative effect, the lower cholesterol level was generally not maintained: the reduction only persisted while the dosage was 10,000–15,000 units daily. An occasional complication, which has also been reported with heparin, was alopecia coming on after two or three weeks of continuous treatment. Cohen and Tudhope also reported the occurrence of diarrhoea with blood in the stools in two patients, and it is clear, therefore, that dextran sulphate must be used with care.

VAGINAL EXAMINATION IN LABOUR

The relative importance of the various causes of maternal morbidity and mortality has changed over the years, as was remarked on recently in these columns.¹ That infection has receded in importance in the last quarter-century is shown by statistics as well as by the diminishing space devoted in successive editions of obstetric textbooks to puerperal sepsis. Various factors have contributed to this favourable development, notably better antenatal care, advances in techniques of asepsis and antisepsis, and the advent of chemotherapy and antibiotics. When, however, the dangers of exogenous infection were first appreciated, vaginal examination in labour began to be regarded as dangerous, and the practice of checking the progress of labour by palpation per rectum was taught to medical students and pupil midwives. It is likely that the pendulum swung too far and that the dangers of vaginal examination in labour, with adequate precautions against introducing infection, were overemphasized. Many textbooks still assert that the vast majority of labours can be conducted safely without a single examination by the vaginal route, but recent years may have seen more liberal views appear. But few obstetricians would give unqualified support to the opinion, recently aired,² that, in hospital practice, repeated clean (but non-sterile) vaginal examinations can be made to follow the progress of labour without added risk to the parturient. Childbed fever is no longer the scourge of midwifery, but deaths from infection still occur.

Rectal examination in labour is not devoid of drawbacks. Most women find it more unpleasant, if not more painful, than when the vaginal route is employed. During the performance the posterior vaginal wall, which is not surgically clean, is rubbed against the cervical os when the degree of dilatation is being assessed. And the findings per rectum are sometimes uncertain or unreliable. This is especially true with regard to dilatation of the os in prolonged labour, particularly when

associated with incoordinate uterine action. In such cases the cervix often has a thin zone immediately surrounding the external os and a thicker zone peripherally, and the junction of the two may be mistaken by the finger in the rectum for the ring of the os.

What then are the indications for performing a vaginal examination in labour? The answer is—when ever an exact assessment is required and rectal examination either is unlikely to suffice or has proved insufficient for this purpose. This is most likely to occur when there is delay in labour; but, whenever the attendant is in doubt about the position of the baby, the degree of dilatation, or the progress of a trial labour, vaginal examination should be carried out without hesitation. Due precautions must be taken against introducing infection, and if there is vaginal bleeding the operating theatre is the best place for performing the examination in case placenta praevia is encountered. The onset of foetal distress is also an indication for using the vaginal route, both to exclude compression of the umbilical cord and to ascertain whether the baby can be quickly and safely delivered from below or whether caesarean section is necessary to save it. Indeed, in many training centres pupil midwives are taught to perform vaginal examination, with the full ritual of precautions, in every labour at the time of rupture of the bag of membranes. This is a suitable time to exclude prolapse of the cord and for a thorough assessment of the progress of the labour. It is true that, if the head is deeply engaged and the labour clinically normal, vaginal examination at this time is not strictly necessary; but those who practise midwifery must obtain considerable and continuing experience of the normal "touch-picture" if they are to appreciate the uncommon abnormal.

GOWERS MEMORIAL LECTURE

Earlier this week, on November 15 at the Royal Society of Medicine, Sir Francis Walshe, F.R.S., delivered the first Gowers Memorial Lecture, choosing as his subject "The Nature and Dimensions of Nosography in Modern Medicine." The funds endowing the lecture are part of a sum left by the two daughters of Sir William Gowers to commemorate their father's name. Part of the bequest has been used to establish a library of general books for the use of both patients and staff at the National Hospital, Queen Square, the hospital with which the name of Sir William Gowers will always be associated. As Sir Gordon Holmes¹ wrote at the time the library was opened: "To him (Sir William Gowers) the National Hospital is largely indebted for the high level of its clinical practice; few have added so much to its reputation as a centre of scientific medicine or contributed more to its policy as a teaching school." It is fitting that the first Gowers lecturer and recipient of the Gowers Memorial Medal (see p. 1185) should be Sir Francis Walshe, who has himself so notably carried on both at the National Hospital and at University College Hospital the clinical traditions established by Sir William Gowers and the other eminent founders of modern neurology.

¹ Holmes, G., *British Medical Journal*, 1951, 2, 1397.

THE EMPLOYMENT OF THE RHEUMATOID ARTHRITIC*

BY

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AND

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The rheumatoid type of arthritis is one of the most variable disorders encountered in medical practice. Unfortunately those cases which run a long, painful, and crippling course have so influenced doctors, social workers, employers, and the public that many of them tend to take an unduly pessimistic view of the employment prospects in this disease. It is forgotten that many rheumatoid arthritis often causes little disability. Many patients continue to work throughout their illness; others return to their own or more suitable jobs after a few weeks or months; and only a minority are unable to work for a prolonged period.

Course of Rheumatoid Arthritis

The disease cannot be divided into clear-cut stages, but it is helpful if early and late cases are considered separately. The early stages are characterized by active inflammation, but this is often mild, and many patients continue at work, while some even fail to consult their doctor. When the activity is more severe work may be impossible, but this depends as much on the nature of the job as on the severity of the disease. Unexpected exacerbations and remissions are common and make prognosis extremely difficult.

After a variable period of months or years the inflammation usually subsides and function improves as a result. Although there may be some superadded fluctuation in joint activity from time to time, the arthritis is now more stable and predictable. The permanent deformities and degenerative changes usually increase slowly, but their extent is very variable. Often they are not severe. Kellgren, Lawrence, and Aitken-Swan (1953), in a field survey, found that half of the rheumatoid arthritics in a population sample had lost no working time for five years.

Medical Responsibility for Employment Problems

Rheumatoid arthritis is an unstable disorder in sharp contrast to stable disabilities such as the loss of a limb, blindness, or residual paralysis after poliomyelitis. In the stable disabilities it is usually possible to conclude treatment and medical rehabilitation. Then welfare and employment officers can take the responsibility for resettlement into suitable living and working conditions with only limited medical guidance.

In rheumatoid arthritis finality is seldom reached in the treatment, rehabilitation, or resettlement of a difficult case. Furthermore, assessment for work is largely a medical matter requiring clinical examination and an understanding of the potential function and prognosis in each patient. With difficult employment problems it is never enough to fill in a reference form and leave the rest to lay personnel. The physician must take an active interest himself and co-operate with employers, personnel managers, and employment officials at all stages to ensure that his patient is guided into suitable work.

Resettlement Conferences

At King's College Hospital resettlement conferences have been held regularly for several years. These are designed to assist the resettlement of patients with disabilities of many

*Read in the Section of Physical Medicine at the Annual Meeting of the British Medical Association, Brighton, 1956.

kinds and have proved particularly helpful for rheumatoid arthritics. They are attended by the physician, the disablement resettlement officer (D.R.O.) from the local employment exchange, the almoner, the occupational therapist, the physiotherapist, and the patients. These conferences have been an education to all concerned and have created a very helpful liaison with the D.R.O. He is essential, for he knows what work is available, what it involves, and whether the patient's training and ability are adequate.

Results are not as good when patients come from other districts where direct liaison with the D.R.O. is lacking. This is not the fault of the D.R.O., for he cannot be expected to appreciate all the medical aspects of an individual case, and the standard form is no substitute for direct discussion. Under such circumstances better results are sometimes obtained if the almoner makes direct contact with employers who are known to be co-operative.

Management of Rheumatoid Arthritis in the Early Stage

From the start patients must be helped to understand their disease and how to live with it. In particular it is important to allay the great fear so often experienced, but not always expressed, of being crippled and unable to work or to undertake household duties. It is also necessary to make clear to patients the limitations imposed by their disease. All too often they persist in an unjustified belief that they will eventually return to their original work. This may keep them unemployed long after they are capable of doing more sedentary work without difficulty. Indeed, it is too much to expect that they will make the decision to change their work without a full understanding of their disease and its implications. For instance, to obtain employment a disabled farm-worker may need to take his family to a neighbouring town where light engineering work is available. Without a full explanation from the doctor he may stay on in the country indefinitely, hoping for an impossible measure of recovery.

It is also wise to consider a patient's employment at the earliest opportunity. This should not be left until the active phase has subsided. Apart from saving time, the doctor's interest in return to work is good for morale.

The patient's customary work must be taken into account from the outset, and it is a fortunate circumstance when it is of a sedentary nature. If the work involves heavy manual labour or much walking or climbing, the patient will have to change to more suitable work sooner or later. Unless there is early recovery he should be advised to accept the necessity to change his work, and plans should be made for resettlement as soon as possible. Labourers in heavy industry and the building trades are a particular problem, for usually they have attained only a low educational standard. When their disability enforces a change of occupation it is always difficult to find alternative jobs, as most of them are suitable only for unskilled manual work.

The change from moderate activity to still lighter work may be necessary, but this is never an easy decision to take. Two factors need to be considered. Reduced physical activity usually favours the joints. On the other hand, change of employment often involves less skilled work and lower wages, except for young patients who are able to undertake a full course of vocational training. Sometimes it is best to temporize and advise sedentary employment well within the patient's physical capacity until the joint activity has subsided. This is certainly better than no employment at all and does not prevent the patient from obtaining more suitable and highly paid work when his condition improves.

A period of rest from work is sometimes advisable. Whether to insist on rest or to allow patients to continue at work is a difficult decision which may have to be taken several times in the course of the disease. General rest and local rest for the affected joints are probably the most effective forms of therapy at any stage. On the other hand, patients who are busily occupied in work within their physical capacity are often less conscious of pain and less apprehensive about their disability than those who are off work and have little to do beyond attending hospitals for

¹ *British Medical Journal*, 1956, 2, 932.

² Fara, F. J., Steward, M., and Standard, J., *Amer. J. Obstet. Gynec.*, 1956, 72, 1.

The purpose of this letter is to call attention to the importance of species diagnosis. It seems not to be generally realized that, at least in tropical Africa, *P. falciparum* (malignant tertian) is the dominant species of malaria.

somewhere in the region of 90% of all species. Yet laboratory returns show that about 50% of positive blood films are diagnosed as *P. vivax*. Our records show that over 10% of films diagnosed as *P. vivax* were, on re-examination, found to be *P. falciparum*, all from tropical Africa. The principal reason for this margin of error is probably due to the fallacy that if the parasites seen are a little larger than the very small ring stage then the species cannot be *P. falciparum*. This is not so, especially in patients who have had several days of fever in the primary attack before reporting sick. In these patients the parasites may be a mixture of minute ring forms, growing trophozoites, and even pre-segmenting forms. The presence of *P. falciparum* parasites in the peripheral blood beyond the young ring form is usually an indication of a severe infection and calls for immediate and drastic treatment, unlike all other species of human malaria.¹

It is not difficult to diagnose correctly *P. falciparum* parasites if it is remembered that in this species: (1) There is no enlargement of the host cell. (2) Ten to twenty per cent. of the host cells may harbour two or more ring forms. (3) Ten per cent. or more of the ring forms may show a double dot of chromatin. (4) In the trophozoite and later stages the pigment is one or two solid lumps, as against 50 or more grains in all other species (this is of the greatest significance). (5) Numerous ring forms are on the periphery of the host cells—marginal or *accolé* forms.² (6) Stippling (Maurer's dots) consists of about ten grains and is a mixture of dots, streaks, and loops, as against uncountable numbers of stippling dots of equal size in all other species, and distributed evenly over the cytoplasm of the parasite.—I am, etc.,

P. G. SHUTE,
Assistant Director,
Malaria Reference Laboratory,
Epsom, Surrey.

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- ² ——— *British Medical Journal*, 1951, 2, 1280.

Cholesterol and Vascular Disease

SIR,—I was very interested to read Dr. J. G. M. Hamilton's account of the recent B.M.A. visit to the U.S.S.R., and especially to see the photograph of Professor Pickering in conversation with Professor Anitchkov (*Journal*, November 3, p. 1049).

Anitchkov and I were together in Aschoff's laboratory in Freiburg im Breisgau in 1911–12, and I knew him very well. I heard all about his work (with Chalator) on the experimental production of atherosclerosis in rabbits by feeding them through a stomach-tube with cholesterol dissolved in sunflower oil, and on my return to Glasgow repeated these experiments in Sir Robert's Muir's department. The results were the same as those described by Anitchkov—extensive changes in the walls of the aorta and large arteries and even development of aneurysms. I reported these results at a meeting of the Association of Physicians in, I think, 1913,¹ where they attracted considerable interest, especially from the late Sir Clifford Allbutt. I next tried the same experiments in cats, but they were totally unsuccessful. So far as I know, no one has produced results in carnivorous or mixed-feeding animals, which seemed to me to rob the work of much of its importance in its possible bearing on human disease. I have been told that, in experiments done abroad, hanging up rabbits by the hind legs for periods every day will eventually bring about similar effects. My results were never published in any journal, for the 1914 war and its new problems enveloped me soon afterwards. They would have added little to Anitchkov's work.

In view of the present interest in cholesterol in relation to human vascular disease, I think it is worth repeating that the experiments were only successful in herbivorous animals—rabbits.—I am, etc.,

Winchester.

JOHN W. MCNEE.

REFERENCE

- ¹ McNee, J. W., *Quart. J. Med.*, 1913–14, 7, 221.

Delayed Emptying of Gastric Stump after
Gastrectomy

SIR,—The problem of the gastric stump which fails to empty after gastrectomy is fortunately rare, but it may occasionally be serious or even fatal. It has often been discussed in the American and Continental literature, but has hardly been mentioned by British authors. The problem is this. After gastrectomy the patient recovers in the usual way, bowel sounds return in two to three days, wind is passed per rectum, and the abdomen remains soft and flat. The gastric aspirations, however, remain large for many days and far more fluid is withdrawn than the patient drinks. Bile is usually absent, but there may be traces of it occasionally. If the gastric tube is withdrawn the patient vomits and barium meal remains in the stomach until it is vomited or aspirated. If the abdomen is re-explored a wide, healthy-looking stoma is found and the surgeon is at a loss to account for its failure to transmit fluid.

Many causes and remedies have been suggested, of which the following are a few: (1) inflammatory oedema (treat with antibiotics or intra-gastric adrenaline); (2) gastric atony (treat with cholinergic drugs); (3) neuro-muscular imbalance (treat with intra-gastric local anaesthetics or left-sided paravertebral block); (4) hypoproteinaemic oedema (correct fluid and electrolyte balance). My experience has been that gastric emptying is more often delayed after a gastro-duodenal than after a gastro-jejunal anastomosis, and that vagotomy performed at the same time as gastrectomy causes no more trouble than gastrectomy alone. There has been no evidence that hypoproteinaemia or hypokalaemia was responsible. Gastric aspiration and maintenance of the fluid and electrolyte balance have always been successful, and on two occasions they have been continued for two weeks. Recently, however, I encountered a patient whose stomach did not start to empty until 24 days after operation and in whom more active measures were taken.

She was a spinster aged 41 with a posterior simple gastric ulcer, 5 cm. in diameter, and adherent to the pancreas. It had been present for eight years, had perforated seven years previously, and had caused repeated small haematemeses. Anaemia was corrected with blood transfusion and iron intramuscularly, and on August 8, 1956, she underwent gastrectomy. The operation was difficult, but the stomach was divided above the ulcer and a gastro-duodenal anastomosis was performed. The stoma was not as wide as it might have been, but it admitted a finger. An incisional hernia was repaired at the same time. Post-operatively everything went well except that for 12 days the gastric aspirations remained two or three times greater than the oral intake, which was 30 ml. of water hourly. The serum potassium fell to 2.5 mEq per litre for two days, but its correction had no effect on the stomach. A barium meal remained in the stomach for at least six hours. Because the stoma might have been too small, the abdomen was reopened on August 21. The stoma appeared quite adequate and uninfamed. However, it was undone and a gastro-jejunal anastomosis, which admitted two fingers with ease, was performed. A Ryle's tube was passed through the stoma to allow jejunal feeding. The stomach was not aspirated until two days later, when a small quantity of foul-smelling fluid was vomited. The Ryle's tube was then pulled back into the stomach and 100 ml. of thin pus was aspirated. Thereafter water was given by mouth, the stomach was aspirated as before, and the fluid became clear within a day or two. A polythene tube was inserted via the long saphenous vein into the inferior vena cava and was used for giving concentrated glucose as well as water and electrolytes. There was still no improvement, however. The aspirations remained large and were unaffected by adrenaline (20 ml. of 1 : 1,000 via the gastric tube), lignocaine ("xylocaine viscous") (20 ml. by the same route) or "mecothane" (5 mg. by subcutaneous injection). By August 30 there were signs of severe infection, uncontrolled by penicillin, streptomycin, and tetracycline. The temperature rose to 103.6° F. (39.8° C.) and the pulse rate increased. The abdomen remained soft and flat and bowel sounds were present. Radiography and a leucocyte count showed no sign of a subphrenic abscess. The most likely sources of infection were the indwelling gastric and intravenous tubes, and a feeding jejunostomy was performed so that the intravenous catheter could be removed and the patient fed adequately.

Erythromycin (500 mg. followed by 250 mg. six-hourly) was introduced through the jejunostomy, but no feeds were given at first. Two days later (September 1) the blood pressure fell to 80/50 mm. Hg, and the serum sodium concentration was being maintained with difficulty. These findings suggested the possibility of adrenal exhaustion following the period of starvation, and hydrocortisone (300 mg. in 24 hours) was given intravenously. At the same time feeds (which included the gastric aspirations) were started through the jejunostomy and the patient was given chlorpromazine (25 mg. three times a day via the jejunostomy) to relieve her mental anxiety. The next day (24 days after the original gastrectomy) the temperature was normal, the blood pressure was rising, the patient felt much better, and the gastric aspirations fell to less than the oral intake. The Ryle's tube was removed, oral feeding was started, and recovery thenceforth was rapid.

There are several points of interest. First, why did the stoma start to work after 24 days? Did it do so "spontaneously," or because of erythromycin, hydrocortisone, or chlorpromazine? We shall certainly try these remedies next time we meet the same problem. Secondly, a feeding tube for the jejunostomy is much better than an intravenous tube for the prolonged administration of food. The jejunostomy should probably have been made the first time the abdomen was re-opened, once it was seen that there was no organic obstruction. Thirdly, the simplest solution to the problem might be to pass a double tube at the time of gastrectomy. One lumen would drain the stomach in the ordinary way and the other would go through the stoma and could be used for feeding if the stomach failed to empty. Perhaps others with more experience of this problem will tell us where the fault lies and how the condition can be treated or prevented.—I am, etc.,

Belfast.

RICHARD B. WELBOURN.

Medical Relief Appeal

SIR,—The Medical Association for the Prevention of War, in common with all members of the medical profession, has been deeply concerned at the events of the last two weeks. The tragic abandonment of the rule of law, and the renewal of violence in the Middle East and in Eastern Europe, have done much to destroy the gains which had been won for a saner attitude in world affairs.

Our association was formed, as its name implies, in the cause of preventing war. In view of what has occurred, we wish also to take some steps to minimize its effects. We are therefore appealing as a matter of urgency to our colleagues in the profession for contributions towards the purchase of medical supplies, which will be made available in kind to the International Red Cross for use in whichever theatre of war they are then most urgently needed in. We also urge our colleagues to support us in pressing upon all the Governments concerned a return to the attitudes of humanity and responsible conduct which seemed lately to be gaining acceptance among them.

Contributions should be sent to the treasurer of the association, Dr. A. F. Mohun, 168a, Finchley Road, London, N.W.3, and not to any individual officers of the association.—We are, etc.,

ALEX. COMFORT.
RICHARD H. DOBBS.
PHYLLIS DOBBS.
RICHARD DOLL.
S. FAZEKAS.

DAVID KERR.
DUNCAN LEYS.
DOUGLAS MCCLEAN.
A. F. MOHUN.
LIONEL PENROSE.

London, S.W.17.

Tests for Drunkenness

SIR,—The letter by Mr. G. F. Rowbotham (*Journal*, October 20, p. 941) has just been brought to my attention. Police have the heavy responsibility of arresting an individual when apparently under the influence of drink or drug so as to be incapable of having proper control of a motor vehicle. Surely, therefore, the primary object of calling a doctor is to make sure that the apparent condition causing the arrest is not due to illness or other cause giving the same symptoms as "drunk in charge." For similar reasons the prisoner is given an opportunity of calling his own

doctor (particularly helpful knowing the individual and his medical history) or, as an alternative, any other doctor.

The general police practice is to take all persons arrested to the nearest police station, where a senior officer has the responsibility of accepting or refusing the charge. Persons injured or seriously ill would of course be taken direct to a hospital. It follows, or so I suggest, that police are not bound to accept medical evidence, and cases have occurred where, for example, an accused has sobered up very quickly on arrival at a police station, and a conviction has been obtained despite medical evidence being in favour of the accused. In general, however, police would never go against medical evidence where illness was masked by drink.

It is suggested that, with the law and police procedure as it is—with the onus of proof on the prosecution—there is really little defective with the system of examination at police stations. A much more serious practical difficulty would be the question of obtaining three doctors quickly with the necessary experience and qualifications in all but the large centres of population, bearing in mind the vital importance of quick examination.—I am, etc.,

W. J. KELLY,
Superintendent,
Leicestershire and Rutland Constabulary.

Anaesthesia and Apnoea Neonatorum after
Caesarean Section

SIR,—In the *Journal* of July 28 (p. 241) Dr. Joseph Taylor, of Tanganyika, refers to the use of spinal anaesthesia in preventing apnoea neonatorum after caesarean section. There is no doubt of the value to the baby of this technique, but with regard to the mother I would like to strike a note of warning—especially since Dr. Taylor has to act as surgeon as well as anaesthetist. Under these circumstances one hears of the sudden collapse of the patient "even before the operation could be started." This collapse may be due either to hypotension or to respiratory embarrassment. In the series of over two hundred caesarean sections performed under spinal analgesia at the Christian Medical Hospital during the last three years¹ there were four cases of intercostal paralysis that needed artificial respiration for some time.

I consider spinal block to be a safe, and under certain circumstances desirable, method of anaesthesia for caesarean section provided (1) there is someone trained to care for the patient while the surgeon operates, and (2) that means for artificial respiration—e.g., the Oxford inflating bellows—are available.—I am, etc.,

Vellore, S. India.

GWENDA M. LEWIS.

REFERENCE

- ¹ Lewis, G. M., *J. Christian med. Ass. India*, 1956, 31, 200.

Anaesthetic Deaths

SIR,—A large number of hospitals in Britain have inadequate and sometimes quite primitive operation theatres. This accommodation creates a serious bottleneck in the hospital service and is an important cause of that tendency for our hospitals to become "surgical sausage machines," as Dr. John E. Elam writes in his letter (*Journal*, October 27, p. 995).

The miserably inadequate theatre accommodation in many of our hospitals compels the use of those theatres for a major part of the day and night. Even planned operations must often be fitted into an overburdened surgical programme, and many an emergency is unduly delayed before operation. Most surgical teams are unable to use two theatres for a list and therefore work unnecessarily long hours. Patients sometimes wait all day for operation, or even suffer the extreme upset and inconvenience of being put off until the following day. Unconscious patients frequently return from the theatre in the late afternoon or evening and are still in need of careful observation when only a sparse night staff is available. In these circumstances it is a cause for wonder that more disasters do not occur.

A number of the misadventures to which your leading article refers (*Journal*, October 13, p. 868) would be avoided if hospitals were provided with generous theatre suites and ample recovery rooms. It is no exaggeration to say that in many places the theatre accommodation needs to be doubled, and the profession would be well advised to press vigorously for the necessary reforms. Not only would this ensure that patients are dealt with more safely and expeditiously, but it would also greatly relieve the strain on the surgical and nursing staff, to which Dr. Elam has also referred.—I am, etc.,

Radlett, Herts.

R. S. MURLEY.

Case of Fetishism Treated by Aversion Therapy

SIR,—In a recent report of the treatment of a case of fetishism by aversion therapy (*Journal*, October 13, p. 854) it was suggested by Dr. M. J. Raymond that the predisposition to fetishism "may lie in an unusual capacity to form conditioned responses, and that this capacity may be used as an asset in treatment." If, with Pavlov, we accept that the ability to condition is a general property of the nervous system, then an objective and quantitative method of assessing conditionability before the onset of treatment would be of prognostic value. As part of a series of investigations being carried out in the psychology department of the Institute of Psychiatry (Maudsley Hospital) such a technique has been developed.

Furthermore, it has been demonstrated experimentally that certain normal personality types (introverts) form conditioned responses very readily, whereas others (extraverts) form conditioned responses much less readily; also certain types of neurotics (anxiety states, obsessive-compulsives, reactive depressives) form conditioned responses readily and others (hysterics, psychopaths) form conditioned responses only with difficulty.¹ It may be that much of both normal and abnormal behaviour is explicable in terms of the ability to form conditioned responses. For example, it has been suggested² that certain aspects of delinquent behaviour may be expressed in terms of a capacity or lack of capacity to form conditioned responses. In the specific cases cited by Dr. Raymond we would expect to find that the patient formed conditioned responses with ease and had a particular kind of personality.

It should be possible to use these techniques both as an aid to diagnosis and as a prognostic predictor of success in treating the patient by any form of therapy based directly upon conditioned responses and learning theory.³ In this latter respect it should be observed that drugs may be used in two distinct ways. They may be used in the manner reported by Dr. Raymond, in which the aim is to produce a conditioned aversion in which the effects of the drug are evoked by a stimulus which originally produced a quite different response. Drugs may also be used as stimulants or depressants directly to facilitate or hinder the formation of any new conditioned response or the expression of an existing one.⁴ Both uses have their place in any form of therapy based upon conditioning or learning theory.—I am, etc.,

London, S.E.5.

CYRIL M. FRANKS.

REFERENCES

- 1 Franks, C. M., *J. abnorm. soc. Psychol.*, 1956, 52, 143.
- 2 ———, *Brit. J. Delinqu.*, 1956, 6, 192.
- 3 Jones H. G., *J. abnorm. soc. Psychol.*, 1956, 52, 414.
- 4 Franks, C. M., and Laverly, S. G., *J. ment. Sci.*, 1955, 101, 654.

Neostigmine-resistant Curarization

SIR,—We were most interested to read of Dr. A. R. Hunter's experiences with cases of neostigmine-resistant curarization (*Journal*, October 20, p. 919). During the past twelve months we have seen three of these cases in this hospital and one of us has previously seen two such cases in another hospital. All of these cases were in poor general condition, exhibiting various degrees of dehydration and electrolyte upset. Notwithstanding, as in the case of the patients described by Dr. Hunter, they had all been accepted in the circumstances as fit for general anaesthesia and opera-

tion. The most recent one is perhaps of greatest interest, not least because it is the only case we know of where recovery has taken place.

This was a small wizened lady of 67, weighing 6½ st., who had previously had an operation at this hospital for relief of intestinal obstruction. On that occasion her electrolytes were estimated as follows: Na 121 mEq per litre; K 5 mEq per litre; NaCl 71 mEq per litre; CO₂CP 32 mEq per litre; blood urea 204 mg.%. At operation a band obstruction of ileum was relieved and the anaesthesia was uneventful. On her second admission to hospital one month later she again presented as an intestinal obstruction. Her electrolytes were: Na 112 mEq per litre; K 3 mEq per litre; NaCl 65 mEq per litre; CO₂CP 38 mEq per litre; blood urea 72 mg.%. Anaesthesia was induced with thiopentone 150 mg. and gallamine 80 mg. All spontaneous respiration ceased and a cuffed No. 9 oral tube was easily passed. Anaesthesia was maintained by controlled respiration with nitrous oxide/oxygen for the duration of the operation—one hour—during which an obstruction of the small bowel due to adhesions was relieved. At the end of the operation there was still complete apnoea and no reaction to tracheo-bronchial irritation, and this state was apparently unaffected by the administration of 5 mg. of neostigmine and atropine 1/50 gr. (1.3 mg.) in divided doses. The patient was attached to a Blease pulmoflator and respiration was thus artificially maintained for five hours, during which numerous attempts were made to restart normal breathing by the periodic introduction of CO₂ into the gas mixture, switching off the machine for a period, and giving intravenous nikethamide and bemegride. At the end of this time, very slight spontaneous respiration of the heavily curarized type commenced. This was insufficient to maintain colour and circulation, but slowly increased in volume during the periods when the pulmoflator was switched off. At the end of a further hour, atropine 1/100 gr. (0.65 mg.) and neostigmine 1 mg. were given. This was followed by marked improvement in respiration and a further 4 mg. of neostigmine and 1/100 gr. (0.65 mg.) of atropine were given. Tidal volume improved greatly and respirations became normal in character. The tube was removed in a further five minutes, the laryngeal reflexes now being in evidence, and the patient made an uneventful recovery, although hypotension required a noradrenaline drip for some hours.

All the other cases which we have seen have been of the same type—that is, a history of vomiting usually prolonged and fairly severe causing upset in electrolytes and hydration. Unlike Dr. Hunter's patients, ours have all had a frank obstruction rather than a primary peritonitis and ileus. In the case described, the lowered serum potassium might seem to indicate the cause of the condition as suggested by Dr. Hunter, but in one of our other cases the potassium was estimated as 5 mEq per litre.

These cases undoubtedly present a serious problem to the anaesthetist and Dr. Hunter has done a service in drawing attention to their existence. We do not, however, feel too happy about his suggestion regarding the use of a suxamethonium drip, as it is in this type of patient that one might expect to find a lowered pseudocholinesterase level. Regional analgesia would seem to be the answer for the moment, although the great problem is to diagnose the existence of the condition beforehand.—We are, etc.,

Belfast.

W. E. B. SCOTT.
J. C. CLARKE.

SIR,—I have read with interest Dr. A. R. Hunter's article on neostigmine-resistant curarization (*Journal*, October 20, p. 919). I first met this problem two years ago. I was summoned on two occasions by a resident anaesthetist because the patient would not breathe adequately following an emergency operation. In each case it was an operation on an elderly patient suffering from intestinal obstruction. The anaesthetic situation was as described by Dr. Hunter: intubation performed with suxamethonium and further relaxation provided by one of the "competitive blocking" relaxants. Maintenance of anaesthesia was with nitrous oxide and oxygen and intermittent pethidine, using controlled respiration with carbon dioxide absorption. In each case the end result was the same—failure to establish satisfactory respiration in spite of adequate doses of neostigmine preceded by atropine. The patients died some hours later

from circulatory failure. On the day on which Dr. Hunter's paper appeared I met my third case of this syndrome—which ended in the same fashion as the others.

I should like to emphasize that other causes of this condition were considered: the soda-lime was changed, carbon dioxide was allowed to accumulate, nikethamide and nalorphine were all tried. Necropsy showed no cerebral lesions. The patient looked the picture of "curarization"—that is, inadequate respiration with well-marked tracheal tug. There are two features which appear significant in these cases: (1) all responded in a normal manner to suxamethonium, and (2) all suffered from either intestinal obstruction or ileus.

Dr. Hunter has tentatively proposed that the condition may be due to a low blood potassium. It is known that when depolarization occurs after the injection of suxamethonium there is an outpouring of potassium ions from the muscle cells into the plasma, sufficient to cause a persistent substantial increase in the plasma potassium level.¹ The third case quoted above and one of Dr. Hunter's cases received stored blood, which is rich in potassium ions. This suggests that low blood potassium is not the answer. Could it be that some toxin formed in the lumen of obstructed bowel is synergistic with the "competitive" group of relaxants and this interferes with the normal depolarizing action of acetylcholine, as occurs with the toxin of *Bacillus botulinus*?²—I am, etc.,

Ely, Cambs.

K. A. STEWART.

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- 1 Paton, W. D. M., *Brit. J. Anaesth.*, 1956, 28, 472.
- 2 Gray, T. C., in *Modern Practice in Anaesthesia*, 1954, edited by F. T. Evans, 2nd ed. Butterworth, London.

Liquorice-all-sorts as Anastomotic Aid

SIR,—I was greatly interested in Mr. Peter Martin's use of liquorice-all-sorts (*Journal*, October 27, p. 999) as an intestinal splint to effect anastomosis between two pieces of intestine of different sizes. In 1905 Messrs. Arnold and Sons made me a number of gelatin bobbins, at my suggestion; they were the shape of a cotton-reel or spool. I also made myself a long gelatin tube of various sizes, and one could cut off the length desired with a scalpel dipped in boiling water. These enabled one, as Mr. Martin remarks, to easily join intestine of different sizes end to end—I got the idea from decalcified bone bobbins, which were too large for the cases Mr. Martin mentions. The gelatin cylinders dissolved, and on one or two occasions this failed to occur and they were found as collapsed soft masses in the faeces.—I am, etc.,

London, S.W.7.

T. YOUNG SIMPSON.

Medical Education

SIR,—Dr. H. Stewart Moore (*Journal*, October 20, p. 940) objects to the phrase, "He was laparotomized," which appeared recently in a "responsible medical journal," and he hopes that all professional journals might collaborate in refusing to print "such monstrous expressions."

I am not so sure that the coining of such new words is so undesirable. There are many examples in medical as well as non-medical phrases where a verb, arising from a noun, has been coined, and quite aptly so. Thus it is quite correct and proper to say that patient was electrocardiographed, rather than the longer wording—an electrocardiograph was taken of patient, and similarly that he was gastroscopied, bronchoscopied, cystoscoped, x-rayed. And one would not think of saying that the patient had a circumcision operation performed in preference to that he was circumcised. Digitalization and hospitalization, or, to keep to verbs being coined from the nouns, digitalized and hospitalized, are also time-saving in writing without offending the ears, as Dr. Moore asserts. I even welcome the expression, "patient was E.B.S'd," rather than "arrangements for patient's admission were made through the E.B.S." (Emergency Bed Service).—I am, etc.,

London, N.W.1.

M. D. RIPKA.

Pitfalls in Medicine

SIR,—It would be interesting to test the reaction of the average medical practitioner to the learned discourse on misdiagnoses so well illustrated by Dr. A. H. Douthwaite (*Journal*, October 20, p. 895, and October 27, p. 958). How much suffering could be avoided and how many lives prolonged are questions which come uppermost to mind. If the reaction of some ultra-conscientious doctor is one of despair one is reminded of a remark once heard, of a doctor who decided to retire because he had grown tired of guessing. The fact is that, even for a case which appears quite trivial, there must probably be x-ray examination, blood examination, sedimentation test, and renal and certainly rectal and other internal investigations, to mention only a few of them.

But one significant and very true observation and conclusion by Dr. Douthwaite is his allusion to the superior intelligence of the physician of bygone days who could arrive at a probable prognosis by the exercise of his senses—hearing, sight, smell, and touch. This reminds the writer of a teaching clinic he once attended at the Presbyterian hospital of New York held by Dr. Hermann Biggs, the commissioner. At this patients walked in and sat down, and the students were required to observe and notice all they could and give an opinion. With one patient there was hesitation, and after a while Dr. Biggs said, "Well, he looks 'sick,' meaning that he was obviously an 'ill' man. Whether such methods of teaching would pass muster in these days (the clinic referred to took place 43 years ago) is very questionable, but it had its value then.

However, Dr. Douthwaite relents in his epilogue quite nicely when he insists that a misdiagnosis must be glossed over at all costs in the presence of the culprit.—I am, etc.,

London, W.1.

BERNARD E. POTTER.

Student Mental Health

SIR,—I read with interest your summary and comments in regard to the First International Conference on Student Mental Health (*Journal*, October 20, p. 936). With the findings of the conference as to the need for further knowledge of the mental health of students, surely one of the most important occupational groups, one cannot too heartily agree. The problem, of course, involves both constitutional and environmental factors. I think it would be agreed that, even where evidence is lacking, a hereditary element enters into the majority of cases. In regard to this problem in eugenics there is at present little that can be done; we have to accept the fact that some students are constitutionally more prone to breakdown than others. The environmental side of the problem on the other hand is vitally important, because here much can be done in the way of prevention and treatment.

An analysis of cases of anxiety neurosis which occurred during the five academic years 1951–2 to 1955–6 has recently been carried out in the University of Aberdeen student health service. Though this has served to emphasize the complexity of certain aspects of the problem it has brought to light some clear and relatively straightforward findings. Perhaps the most outstanding feature is the high proportion of distressed students who were found to have been living a totally unreasonable life, lacking any sort of interest outside the course of study, and in particular (87% men and 96% women) failing to take any form of outdoor exercise. The question of "cause or effect" naturally arises. Does this way of life predispose to, or is it the result of, anxiety neurosis?

It would be unwise to dogmatize, but more often than not the main stress factors were found to be essentially "university"—associated with the academic and/or social aspects of university life. Much less frequently bad childhood conditions, broken homes, parental disharmony, or unhappy school life proved to be important factors. It is of interest that the majority of students stated that while still at school they had taken part in and enjoyed all sorts of

activities. Very few of them seemed to have been adequately prepared for their new environment; they arrived with no clear understanding of what the university expected of them or how to make the best of their student years. It is not without significance that, although this university provides quite exceptional, and very conveniently placed, recreational facilities, the total membership of the athletic union has never, in any one year, exceeded one-third of the total student body.

When watching young men and women energetically disporting themselves in God's good air, and afterwards, pleasantly tired, enjoying the camaraderie of the pavilion, I cannot help feeling that herein lies at least one answer to the problem of student mental distress. There are of course many sides to this question, but how to persuade young men and women coming to the university for the first time towards a healthier way of living than many of them now adopt is, I suggest, a medico-social problem well worth the consideration of all who have to do with students. The subject of "school to university" has received attention at high level, but discussion so far has centred mainly round the academic aspects of the problem: what to teach in the sixth form, etc. It would seem to me that the health (in its widest sense) aspects are equally important.—I am, etc.,

Aberdeen.

A. H. MACKLIN.

Twopenny-halfpenny Advertising

SIR,—Most of us have received the circulars with the 2½d. stamp which were the subject of letters from Drs. A. E. Penn and D. Saklatvala (*Journal*, October 20, p. 941). Personally, I was amused at the ingenuity of the drug firms.

Another firm sent me a superb portrait, a real photograph, of a very charming and beautifully dressed young lady. There was no indication on the front that it was an advertisement, but the name of the firm is printed in small letters on the back. I mentioned the matter to the representative at the exhibition in Brighton this year, complaining that they had not sent me her name, address, and telephone number. I certainly never omit opening any correspondence from that firm nowadays. I can prophesy a great future for the advertisers who take the daring plunge and send out a few nudes.—I am, etc.,

Stanley, Perth.

OWEN McDONAGH.

Chorda Tympani Syndrome

SIR,—Mr. A. Greville Young in his article, "Unilateral Sweating of the Submental Region after Eating" (*Journal*, October 27, p. 976), describes a most interesting case, allied in nature to the now well-known auriculo-temporal syndrome. I have described¹ an example of the latter syndrome, which was remarkable in being bilateral. The patient was a young man in whom appendicitis was followed by parotid buboes, one on either side of the face—both of which had to be opened. The scars led to the persistent flushing and sweating on eating, which may have been especially annoying to the patient, because his German surname meant "shame red." I occasionally alluded to this case at clinical medical meetings in London. Kinnier Wilson² in his book on neurology pointed out that the term Frey's syndrome was due to Madame Frey's "rediscovering" the syndrome. I alluded to allied syndromes in an article entitled "The Auriculo-temporal and Allied Syndromes" in my book, *Rare Diseases and Some Debatable Subjects*.—I am, etc.,

London, N.W.1.

F. PARKES WEBER.

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- 1 Weber, F. P., *Trans. clin. Soc. Lond.*, 1897-8, 31, 277.
- 2 Wilson, S. A. K., *Neurology*, 1955, London.
- 3 Weber, F. P., *Rare Diseases and Some Debatable Subjects*, 1946, p. 66. London.

SIR,—May I suggest that the obvious treatment of unilateral sweating of the submental region after eating (chorda tympani syndrome) (*Journal*, October 27, p. 976) should be interruption of the chorda tympani in the middle ear?

The approach would be identical to that used by Rosen for mobilization of the stapes for otosclerosis.¹ Under local analgesia a small flap, consisting of part of the cutaneous lining of the posterior wall of the auditory meatus and the tympanic membrane, is reflected forwards, the chorda tympani cut where it leaves the Fallopian canal behind the handle of the malleus, and the tympano-meatal flap replaced.

This relatively minor operation can be performed by any otologist trained in the permeatal approach to the tympanic cavity. Disappearance of the submental sweating would confirm the theory of dysfunction of the chorda tympani in this syndrome. The operation would not leave any visible scar and would not impair hearing.—I am, etc.,

FRANCIS BAUER.

Liverpool, 22.

REFERENCE

- 1 Rosen, S., and Bergman, M., *J. Laryng.*, 1955, 69, 297.

SIR,—Mr. A. Greville Young in his paper on the chorda tympani syndrome (*Journal*, October 27, p. 976) rightly rejects destruction of the lingual nerve as a form of treatment on account of its undesirable side-effects. These objections do not apply to the division of the chorda tympani alone, which can be done easily in the middle ear using Rosen's transmeatal approach.—I am, etc.,

Rugby.

P. E. ROLAND.

Cardiac Diagnosis

SIR,—I have read with interest the review (*Journal*, October 27, p. 984) by Dr. Paul Wood of Dr. R. F. Rushmer's new book entitled *Cardiac Diagnosis: A Physiologic Approach*. While believing that the title might with advantage have been instead "Cardiac Physiology: An Approach to Diagnosis," and thereby have emphasized its physiological rather than clinical bias, I feel that the reviewer has been a little unfair in his criticism of it.

Dr. Wood says that "a physiologist has set out to teach the cardiologists the scientific basis of their subject," but in the preface to the book the author states: "... the text is intended for students of medicine in the broadest sense; from first-year medical students to experienced physicians who are interested in applying basic concepts to the recognition of disease processes." Further, the reviewer questions the restricted choice of pathological conditions which Rushmer discusses in Part V and comments: "No explanation is given for this curious selection." However, again in the preface, the author explains that "these discussions are intended to indicate how physiologic principles apply to the diagnosis of selected conditions rather than to provide a complete dissertation on heart disease."

One would like to think that expert cardiologists have no need for such a book, but many medical students and newly qualified practitioners, as well as teachers of physiology, will find in it much of great value in laying the foundations of an understanding of cardiology. This, as I see it, was Rushmer's aim, and his efforts are, I think, to be applauded.—I am, etc.,

Cardiff.

R. C. JORDAN.

Irradiation-induced Malignant Hypertension

SIR,—Drs. W. M. Levitt and Samuel Oram (*Journal*, October 20, p. 910) appear to have made a somewhat limited examination of the literature on the above subject when they state that, to the best of their knowledge, theirs is the first case of this kind to be recorded. Dean and Abels¹ described a similar case in 1944, and their case was summarized and the reference given in the *Quarterly Journal of Medicine* in 1953.²

It is more serious that Drs. Levitt and Oram have not mentioned that, when malignant hypertension follows abdominal radiotherapy for seminoma, both kidneys may already be badly damaged by the irradiation. To remove one kidney under such circumstances would bisect the patient's renal reserve, already failing, at one blow. This

statement is based on the following: (1) Abdominal radiotherapy used as routine prophylaxis after orchidectomy for seminoma is given on the assumption that metastases may be present in the abdominal lymph nodes. The irradiation usually includes both kidneys, although the upper third of each kidney is excluded from the field, as far as possible. Both kidneys commonly receive the same total dose. (2) In a study of 27 cases of radiation nephritis³ I described two cases as "late malignant hypertension," the syndrome developing many months after abdominal radiotherapy. I have since seen two more such patients, one very recently and still living, in each of whom malignant hypertension commenced four years after abdominal radiotherapy. Thus, out of 40 patients with radiation nephritis carefully studied during the past eight years, four have shown "late malignant hypertension" as distinct from the other clinical syndromes of radiation nephritis. Three of the patients with late malignant hypertension died within three months of the onset of symptoms, and necropsies were performed on two. In each case both kidneys were of normal size and all four kidneys showed histologically the picture of severe hypertensive nephrosclerosis. One case had bilateral perirenal fibrosis. Necropsy on the third patient was refused, but an intravenous pyelogram taken four weeks before death showed no deformity of either kidney.

It is valuable to have confirmation of the fact that, when one kidney is seriously disorganized by radiotherapy due to vigorous treatment of a localized tumour mass in the neighbourhood of that kidney, nephrectomy may cure a resulting malignant hypertension. It is unfortunate, however, that Levitt and Oram should record their case without adequate reference to the basis on which malignant hypertension may arise after abdominal radiotherapy, for their paper could mislead clinicians into unjustified and harmful surgery.—I am, etc.,

R. W. LUXTON.

Manchester.

REFERENCES

- 1 Dean, A. L., and Abels, J. C., *J. Urol.*, 1944, 52, 497.
- 2 Luxton, R. W., *Quart. J. Med.*, 1953, 22, 215.

Breath-holding Test

SIR,—I was interested in Dr. S. A. Mason's views on the breath-holding test (*Journal*, September 29, p. 766). A few years ago I did this test on 52 patients with varying degrees of pulmonary fibrosis and dyspnoea, and the results led me to begin an article on "The ineptitude of the breath-holding test as an index of either the vital capacity, the maximum ventilatory capacity, or the ventilatory cost of standard exercise." In this study the breath-holding time had been measured in the sitting position after a single deep inhalation. The paper was put aside on finding that the results agreed very closely with those of a far more extensive study on 425 patients with pulmonary insufficiency by Gaensler, Rayl, and Donnelly,¹ who measured the breath-holding time after three consecutive deep inhalations. The interrelation between various ventilatory indices and the voluntary breath-holding time found by these workers and myself is given in the table of correlation coefficients below.

Author	Index	Correlation with Breath-holding Time (r)
Gaensler et al.	Vital capacity	0.28 ± 0.03
" "	Maximum ventilatory capacity (1)	0.38 ± 0.03
" "	Subjective dyspnoea	0.19 ± 0.03
Personal findings	Maximum ventilatory capacity (2)	0.17
" "	Ventilatory cost of standard exercise (3)	0.13
" "	Ventilatory reserve ((2)-(3))	0.12

(1) Obtained using the maximum voluntary ventilation test as described by Baldwin et al.² (2) Obtained using the expiratory flow rate test.³ (3) Obtained according to the method of Hugh-Jones and Lambert.⁴

Although the above table shows no significant correlation between the breath-holding time and the various ventilatory indices, there is no doubt that the breath-holding time is influenced by the oxygen and carbon dioxide tensions of

arterial blood,⁵ which are themselves dependent on so many physiological factors. Mirsky, Lipman, and Grinker⁶ found the mean breath-holding time to be significantly lower in patients suffering from anxiety states than in normals, and it may have been for this reason that Flack⁷ found the test to be useful in assessing the fitness of pilots for wartime operational duties. Apart from these physiological and psychological variables, Gaensler and his colleagues have shown that the breath-holding time can be almost doubled by practice and suggestion, and they state that the only conclusion that can be drawn from a greatly reduced breath-holding time is that the patient is uncooperative, poorly trained, or ill.

Whatever this test measures, it does not appear particularly sensitive in picking out patients who are likely to die under anaesthesia. Of the 52 poor-risk patients reported by Ruth,⁸ the breath-holding time was normal in 28 patients (two deaths) and subnormal in 24 patients (four deaths). In view of the many variables involved I cannot share Dr. Mason's optimism that this test is likely to prove useful in assessing anaesthetic risk, whether the breath-holding time be measured after a maximum inspiration or after a normal expiration.—I am, etc.,

London, S.W.3.

MICHAEL C. S. KENNEDY.

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- 1 Gaensler, E. A., Rayl, D. F., and Donnelly, D. M., *Surg. Gynec. Obstet.*, 1951, 92, 81.
- 2 Baldwin, E. de F., Courmand, A., and Richards, D. W., *Medicine*, 1948, 27, 243.
- 3 Kennedy, M. C. S., *Thorax*, 1953, 8, 73.
- 4 Hugh-Jones, P., and Lambert, A. V., *British Medical Journal*, 1952, 1, 65.
- 5 Ferris, E. B., Engel, G. L., Stevens, C. D., and Webb, J., *J. clin. Invest.*, 1946, 25, 734.
- 6 Mirsky, I. A., Lipman, E., and Grinker, R. R., *Fed. Proc.*, 1946, 5, 74.
- 7 Flack, M., *Lancet*, 1919, 1, 210.
- 8 Ruth, H. S., *Anesth. et Analg.*, 1926, 5, 16.

Public Health Laundry Service

SIR,—As long ago as 1945 you published an inquiry about how to protect workers in a laundry against the fleas which came in with the washing¹; and in 1947 the *Spectator* published a letter which pointed out that the public health authorities were faced with a quite new problem in social hygiene. Until then the slum-makers had washed their clothing at home, but with full employment and very high wages they found that they could send it to the laundries. Ever since then bedclothes and body linen heavily contaminated with faeces, urine, blood, sputum, and every kind of discharge from every kind of disease has been packed off to the ordinary commercial laundries without any hindrance from anybody. The matter was raised again about a year ago in the *Yorkshire Post* with the object of persuading the West Riding County Council to establish a public health laundry service to undertake the washing of contaminated clothing, but the proposal was turned down.

The people who are liable to be infected by contaminated material in laundries are the workers who sort it and the customers whose clothing is mixed with it when it is washed. The sorters may pick up all sorts of infections themselves and they may start an outbreak of food-poisoning at home; the customers may be infected if the clothing that comes back from the laundry has not been efficiently sterilized. Obviously, all laundries ought to be inspected and controlled, but the difficulty seems to be that they are in a sort of no-man's-land between the Ministry of Health, the factory department of the Ministry of Labour and National Service, and the county councils. The factory inspectors are responsible for the prevention of accidents, and no doubt H.M. medical inspectors of factories go round periodically to make sure that the workers do not get dermatitis from the chemicals they use, but it does not seem to be anybody's duty to see that fouled clothing is kept out of the laundry (unless it is known to come from a case of scarlet fever or similar notifiable disease), or to make sure that it is sterilized before it is handled.

The general public appreciates that factories are inspected for the benefit of the workers and not for the benefit of the customers, but they often say that with health visitors.

medical officers of health, and a whole Ministry of Health it is a queer state of affairs if there is nobody at all to make sure that their linen comes back from the laundry not only clean but sterile. And it certainly does seem curious that after all these years there is nothing at all in the Public Health Act and subsequent regulations to make it the duty of the local authorities to protect the public by inspecting the laundries.

It is manifestly extremely difficult to make out where, among so many authorities, responsibility lies, but I think it is clear that the first and urgent requirement is public health laundry services to deal with all fouled clothing, and I hope the B.M.A. will take steps to get them established.—I am, etc.,

Wetherby, Yorks.

R. L. KITCHING.

REFERENCE

¹ *British Medical Journal*, 1954, 2, 792.

New Preparations

SIR,—Dr. C. D. Peters's letter on the subject of tranquilizers (*Journal*, October 27, p. 998) prompts me to make a suggestion which is not revolutionary in the publishing business. I need not stress the huge quantity of circulars we all receive, and the impossibility it is for a busy practitioner to digest their contents and weigh their extensive individual claims. The price, too, is never mentioned. Would it not be possible for the *Journal* to publish each week a list of new preparations with comments as to their efficacy and their price? In this way we would be well informed of worth-while new preparations, the astronomical and ever-rising N.H.S. drug bill would be reduced, and the bombardment from the drug houses subdued to the odd broadside, to the benefit of all.—I am, etc.,

Stroud, Glos.

W. G. B. HALLIDEN.

Allergy to Intravenous Iodine

SIR,—The following experience, apparently not unknown to radiologists in general hospitals, is described in the belief that it may be of assistance to anyone occasionally called upon to carry out intravenous pyelography.

A patient suffering from pulmonary tuberculosis complained of haematuria, and an intravenous pyelogram (I.V.P.) was considered necessary. Pressure was applied to the lower abdomen by a football bladder inflated under a tight band, and 20 ml. of "diagnol" (sodium acetate) 50% was injected intravenously into the right arm over a period of about two minutes. The patient noted the usual feeling of heat almost immediately, but within two or three minutes his eyelids were seen to be puffy and the face became flushed. A feeling of malaise followed, with alteration of the voice suggesting some constriction of the larynx. An x-ray taken at five minutes showed only the faintest excretion of the opaque medium from the right kidney, and none from the left, and subsequent films taken at 10, 15, 25, and 45 minutes showed none at all. It was, however, observed that the outline of both kidneys showed up more clearly than usual on all the films from 10 minutes onwards. On the assumption that the reaction was allergic, 5 min. (0.3 ml.) of adrenaline was given hypodermically during the procedure, but produced no immediate relief. The symptoms eventually disappeared in about three hours.

The question then arose as to why the opaque medium had not been excreted in the urine, and advice was sought from the radiologist of the neighbouring infirmary, who stated that he had had a similar result associated with an allergic reaction. At his suggestion, "urogratin" 76% was tried 10 days later; 1 ml. was given intravenously, and, as no reaction was observed in an hour, the rest of the ampoule was injected, using the same technique as on the first occasion. An excellent normal I.V.P. was obtained without untoward incident, the medium being excreted freely from both kidneys in the first five minutes. Although both brands of media contain iodine it would seem that a patient is allergic only to the whole molecule and not to any fraction of it, so that where one brand causes trouble it is possible that another of different molecular composition

may be used with safety. It has not been possible to discover why the medium is not excreted in the allergic case.

Thanks are due to Dr. C. Edwards, consultant radiologist to the North Staffordshire Royal Infirmary, for his advice.—I am, etc.,

Market Drayton, Salop.

J. S. MILLER.

BZ 55

SIR,—I would like to make this small contribution towards the reports which have appeared in your *Journal* in regard to the treatment of diabetes with BZ 55.

My report is upon the first 20 cases I have treated, 17 of whom have continued on BZ 55 for at least 15 weeks; in the other three patients in this series the treatment failed. The three "failures" were patients who asked if they might "try it." Their ages were 18, 37, and 39; the duration of their diabetes three years, twenty years, and twenty years, and their insulin requirements 60, 40, and 70 units daily respectively. Only one had ever been in ketosis. Of the remaining 17—the average age is 64 (ranging from 45 to 77)—six had been on diet and insulin (doses ranging from 20 to 92 units daily) and the average duration of the diabetes is four years. Only one has ever been in ketosis. Insulin was no longer required after starting BZ 55 in all but one case. Eleven had been on diet alone and the average duration of their diabetes is two years. Only one has been in ketosis.

All have responded satisfactorily as judged by diminution or disappearance of glycosuria and reduction of post-prandial blood-sugars. In 14 of these the control is as good as one could wish on any form of treatment. It is of interest to me that one case remained well stabilized despite severe sepsis of a foot, and that another (not included in this report) has remained well stabilized on BZ 55 prior to and following upon a below-knee amputation for gangrene of the foot.

I would like to take this opportunity of expressing my gratitude to Eli Lilly and Co., Ltd., for their generous supplies of BZ 55 and for their interest and help.—I am, etc.,

Chester.

PHILIP R. GRAVES.

Royal College of Surgeons Annual General Meeting

SIR,—We wish to call the special attention of all members and fellows of the Royal College of Surgeons of England to the annual general meeting to be held at the College in Lincoln's Inn Fields on Wednesday, December 12. The nature of this meeting has been recently revised and a programme arranged which should prove attractive to general practitioners and surgeons alike.

About 30 scientific exhibits by members and fellows illustrating aspects of medicine and surgery and the work of the departments of anatomy, pathology, physiology, and pharmacology in the College will be on view from 10 a.m. At 11 o'clock in the Great Hall (accommodating some 700) there will be a series of scientific cinematograph films. At 1 p.m. lunch will be available in the College, and at 2.30 p.m. there will be a ceremony of admission to the Honorary Fellowship followed by a Moynihan Lecture by Professor I. S. Ravdin, Professor of Surgery in Philadelphia and chairman of the Board of Regents of the American College of Surgeons.

The annual meeting of fellows and members at 4 o'clock will include a résumé of College matters and afford members and fellows the opportunity to discuss matters of general interest and to make recommendations to Council. Tea at 5 p.m. will be provided, and the day will end with a subscription dinner (informal dress), at 7 for 7.30, to which guests may be brought. Applications for tickets, £1 10s. each, accompanied by a cheque, must be sent to the deputy secretary at least a week in advance.

All general practitioners and specialists will be made very welcome and are assured of a profitable and friendly day.—We are, etc.,

A. LAWRENCE ABEL,
RUSSELL BROCK,
Vice-presidents of the
Royal College of Surgeons of England.

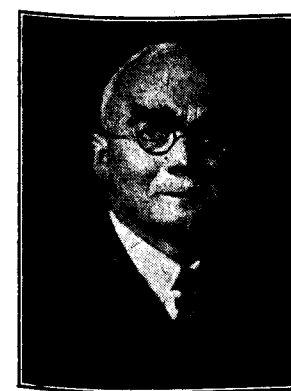
London, W.C.2.

Obituary

M. J. STEWART, C.B.E., M.D., LL.D.
F.R.C.P., F.R.F.P.S.

Professor Matthew J. Stewart, emeritus professor of pathology in the University of Leeds, and editor for many years of the *Journal of Pathology and Bacteriology*, died at his home at Stoke Poges, Buckinghamshire, on November 7. He was 71 years of age.

Matthew John Stewart was born at Dalmellington, Ayrshire, on May 4, 1885, the son of William Ritchie Stewart, F.S.A., and was educated at the local school and at Glasgow University, where he graduated M.B., Ch.B., with honours, in 1907, gaining the Brunton Memorial Prize as the most distinguished graduate of his year. After graduation he held the appointments of



house-physician and house-surgeon at the Western Infirmary, Glasgow, and resident medical officer at the Ruchill Fever Hospital, where he worked under Dr. John Brownlee. In 1909 he was appointed assistant pathologist at Glasgow Royal Infirmary. He became a member of the Royal College of Physicians of London in 1912.

Stewart began his long association with Leeds in 1910, when he was appointed clinical pathologist to the General Infirmary, a post he continued to hold until 1918. Over much the same period he was honorary demonstrator in clinical pathology in the university. During the first world war he served in the R.A.M.C., first as pathologist to the East Leeds War Hospital and subsequently in the north of France with the 59th General Hospital, where he did fine work among men suffering from the effects of mustard gas. In 1918 he was appointed professor of pathology at Leeds University and occupied the chair for the long period of 32 years, until 1950, when he retired. Academic sub-dean from 1923 to 1941, he was also dean of the Faculty of Medicine from 1941 to 1948 and Pro-Vice-Chancellor from 1939 to 1941, and he represented the university on the General Medical Council from 1942 to 1950.

Recognized at an early stage of his career as one of the leading pathologists in the country, he was president of the Section of Pathology and Bacteriology at the Annual Meeting of the B.M.A. in Newcastle-upon-Tyne in 1921, and at Winnipeg in 1930 he was a vice-president of the Section of Pathology, Bacteriology, Physiology, and Biochemistry. Between these two meetings, in 1924-5, he served as chairman of the Leeds Division of the B.M.A. From 1947 to 1950 he was a member of the Leeds Regional Hospital Board and of the Board of Governors of the United Leeds Hospitals. He was an honorary member of the Leeds and West Riding Medico-Chirurgical Society and of the Glasgow University Medico-Chirurgical Society—of both of which he was a past-president—and of the Faculty of Radiologists. In 1932 he was elected a Fellow of the Royal Faculty of Physicians and Surgeons of Glasgow, and six years later the University of Glasgow conferred on him the honorary degree of LL.D.

Professor Stewart was elected a Fellow of the Royal College of Physicians of London in 1924. Seven years later he gave the Croonian Lecture before the College, choosing for his subject "Precancerous Lesions of the Alimentary Tract." With Sir Arthur Hurst he was co-author of a book entitled *Gastric and Duodenal Ulcer* (1929). As a morbid histologist he was specially interested in malignant disease and in industrial diseases of the lung. A member of the Medical Research Council from 1935 to 1940, he served on its Industrial Pulmonary Disease Committee from its inception and on its Arsenic Committee. He was also a trustee of the Hunterian Collection and a consulting pathologist to the Imperial Cancer Research Fund. His services as an examiner in pathology were in great demand, and he examined for the Universities of Oxford, Cambridge, Manchester, Bristol, Aberdeen, Glasgow, Birmingham, Sheffield, St. Andrews, Wales, Belfast, and for the Conjoint Board, the Faculty of Radiologists, and the Czechoslovak Government.

Professor Stewart will long be remembered for his services to medicine as assistant editor and editor of the *Journal of Pathology and Bacteriology*, which under his direction became one of the leading pathological journals of the world. He was associated with the journal for 33 years, being appointed assistant editor in 1923 and editor—a post he held until this year—in 1934. The 69th volume of the journal (January–April, 1955) was inscribed in his honour on the occasion of his 70th birthday. In 1950, in recognition of his notable contributions to pathology, of his work on behalf of the Pathological Society of Great Britain and Ireland, and of his long tenure of the chair of pathology at Leeds, his friends decided to commemorate his unique service by making an appeal for funds for the foundation of a lectureship bearing his name and for a bronze plaque struck in his honour to be placed in the medical school at Leeds. The plaque was unveiled in 1952 by Professor H. R. Dean, and the residue of the money, nearly £2,000, is to be used to found a Matthew Stewart Lecture at the university. At a dinner earlier this year Professor Stewart's past and present colleagues on the committee of the Pathological Society of Great Britain and Ireland made a presentation to him and Mrs. Stewart in recognition of his devoted service to the society as editor of the *Journal of Pathology and Bacteriology*. After his retirement from the chair at Leeds, Professor Stewart, accompanied by his wife, went on a tour of Australia, New Zealand, and the United States of America. The University of Melbourne conferred on him the honorary degree of M.D., and while at Brisbane he delivered the Bancroft Oration at the university, taking as his subject "Medicine in Pepys's Diary." In 1951 he was appointed C.B.E.

Stewart was an authority on Pepys; he was also a Burns enthusiast and a member of the council of the Brontë Society. Among his hobbies was stamp-collecting, and he was a past president of the Leeds Philatelic Society. Other recreations were the study of mediaeval architecture and country walking. He married Dr. Clara Eglington in 1913, and she survives him.

We are indebted to Professor J. W. McLEOD for the following appreciation:

After a brilliant student career at Glasgow University Matt Stewart was associated in his hospital appointments with two chiefs of unusual outlook and attainments. These were the late Professor Samsen Gemmell and Dr. Brownlee, who was for many years in charge of the Ruchill Fever

Hospital and later the first statistical adviser to the Medical Research Council, and from these he doubtless got much inspiration. It was after working under these two men that Stewart came to the Leeds General Infirmary as pathologist in the years immediately preceeding the first world war. In his work for that hospital Stewart built up his outstanding prowess as a morbid anatomist and developed many valuable contacts with his clinical colleagues which in later years helped him, when dean, to preserve a sound balance between the demands of the clinical and the more academic departments in the medical faculty.

After his Army service in the first world war he was recalled to Leeds to take over the vacant chair of pathology and to build up the pathological services of the hospitals of that city. He set about this with characteristic energy and thoroughness, and already in 1919 lecturers in bacteriology and in chemical pathology had been appointed under him and an extension of accommodation begun by the conversion to bacteriological and biochemical laboratories of a commercial college adjacent to the medical school. The dean of the Leeds Medical School at this time was the late Professor J. K. Jamieson, and Stewart was associated with him as academic sub-dean. These two men worked in cordial co-operation and succeeded in interesting a number of benefactors in the development of the department of pathology. By the first of many benefactions which he made to the university, Lord Brotherton founded the chair of bacteriology in 1922. A few years later a great drive for funds to support cancer research was launched in Yorkshire, and in this the late Lord Moynehan took a leading part. This was highly successful and made possible the establishment of a third chair in the department, devoted to experimental pathology and cancer research. All these scattered sections of the department were finally united in an ample new building, the gift of the late Sir Algernon Firth. Thus within about fifteen years of the appointment of "M.J." to the professorship the department had passed from a state in which the whole pathological work of the Leeds General Infirmary and city was carried out in two very inadequate rooms adjacent to the post-mortem room in the Infirmary and one even less adequate room in the medical school (with some shared laboratory and lecture-room accommodation for teaching purposes) to the possession of a large building equal to any in the country. In this building the work was directed by three men of professorial rank working under Stewart as administrative head, the last expansion of the department being the creation of a chair in chemical pathology.

Stewart succeeded Jamieson as dean and occupied this position throughout the second world war and up till 1948, and it was in this capacity that his broad interest in medicine and equal interest in the academic and clinical aspects of the subject were particularly valuable. It was remarkable how often the promising younger men who were becoming prominent in the school had been directly associated with the work of the pathological department as demonstrators or as joint authors of scientific papers with the head of the department. How any one man could run a large department successfully while attending to the duties of the dean of a faculty and editing a large and important scientific journal was a puzzle to all his colleagues. His great abilities, his remarkable capacity for hard work, and the determination with which he sought his objectives played a large part, but perhaps not less important was his singularly likable personality, which showed itself above all in his vivid interest in everyone with whom he came in contact, from the last acquired laboratory boy to his most senior colleague.

We are indebted to Professor D. H. COLLINS for the following appreciation:

Matthew John Stewart, "Matt" or "M.J." as he was called by many in all walks of medicine, was a great man. He was an outstanding figure in British pathology. His influence has been widely felt throughout the United Kingdom and in the Commonwealth, especially, perhaps, in

Africa, Australasia, and Ceylon. Everywhere he seemed to have innumerable friends and correspondents who had been his former students or colleagues or who had become acquainted with him either as editor of the *Journal of Pathology and Bacteriology* or as an expert whose opinion had been sought in some difficult case. Indeed, there can be very few Britishers now practising pathology who do not remember him with affection and gratitude for some helpful, considerate, or just friendly activity, great or small, on their behalf.

Stewart himself often said that his principal contribution to the progress of medical science was his editorship of the *Journal of Pathology and Bacteriology*, in whose volumes his name first appears as assistant editor in 1923 and as editor for 22 years, from 1934 to the middle of this year. This was indeed a great contribution to medicine, for through diligence and concentration upon detail he succeeded in maintaining the highest possible standards of matter and presentation, and the journal has for many years held its place among the top-rank specialist journals throughout the world. Stewart had much to be proud of in this connexion, and those of us who have been privileged to work with him know how unremittingly he gave himself to this work. Manuscripts and proofs were always about him—in his room in the Pathological Institute, at his home, in the train, and even, though partly concealed, at some of the less interesting of the countless administrative committee meetings on which he sat.

But Stewart was too modest about his own original work. He wrote for publication only when he had something important to say. Some of us feel that he put on record too little of his vast experience, for so much of what he did publish remains of sound worth to-day. For instance, statistics from his Croonian Lectures on precancerous lesions of the alimentary tract are still often quoted. He had a lasting interest in giant-cell tumours of bone, and it was from Stewart's identification, 34 years ago, of the giant-cells with osteoclasts that the concept and the name of osteoclastoma arose. Gastric ulcer and carcinoma form another subject in which Stewart's original work is well known: his lifelong interest in it culminated, in 1953, in his Macewen Memorial Lecture at Glasgow on ulcer-cancer of the stomach. The third field of pathology in which Stewart was a great expert was that of industrial diseases of the lung. His opinion was widely sought in this respect. There were few cases of asbestosis in this country upon which he was not consulted, and he was writing widely on the pneumoconioses throughout the 1930s. It is very fitting that his name appears as joint author at the head of the first article in the next number, about to be published, of his beloved *Journal of Pathology and Bacteriology*. The paper is on carcinoma of the lung in haematite miners. It is gratifying to reflect that he was at least able to see the proofs of this paper, which stands as a becoming minor memorial, symbolically combining his contributions both to pathology and to medical journalism.

Three little vignettes from personal reminiscence may serve to portray a great character: first, twenty years ago, being summoned to him convalescing from an illness and sitting shivering at his bedside by a wide-open window, while he, the counterpane smothered in sheets of paper, patiently went phrase by phrase over an inept manuscript that I had submitted for editorial judgment, and the feeling of certainty as I came away that I had learnt from "M.J." in that hour so much more than anyone else could have taught me, not only about presenting scientific results but about the use of our beautiful English language; second, his genial figure moving around some social gathering, knowing everyone, and greeting his juniors especially with warming friendliness and a firm grip on one or other elbow; third, the deep satisfaction that I know he felt when, at the time of his 70th birthday in 1955, his assistant editors, taking independent action on the only occasion in history, inserted his own portrait into Vol. LXIX of the *Journal of Pathology and Bacteriology* and inscribed it "In honour of a distinguished pathologist and a great editor."

C. E. BEVAN, M.B., D.T.M.&H.

Dr. C. E. Bevan, medical superintendent of the sanatorium at Saitta and consulting thoracic surgeon to the Government of Cyprus, was shot dead by terrorists while attending a patient at Amiandos, 45 miles from Nicosia, on November 8.

Charles Edward Bevan was born in 1905, a member of a Quaker family. From Emmanuel College, Cambridge, he went on to St. George's Hospital, qualifying M.R.C.S., L.R.C.P. in 1931. He took the D.T.M.&H. of the English Royal Colleges in 1933, the B.Chir. in 1935, and the M.B. two years later. After qualification he held the posts of house-surgeon, house-physician, resident obstetric assistant, and casualty officer at St. George's, and resident medical officer at St. Andrew's Hospital, Dollis Hill. Entering the former Colonial Medical Service in 1933, he was posted to Nigeria, but left the service after two years to join the Friends' Ambulance Unit in Ethiopia during the Italian invasion of that country. Returning to the Colonial Medical Service in 1936, he became district medical officer in Cyprus, where he specialized in tuberculosis, a disease from which he had suffered as a young man. His untiring efforts to eradicate the disease from among the people of the island dated from his association with the late Dr. Noel Bardswell in a tuberculosis survey of Cyprus just before the outbreak of the second world war. In 1949 he was appointed tuberculosis specialist under the Colonial Medical Service, and for some years was head of the Jubilee Sanatorium at Kyterounda. An active member of the British Medical Association, he was honorary secretary of the Cyprus Branch in 1938-9 and again in 1952-3, and in 1954 he became president of the Branch. Dr. Bevan knew Cyprus and the Cypriots as few Englishmen can know them: he was at home in the island and loved its people, who have been deprived by this senseless assassination of one who had given much of his life to the promotion of their well-being.

Dr. Bevan was twice married. He is survived by his second wife and two daughters, and his friends in the medical profession will sympathize with them most sincerely in their tragic loss.

Dr. P. L. STALLARD, one-time principal medical and health officer, Great Indian Peninsula Railway, died at his home at Pyrton, near Oxford, on August 23, at the age of 76. Philip Lechmere Stallard was born at Powick, Worcestershire, on May 20, 1880. From Sedbergh School, and after a year spent in Paris, he went up to Gonville and Caius College, Cambridge, in 1899. Taking first-class in honours in the Natural Sciences Tripos in 1902, he remained in residence a fourth year to take the second part of the Tripos—again with honours—with physiology as his main subject. He was also a prizeman in Natural Science. He took his medical training at St. Thomas's Hospital, qualifying M.R.C.S., L.R.C.P. in 1907, and obtained an appointment as house-surgeon and later as anaesthetist at the Seamen's Hospital, Greenwich. It was here he gained an interest in tropical medicine which led him to take the D.T.M.&H. and the D.P.H. in 1909, and to accept an appointment with the G.I.P. Railway in Western India. During his service in the India he held at various times administrative charge of the railway districts of Bina, Jhansi, Igatpuri, Lonavla, and Bombay, and was Principal Medical Officer in 1926-7. After his retirement to England in 1929 he settled down to an ophthalmic practice in High Wycombe—he had obtained the D.O.M.S. in 1924—and was ophthalmic consultant for the

Buckinghamshire, Bedfordshire, and Oxfordshire county councils from 1930 to 1949. His heart, however, had been unsound since 1917, and recurring minor warnings caused him to reduce his activities until, in 1953, a severe attack of coronary thrombosis forced him to give up work entirely. The end came suddenly as he entered his house after a short afternoon drive in his car.

H. R. R. writes: Stallard was a man whose exceptional intellectual brilliance was apparent to his friends even in the early days at Cambridge, and throughout his life he never failed to astonish all who sought his opinion by the soundness of his judgment and the depth of his knowledge. While still at Cambridge, and engaged in Natural Science, he amused himself by mastering French, German, and Spanish, and was familiar with the classics of these languages. Later, when serving in the East his interest in languages continued, and he taught himself, in the recreational intervals of a busy official life, Urdu, Arabic, Persian, and Turkish to the extent that he could translate selections from old Persian and other Oriental poets into beautifully phrased English verse, which gave much pleasure to such of his friends who were privileged to receive the little volumes he published for private circulation. He was in fact a master of English composition, and it was always a delight to receive a letter from him. His *Renderings from the Dewan of Khwaja Shamsuddin Muhammad Hafiz Shirazi*, published by Basil Blackwell and printed at the Shakespeare Head Press, contains thirty-two poems of rare merit translated from the original Persian of the Shirazi philosopher. During the early years of his service in the East the lack of precise standards in vision testing and physical examination of railway staff led him to a profound study of the subject. He spent several years in a careful analysis of the procedures in this regard on English, French, and German railways, and in the civil services and the armies of these countries. The result was a masterly and as yet unpublished demi-official report to the administration containing much original work on the functional capacity, efficiency and classification of staff with substandard vision, colour weakness, stereoscopic perceptive defects, and night blindness. The extent of the material studied may be judged from the bibliography, which covers sixty-nine books, periodicals, and official reports in English, French, and German, each of which was conscientiously examined by him in the original. This report formed the basis of the elaborate and unique system of physical examination of candidates and employees now in use throughout the extensive railways of India. His last two years in India were spent on special duty devoted to clarifying and coding the mass of medical and sanitary regulations which had accumulated with the growth of the railways during the preceding three-quarters of a century. Two impressive official volumes remain as a memento to his industry and cover the subject with Pepsian thoroughness and attention to detail. Just before settling down to practise in High Wycombe he spent most of his hard-earned leave touring the old Great Western; London and North-Eastern; London, Midland, and Scottish; and Southern railways, studying their medical services. The result of this work was published by the Government of India under the title *Notes on Medical Arrangements on Four Home Railways*, and circulated for the guidance of railway medical officers in India. Stallard's unusual talents were controlled by an acutely critical faculty. Combined with great modesty, this prevented him from publishing the results of his work with the freedom of many a lesser man. They lie buried in the pages of official files, but nevertheless continue to influence the work of the huge staff who operate some 43,000 miles of railway track and the safety of millions of its passengers. On the lighter side he could perform with credit on the violin and was a draughtsman of no mean ability. He was also a master craftsman in bookbinding. He married in 1910 Dorothea, daughter of the Rev. J. W. D. Bell, vicar of Pyrton, who survives him. They lost their only daughter at an early age. Stallard's many friends in England, his Indian colleagues, both medical and lay, and the staff of the G.I.P.

Railway who served with him under the old regime in India will deeply regret the passing of one whose character is well epitomized in the words of the Fifteenth Psalm.

By the sudden death of Dr. BENJAMIN HUTCHISON on October 30, after a relapse from an illness from which it was thought he had recovered, Lanarkshire has lost one of its most distinguished family practitioners and medical administrators. Benjamin Hutchison was born in Glasgow on October 21, 1886, and after a distinguished academic career at Glasgow University graduated M.B., Ch.B., with commendation, in 1908. Having completed the usual resident posts in the Victoria Infirmary and the Maternity Hospital, Glasgow, he entered general practice and finally settled in Cambuslang in 1911. During the first world war he served as a captain in the R.A.M.C. and was awarded the Military Cross, and in the second world war he was second in command of the Lanarkshire Home Guard, with the rank of major. For 45 years Hutchison carried on the work of a large mixed general practice single-handed until joined by his son after the second world war. He was one of the type of general practitioners now called old-fashioned, and tending to become extinct, who devoted his whole life to the welfare of his patients, not only in relation to their medical needs but also as a counsellor and friend. He was a man of robust health and vitality, and throughout his long and active career was never absent from duty until the onset of his first and last illness. Withal he had a very real understanding and sympathy which endeared him to his patients. Hutchison was an enthusiastic member of the British Medical Association for nearly 40 years, and was a past-chairman of the Lanarkshire Division and a past-president of the Glasgow and West of Scotland Branch. He was also intimately associated with the work of the Insurance Acts Committee and the Lanarkshire Medical Practitioners' Union, which was disbanded on the introduction of the National Health Service. Lanarkshire has produced many distinguished men who have risen to high office in the British Medical Association, but Ben Hutchison, though well known centrally, preferred to devote his main activities to serving his fellow practitioners in the home field. His main work in this regard began with the inception of the National Health Service. He had been strongly opposed to the conditions under which the profession accepted service under the new Act, but once it was an accomplished fact he devoted himself to making the Service work. He became the first chairman of the local medical committee in Lanarkshire and vice-chairman of the executive council and still held both these posts at the time of his death. He was also a member of the General Medical Services Subcommittee (Scotland) from its inception and served on its main subcommittees. In spite of these many commitments and the burden of work which they entailed, he also found time to serve for a period on the Western Regional Hospital Board, and at the time of his death was a member of the Scottish Medical Practices Committee. In addition, he had been for several years a member of the National Insurance Advisory Committee in London. In all these offices he played an important part in the moulding of the new legislation into a workable service, not only in the interests of his medical colleagues but mainly in what he regarded as the most important part, the interests and the welfare of the patient. He found a respite from his many activities in a lifelong interest in sport, including Rugby, golf, and fishing, and was a past captain of Cambuslang Golf Club. To those who enjoyed his personal friendship he has left the memory of a delightfully serene and sympathetic personality and of a loyal and affectionate friend. He is survived by his wife, a daughter, and two sons, the elder of whom is in the practice and the younger a major in the Royal Horse Guards at present serving in Cyprus. The funeral service in Daldowie crematorium on November 1 was attended by a large and representative gathering, a fitting tribute from those he had served so well. —J. C. M.

Dr. EUGEN BIRCHER, co-editor of the *Schweizerische Medizinische Wochenschrift* since 1927, died in Aarau on October 20 after a long illness. Eugen Bircher, the son of Heinrich Bircher, a distinguished surgeon and hospital superintendent, was born at Aarau on February 17, 1882. He qualified in medicine at Basle in 1906, proceeding to his M.D. two years later. After serving as an assistant at the surgical clinic in Basle, he joined his father at the surgical clinic of the cantonal hospital at Aarau, and eventually succeeded him as chief of the clinic. From 1932 to 1934 he was superintendent of the hospital. A leading figure in the medical affairs of his country, he served as president of the German-Swiss Medical Association and as vice-president of the Association of Swiss Physicians. He was interested in politics, both local and national, and from 1942 to 1955 was a member of the National Council of the Federal Assembly: here he was known as a man of broad views, refusing to be confined by narrow party interests. As an author Bircher wrote on military, political, and surgical subjects. His study of the Battle of the Marne established his reputation as a military historian; for some years he edited the *Allgemeine Schweizerische Militärzeitschrift*. His numerous medical papers were for the most part published in the *Schweizerische Medizinische Wochenschrift*, the journal which he helped to edit for so many years.

Medico-Legal

ALLEGED DELAY IN TREATING TUBERCULOSIS

[FROM OUR MEDICO-LEGAL CORRESPONDENT]

On November 5, 1956, settlement was reached before Mr. Justice Donovan in the Queen's Bench Division¹ in an action brought against Dr. Claude Conway and Dr. Abraham Sless, of Brighton, by Miss Roberta Eleanor Maguire, of Brighton. Miss Maguire's case was that in 1949 and 1950 Dr. Conway and Dr. Sless were practising in partnership and that over a period of 14 months she attended their surgery as a patient. During that time she was exhibiting symptoms which must have given notice and warning to any reasonable doctor that the state of her chest ought to be investigated. No investigation was suggested, and 14 or 15 months later when an x-ray photograph was taken of her chest at the instance of a school medical officer it was found that she was in an advanced stage of adult pulmonary tuberculosis. It was then too late for any treatment except drastic surgery. Her right lung was grossly affected and the left lung also, but not so much.

Dr. E. W. T. Evans, consultant physician in charge of the chest department at Worthing Hospital, called on Miss Maguire's behalf, thought that if an x-ray photograph had been taken in January or February, 1950, it would have shown signs of tuberculosis. If a moderate degree of infiltration had been shown then it might have been cured by drugs or a minor surgical operation. He agreed that it was very unusual to find adult tuberculosis in a child of 13.

Dr. I. R. Clout, of Crawley, criticizing the medical record card of Miss Maguire's case kept by Dr. Conway, said that, though he would have expected to find a note of the diagnosis as well as of the treatment, the card did show colds, coughs, sore throat, and loss of weight, which in his opinion showed a debilitated, sick child treated over a year and requiring investigation. He did not agree that though some doctors would have referred the patient for x-ray examination others would have accepted responsibility and gone on with the treatment.

Miss Maguire's evidence was that in the winter of 1949, when she saw first Dr. Conway and later Dr. Sless for sore throats and colds, she was given medicine but never examined with a stethoscope. Next winter she was worse, and towards the end of the year was visiting the surgery almost weekly. On one

occasion Dr. Sless examined her with a stethoscope, but did not take her temperature or weigh her. She was once told she had bronchitis. On a visit to her home Dr. Sless, when told by her mother that Miss Maguire was tired and listless, said it was all fuss and nonsense and she should be made to eat and should go out and play. She agreed that she had gone swimming against her parents' wishes and without telling the doctor while she had a cough. She said that she had told both Dr. Conway and Dr. Sless and her school doctor when she had night sweats in the autumn of 1950.

Miss Maguire's form mistress gave evidence that in the winter of 1949 her cough had interrupted lessons, but it improved during the summer of 1950. Miss Maguire's mother said that she was not so worried about her daughter's coughs and colds in the winter of 1949-50 as in the following winter. Her daughter was not too shy to go to the doctor regularly. Mr. Maguire gave evidence that his doubts about his daughter's health arose before March, 1951.

Dr. Conway said in evidence that in 1949 he had 4,600 patients on his list and was then joined by Dr. Sless. He was deputy Treasury medical adviser for the area, carrying out examinations for various Ministries. Miss Maguire's medical card was in Dr. Sless's handwriting and dated November 15, 1949, and he first saw her on December 30 of that year. She could not have seen him without its being recorded. When he next saw her on March 17, 1950, she complained of a cough. He examined her general condition and found nothing unusual. He next saw her in September for an elbow injury and was not told by her mother that she was going downhill fast. If he had been told that he would have examined her at once and sent her to the children's hospital or clinic for further examination. He never suspected tuberculosis. He would not expect Dr. Sless to record a cold and a few odd sounds in the chest.

During Dr. Conway's evidence there was a short adjournment, after which Miss Maguire's counsel announced that the action had been settled on terms of the payment of an agreed sum by way of damages, to include £150 for special damages for expense incurred by the father, and a payment for costs by the defendants amounting to a complete indemnity against any claim the legal aid fund might have against Miss Maguire on any of the damages recovered. Mr. Justice Donovan approved the settlement.

The Medical Defence Union instructed Messrs. Hempsons, solicitors, to act for Dr. Conway, and the Medical Protection Society instructed Messrs. Le Brasseur and Oakley to act for Dr. Sless.

Medical Notes in Parliament

Polio-myelitis Vaccination

Mr. SOMERVILLE HASTINGS (Barking, Lab.) on November 12 asked the Minister of Health for a statement on the recent campaign for inoculation of children against polio-myelitis and his plans for further inoculation in the future. Mr. R. H. TURTON stated that 176,200 children were vaccinated last May and June, including 27,000 who received only one injection. Nearly 1½ million children whose names were registered earlier this year would be given priority when vaccination was resumed. This should be in December for those children who had had one injection and in January for the others, but this further programme would depend on the rate of supply and testing of the vaccine.

Dr. EDITH SUMMERSKILL (Warrington, Lab.) said there had been strong adverse criticism by the B.M.A. of the Minister and the Parliamentary Secretary for using the polio-myelitis campaign for party propaganda purposes at the Llandudno conference, and she asked for an undertaking that this would not be repeated. Mr. TURTON suggested that she must have been misinformed. He made no speech at the party conference, and he understood that the Parliamentary Secretary made no such reference as was alleged. Dr. SUMMERSKILL told him that if he read the *British*

Medical Journal he would see that it was the Parliamentary Secretary's speech, and he as Minister was responsible for what she said. For the second time this year the Minister had been criticized by the great majority of doctors.

Prescription Charge Complaints

Mr. V. COLLINS (Shoreditch and Finsbury, Lab.) asked the Minister if he would exclude from the proposed charges for prescriptions all prescriptions for diabetes and varicose ulcer patients. Mr. TURTON replied "No," but added that any person who on application to the National Assistance Board showed that he would suffer financial hardship in accordance with the board's standards would be able to obtain a refund. Mr. COLLINS said that this class of patient required prescriptions consisting of a number of items throughout their lives. Could the Minister suggest some way in which these people could be helped by having one prescription covering a variety of items? Mr. TURTON replied that diabetics were now paying 1s. whenever they had a form. Under the regulations it was being provided that where a doctor thought it medically advisable he could prescribe a larger quantity of the drugs or dressings for a patient, and the patient would only pay 1s. He had been in touch with the B.M.A., and had asked them to consider any further composite packs that might be desirable. If they discovered such packs they would see that these composite packs would be charged only 1s. when they were prescribed.

Mr. S. AWBERY (Bristol, Central, Lab.) asked the Minister if he would introduce the use of larger medicine bottles and instruct doctors to prescribe larger quantities of drugs, dressings, and medicines in order to obviate the extra cost to those who could not afford to pay the extra charges and who were anxious to avoid a means test. Mr. TURTON stated that the quantity prescribed was a matter for the doctor's decision in accordance with his view of the treatment needed. The charge would be made for each quantity prescribed at any one time, notwithstanding that it might be dispensed in more than one container.

Mr. LLYWELYN WILLIAMS (Abertillery, Lab.) asked for an estimate of the number of persons eligible on the ground of economic circumstances to receive medically prescribed items free of charge and of the number of these who were old-age pensioners. Mr. TURTON said that the prescription charge would be refunded without further inquiry to persons already receiving National Assistance, who on September 25 numbered 1,628,000, of whom 1,065,000 were receiving retirement or non-contributory old-age pensions. He could not form any reliable estimate of the number of other people who might apply and be found eligible for a refund.

Critics of the New Flour

Lieutenant-Colonel LIPTON (Brixton, Lab.) asked the Minister of Agriculture, Fisheries, and Food what further regulations on the composition of flour and bread had been recommended by the Food Standards Committee. Mr. HEATHCOAT AMORY said that the committee had only within the last few days received written observations from interested parties and had yet to take oral evidence. It would therefore be some time before they were able to make recommendations. Lieutenant-Colonel LIPTON said that housewives had no idea of the extent to which the quality of flour had been reduced. Mr. AMORY said he could not agree that the quality had been reduced. He believed the average quality was more wholesome than it was before the recent change in the extraction rate. Mr. HASTINGS said that many, if not most, of those who knew most about the food value of bread would not agree with the Minister that the quality of bread had not been reduced recently. Would the Minister look at the leading articles in the *Lancet* and the *British Medical Journal* and other papers at the time the change was made? Mr. AMORY replied that he believed that flour to-day probably contained the three essential nutrients to a greater extent than it did before the recent change.

¹ *The Times*, November 1, 2, 3, and 6, 1956.

INFECTIOUS DISEASES AND VITAL STATISTICS

Summary for British Isles for week ending October 27 (No. 43) and corresponding week 1955.

Figures of cases are for the countries shown and London administrative county. Figures of deaths and births are for the 160 great towns in England and Wales (London included), London administrative county, the 17 principal towns in Scotland, the 10 principal towns in Northern Ireland, and the 14 principal towns in Eire.

A blank space denotes disease not notifiable or no return available. The table is based on information supplied by the Registrars-General of England and Wales, Scotland, N. Ireland, and Eire, the Ministry of Health and Local Government of N. Ireland, and the Department of Health of Eire.

CASES in Countries and London	1956					1955				
	Eng. & Wales	London	Scotland	N. Ireland	Eire	Eng. & Wales	London	Scotland	N. Ireland	Eire
Diphtheria ..	9	0	3	0	5	11	0	6	2	
Dysentery ..	568	74	220	7		474	44	175	6	2
Encephalitis, acute	6	0		0		5	0		0	
Enteric fever:										
Typhoid ..	2	1	3	0		0	0	0	0	
Paratyphoid ..	14	0	0	0		12	0	1	0	
Food-poisoning ..	303	46	34	1		288	46		0	
Infective enteritis or diarrhoea under 2 years ..				19	29				18	38
Measles* ..	3,009	195	219	116	94	2,301	33	49	21	65
Meningococcal infection ..	22	3	9	0	2	23	3	12	1	
Ophthalmia neonatorum ..	26	1	3	0		26	0	10	0	
Pneumonia† ..	316	23	140	1	1	329	26	147	4	
Poliomyelitis, acute:										
Paralytic ..	52	8				189	20			
Non-paralytic ..	62	6		7	2	140	25		27	5
Puerperal fever§ ..	224	45	11	0		237	38	9	0	
Scarlet fever ..	578	50	97	22	25	888	53	98	45	23
Tuberculosis:										
Respiratory ..	590	73	93	31		633	93	123	20	
Non-respiratory ..	78	10	12	0		79	5	15	7	
Whooping-cough ..	1,552	98	321	14	27	833	72	90	65	85

DEATHS in Great Towns	1956					1955				
	Eng. & Wales	London	Scotland	N. Ireland	Eire	Eng. & Wales	London	Scotland	N. Ireland	Eire
Diphtheria ..	0	0	0	0	0	0	0	0	0	0
Dysentery ..	0	0	1	0		0	0		0	
Encephalitis, acute		0			0		0			0
Enteric fever ..	0	0	0	0		1	0	0	0	
Infective enteritis or diarrhoea under 2 years ..	4	1	5	0	1	6	0	0	0	2
Influenza ..	9	1	0	0	0	8	1	0	0	0
Measles ..		0	0	0	0		0	0	0	0
Meningococcal infection ..		0	0				0	0		
Pneumonia ..	162	28	15	13	6	214	32	14	9	3
Poliomyelitis, acute	4	2			0	11	0			0
Scarlet fever ..		0	0	0	0		0	0	0	0
Tuberculosis:										
Respiratory ..	54	9	9	0	3	58	8	12	2	2
Non-respiratory ..		0	1	0	2		1	2	1	0
Whooping-cough ..	1	0	0	0	0	3	0		0	0
Deaths 0-1 year ..	180	29	39	8	5	195	27	13	6	10
Deaths (excluding stillbirths) ..	4,806	719	525	98	163	4,957	741	533	87	119
LIVE BIRTHS ..	7,528	1,068	911	219	412	7,210	1,137	858	207	312
STILLBIRTHS ..	177	19	39			145	19	23		

* Measles not notifiable in Scotland, whence returns are approximate.

† Includes primary and influenza pneumonia.

§ Includes puerperal pyrexia.

Vital Statistics

Week Ending November 3

The notifications of infectious diseases in England and Wales during the week included: scarlet fever 574, whooping-cough 1,538, diphtheria 4, measles 3,089, acute pneumonia 322, acute poliomyelitis 135, dysentery 458, paratyphoid fever 16, and typhoid fever 4.

Infectious Diseases

The variations in the notifications of infectious diseases in England and Wales during the week ending October 27 were small. The largest rises were 219 for measles, from 2,790 to 3,009, 83 for whooping-cough, from 1,469 to 1,552, and 32 for acute pneumonia, from 284 to 316; the largest falls were 68 for dysentery, from 636 to 568, 38 for food-poisoning, from 341 to 303, and 22 for scarlet fever, from 600 to 578.

The largest rises in the incidence of measles were 79 in Montgomeryshire, from 30 to 109 (102 of the 109 cases were notified in Newtown and Llanllwchaearn U.D.), and 55 in Lancashire, from 779 to 834; the largest fall was 61 in Cheshire, from 158 to 97. Only small changes were reported in the local returns of scarlet fever. The largest variation in the trends of whooping-cough was a fall of 38 in Lancashire, from 227 to 189. 9 cases of diphtheria were notified, being 3 more than in the preceding week; 6 of these cases were notified in Lancashire (Liverpool C.B. 4).

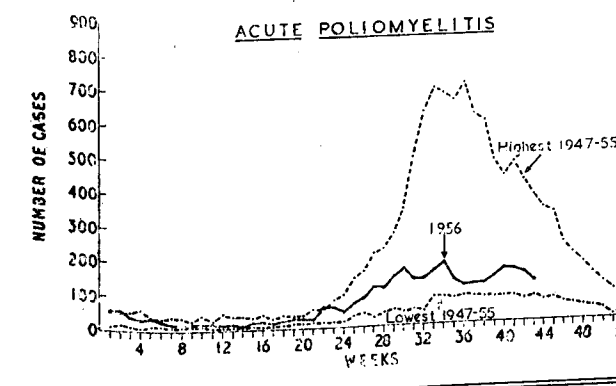
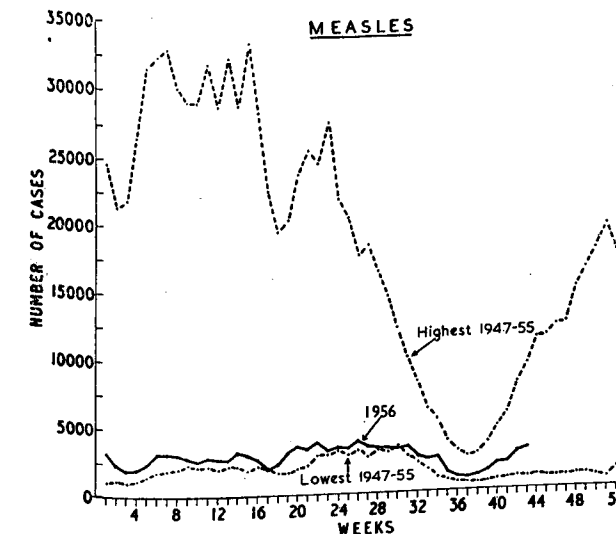
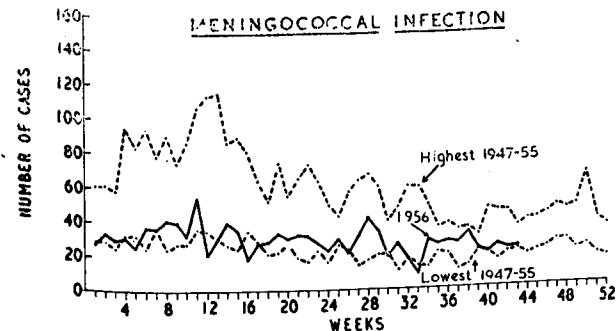
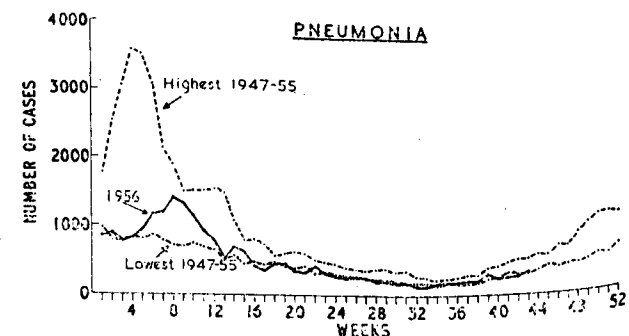
114 cases of acute poliomyelitis were notified; these were 25 fewer for paralytic and 1 fewer for non-paralytic cases than in the preceding week. The largest returns were Lancashire 15 (Liverpool C.B. 6, Manchester C.B. 4); London 14 (Battersea 2, Chelsea 2, Greenwich 2, Lewisham 2, Poplar 2), Cheshire 12 (Altrincham M.B. 2, Bebington M.B. 2, Sale M.B. 2), Middlesex 12 (Ealing M.B. 6).

The largest variations in the local outbreaks of dysentery were decreases of 55 in Lancashire and 51 in Yorkshire West Riding. The chief centres of infection were Yorkshire West Riding 96 (Rotherham R.D. 22, Leeds C.B. 19, Sheffield C.B. 11), Lancashire 75 (Rawtenstall M.B. 16, Rochdale C.B. 11), London 74 (Chelsea 15, Wandsworth 9), Essex 50 (West Ham C.B. 37, Ilford M.B. 9), Yorkshire East Riding 46 (Haltemprice U.D. 38), Staffordshire 37 (West Bromwich C.B. 20), and Worcestershire 20 (Oldbury M.B. 19).

The largest outbreak of food-poisoning in the country was 65 cases in Liverpool C.B.

Graphs of Infectious Diseases

The graphs below show the uncorrected numbers of cases of certain diseases notified weekly in England and Wales. Highest and lowest figures reported in each week during the nine years 1947-55 are shown thus -----, the figures for 1956 thus ———. Except for the curves showing notifications in 1956, the graphs were prepared at the Department of Medical Statistics and Epidemiology, London School of Hygiene and Tropical Medicine.



The Services

Wounded in Egypt.—Lieutenant A. J. Cavanagh, R.A.M.C., attached Parachute Regiment (Bedford).

Surgeon Rear-Admiral S. G. Weldon, C.B.E., R.N., has been appointed an Honorary Physician to the Queen in succession to Surgeon Captain D. H. Kernohan, R.N.

Colonel H. Sissons, O.B.E., T.D., R.A.M.C., T.A., has been appointed Honorary Colonel, 42 (Lancs) Inf. Div., R.A.M.C., in succession to Colonel J. F. O'Grady, T.D., R.A.M.C., T.A., tenure expired.

Colonel M. H. Summers, D.S.O., T.D., R.A.M.C., T.A., has been appointed Honorary Colonel 57 (Mx.) General Hospital.

A Supplement to the London Gazette has announced the following appointments in recognition of distinguished services in Malaya for the period January 1 to June 30, 1956:

C.B.E. (Military Division).—Colonel (temporary) J. C. Reed, O.B.E., R.A.M.C.

M.B.E. (Military Division).—Captain E. W. Brentnall, R.A.M.C.

Medical News

Royal Medal.—On the recommendation of the council of the Royal Society and with the approval of the QUEEN, Dr. DOROTHY HODGKIN, F.R.S., reader in x-ray crystallography at Oxford, has been awarded one of this year's two Royal Medals. The award, states the citation, is "for her distinguished work in the elucidation of structures of penicillin, vitamin B₁₂, and other important compounds by the methods of x-ray crystallography."

Gowers Memorial Medal.—We illustrate here the Gowers memorial medal which was presented to Sir FRANCIS WALSH, F.R.S., by Sir RUSSELL BRAIN, P.R.C.P., on Thursday evening, when Sir Francis delivered the first Gowers



memorial lecture at the Royal Society of Medicine (see p. 1168). At the lecture the chairman was Sir ERNEST GOWERS, whose father, Sir William Gowers, the lecture and medal commemorate. Sir Ernest is chairman of the board of governors of the National Hospitals for Nervous Diseases. The medal, which is in gold, was designed by Mr. T. H. PAGET, and bears on its obverse a likeness of Sir William Gowers based on contemporary photographs, and the words "Sir William Gowers, F.R.S., 1845-1915." It is understood that the lecture and medal will be awarded triennially.

Mental Hospitals.—The Board of Control's report on the condition of mental hospitals and other institutions for the mentally ill (excluding mental defectives) in England and Wales in 1955 states that at the end of the year the mental hospitals were overcrowded to the extent of nearly 18,000 patients and that the nursing shortage persisted. However, the figures showed some improvement on the previous year. The encouraging feature of the report is that the proportion of voluntary patients continued to rise, being 75% of the total admissions to designated mental hospitals during the year; in 1946 the comparable figure was 50.8%. At the end of 1955 a total of 150,856 patients were notified to the Board as being then under institutional care for mental illness. This figure includes 4,291 private patients and 1,108 "criminal lunatics," and represents a fall of 1,288 since the beginning of the year. Of the total admissions 41.6% were readmissions, and there was, as previously, little difference between the readmission rates for voluntary and certified patients. Sir FREDERICK ARMER is continuing as chairman of the Board, despite his retirement this week from the post of deputy secretary at the Ministry of Health.

Chair of Medical Entomology.—Dr. D. S. BERTRAM, Ph.D., reader in entomology at the London School of Hygiene and Tropical Medicine, has been appointed to the London University Chair of Medical Entomology tenable at the School. Dr. Bertram, who is 42, was educated at Glasgow University, where he graduated B.Sc. in zoology (with first-class honours) in 1935, proceeding Ph.D. in 1940. After holding appointments as lecturer and demonstrator in medical zoology and entomology at Glasgow and later the Liverpool School of Tropical Medicine, Dr. Bertram joined the R.A.M.C. as an entomologist in 1940. He was a prisoner of war in Germany from 1941 to 1945, and later in charge of the department of

DEATHS

Boftrell.—On October 20, 1956, at his home, Stanley Henry Reginald Bofftrell, L.R.C.S.Ed., L.S.A., aged 89.

Bryson.—On October 30, 1956, in an infirmary, Thomas Bryson, M.B., Ch.B., of Glasgow, and Kilmarnock, Ayrshire.

Davidson.—On October 27, 1956, at Hildenborough, Kent, the result of an accident, Guy Beaumont Davidson, M.B., B.Chir., D.Obst.R.C.O.G., of Philipotts, Hildenborough, aged 29.

Dunn.—On October 31, 1956, at 42, Upper Cheyne Row, Chelsea, London, S.W., Williamina Shaw Dunn, M.D., D.Sc., D.P.H.

Eardley.—On October 29, 1956, William Eardley, M.B., B.Ch., of Lindum House, Boothferry Road, Goole, Yorks., aged 92.

Glegg.—On October 29, 1956, William Little Glegg, D.S.C., M.B., Ch.B., D.P.H., B.Hy., of 135, Horston Road, Leicester.

Hardy.—On October 30, 1956, at Torquay, Devon, Thomas Mellor Hardy, M.D., of "Prospect," Barton Hill Road, Torquay, formerly of West Byfleet, Surrey.

Henpolette.—On October 30, 1956, at his home, Southdene, Regent Road, Jersey, John Emmanuel Reid Henpolette, M.B.E., F.R.C.O.G., M.R.C.S., L.R.C.P., formerly of Agra, India.

Simpson.—On October 29, 1956, Thomas Edward Norman Simpson, M.R.C.S., L.R.C.P., of West Hythe, Patchway, Bristol, aged 53.

Any Questions ?

We publish below a selection of those questions and answers which seem of general interest. It is regretted that it is not possible to supply answers to all questions submitted.

Age of Puberty

Q.—We know that the heights and weights of school-children have improved within recent years. Is there any evidence that the age of puberty is earlier? What factors influence the age at which it occurs?

A.—There is a great deal of evidence that the age of puberty in girls, and also in boys, is earlier than formerly. Unfortunately none of the evidence comes from Britain, where up to about ten years ago very little attention was paid to the growth of children; but European and American statistics make it quite clear that the age at which the first menstrual period occurs (menarche) has got less by about a third of a year per decade continuously during the last hundred years. The average age of menarche in England now is approximately 13½ years. So far as we know age of puberty is not greatly affected by climate (contrary to what used to be thought); poor nutrition retards the age of puberty, and poor social environment does so as well. Various other factors influence the age of puberty, the chief amongst them being the factor of inheritance. A full discussion of these factors can be found in J. M. Tanner's *Growth at Adolescence* (Blackwell Scientific Publications, Oxford, 1955).

Foreign Bodies in Children's Ears

Q.—What is the best way of removing foreign bodies such as beads, beans, etc., from children's ears? Do any of the new plastic adhesives make it possible to attach a match-stick or similar instrument to the object to facilitate its extraction?

A.—The danger of foreign bodies in the ear lies mainly in their removal. In the case of children a general anaesthetic must be given if the child is nervous and unable to hold its head perfectly still during examination, and if the foreign body is too large to remove by syringing. Only a practitioner with considerable experience in otoscopic examination and in the intra-meatal manipulation of instruments should attempt to remove a foreign body from the ear, and it should be carefully examined before any such attempt is made. Small free objects are best removed by syringing; it should be remembered in so doing that beans and peas are hygroscopic and swell when moist, and in such cases syringing with alcohol is recommended. Hard bodies, such as beads and buttons, may damage the tympanic membrane if driven against it by forcible syringing and should be removed by the aural curette; this is best passed along the roof of the meatus between the foreign body and the meatal wall and the body rolled outwards along the floor. It is useless to try to grasp cylindrical bodies with forceps in the meatus.

Partially impacted foreign bodies may be freed and removed by means of a fine aural hook in the same manner as the aural curette; secondary otitis or swelling from trauma may be a contraindication to their immediate removal. If firmly impacted, it may be necessary to remove foreign bodies by operation, in which case an incision is made in the post-audicular groove, the membranous meatus is freed and incised, and the body disimpacted and removed. It may occasionally be necessary to enlarge the bony meatus by paring down its walls with a gouge.

There is no record known of the use of plastic adhesives for removing foreign bodies from the meatus.

"Mist. Menses"

Q.—I have been asked by the warden of a hostel for pupil-midwives to prescribe a mixture for the relief of dysmenorrhoea. Apparently a number of the pupils suffer considerable distress from premenstrual and first-day pain. I am given to understand that at one London hospital a mixture known as "Mist. Menses" was prescribed in such cases. What does your expert suggest?

A.—Although this is, or was, traditional in some hospital nurses' homes, the wisdom of providing a stock mixture—sedative, antispasmodic, or both—for the home sister to dole out to nurses with dysmenorrhoea is, to say the least, doubtful. Each girl or woman with dysmenorrhoea deserves individual attention from her doctor, including questioning, examination, explanation, reassurance, and in some cases reference to a specialist. Even pupil-midwives are not free from misconceptions regarding the phenomena of menstruation; and, although most are in their early twenties, a few are older women in whom an organic cause for the symptom may be present.

Child Guidance Clinics

Q.—(1) What are your experts' views on the usefulness of child guidance clinics? What facilities not easily obtainable elsewhere do they offer? (2) What staff is required to run a child guidance clinic, and what accommodation is necessary? About how many cases a year can such a clinic deal with? I have in mind a town with a population of about 100,000.

A.—A CHILD PSYCHIATRIST writes: (1) Although child guidance clinics are becoming more systematic and organized in diagnostic, therapeutic, prophylactic, and experimental work it is not yet possible to assess their value in terms of improved general mental health, reduced frequency of breakdown in adult life, and influence upon the amount of antisocial and delinquent behaviour. However, most psychiatrists agree that the conditions occurring during infancy, childhood, and adolescence are, generally speaking, more amenable to treatment than those met with in adult life, and are convinced of the immediate value of child guidance in relieving distressing symptoms or behaviour, in improving adjustment, and in freeing the developing personality of the child from the influence of distorting attitudes and circumstances. Clinics provide facilities for the assessment of physical, emotional, intellectual, and social stresses and their relation to symptom formation, disturbed behaviour, and deviations of personality in infancy, childhood, and adolescence; and for the relief of many of these stresses through the advice, guidance, and help given to parents, teachers, etc., and through the direct treatment of the child by psychotherapeutic methods or by placing the child in a suitable alternative environment. There is a growing realization amongst those concerned with the education, physical health, care, and supervision of children that emotional factors play an important part in the child's development, adjustment, and response to stress, and that a better understanding of these factors would assist considerably in their work. The modern clinic should be prepared to meet this growing need and to advise and help when questions of mental hygiene arise during the work of infant and child welfare clinics.

(2) Conditions vary considerably from area to area as far as the responsibility for the provision of staff and accommodation is concerned and for the general administration of the unit. The recommendation of the committee on maladjusted children¹ on staffing has been accepted by most as a reasonable ideal: nevertheless, for a population of 100,000 inhabitants the needs suggested above could be more adequately met by a team consisting of one full-time psychiatrist, one full-time psychologist, and two full-time psychiatric social workers. The most satisfactory arrangements so far as local authority clinics are concerned is for

the unit to be accommodated in offices set aside for the purpose and not shared by other workers; a minimum of an office for each member of staff, a fairly large play-room, a waiting-room, and a general office is required. The turnover of cases will depend upon the policy adopted by the clinic, but in an area of 100,000 inhabitants between 100 and 200 new cases could be examined each year in addition to cases attending for regular treatment.

A MEDICAL OFFICER OF HEALTH writes: (1) There is no doubt about the value and usefulness of child guidance. There are two components of child guidance in its broadest sense which may be combined or associated together in a child guidance clinic. The first concerns the clinical treatment of those children called maladjusted, who show evidence of emotional instability or psychological disturbance and require special educational treatment in order to effect their full personal, social, and educational adjustment. The second component includes the duties of a school psychological service. The function of this service, which is primarily non-medical in character, is to assess the abilities and aptitudes in an educational sense of children throughout their school life so as to obtain the best results from the education provided. A child guidance clinic of this dual character can provide a centre for the diagnosis and treatment of emotional and behaviour problems occurring in the child at home and in school, and it can also provide guidance in the purely educational sense both to the child and to the teaching staff of the school. In its psychiatric aspect the clinic can prevent delinquency, and in this respect can give valuable advice to magistrates and to juvenile courts, and later on in the life of the child give advice on aptitude for employment. It is recommended that child guidance clinics should work in close association with juvenile courts and with the children's departments of local authorities.

(2) The minimum staff required is a psychiatrist, an educational psychologist, and a psychiatric social worker. The psychiatrist should be one with a special interest in child psychiatry. A clinic taking about 100 new cases per year will need the services of a part-time psychiatrist, a psychologist working half-time, and a full-time social worker. In a clinic taking 300 new cases per year the minimum staff needed would be one full-time psychiatrist, two full-time psychologists, and three full-time social workers. The clinic should be run in close association with the school health service and with the general practitioners in the area. In addition the consultant services of a paediatrician are valuable, and it is recommended that the services of a speech therapist should be available as required. The accommodation necessary will depend on the size of the clinic, but it should be sufficient to ensure privacy for each member of the staff to interview parents and children. The suggested minimum would be a waiting-room, individual rooms for each psychiatrist and psychologist, and accommodation for the social workers. In addition to this there should be two play-rooms for play therapy and observation, together with the necessary office and record accommodation. The accommodation should be as informal and as homely as possible, and it is desirable that the building should be as unobtrusive as possible. It is estimated that a child guidance team of one full-time psychiatrist, two psychologists, and three social workers can adequately serve a population of 45,000 schoolchildren.

REFERENCE

¹ Report of the Committee on Maladjusted Children, Ministry of Education, 1955. H.M.S.O., London.

Mescaline

Q.—Has mescaline any therapeutic value?

A.—Mescaline is the best studied of those drugs with a central stimulating action which because of their effect on imagery have been called "phantastica" or hallucinogenic drugs. Its chemical constitution is of interest because of its close relation to adrenaline and similar substances occurring

in the normal human body. In view of the frequent occurrence of "depersonalization" under mescaline intoxication, Guttman and Maclay¹ suggested its use for treating this symptom, but their results have not been confirmed by other observers. Small doses have lately been used as a help to provoke the production of "subconscious" material which was apparently forgotten or "repressed" from consciousness. Other means of releasing such material are available and more effective than mescaline. Aldous Huxley's recommendation of mescaline in place of alcohol as a general stimulant has no medical support.

To sum up: mescaline has no therapeutic value in spite of its considerable interest as a research tool.

REFERENCE

¹ Guttman, E., and Maclay, W. S., *J. Neurol. Psychopath.*, 1936, 16, 193.

Fungal Infections of the Urinary Tract

Q.—What treatment is suggested for a monilial pyelitis? The patient in question had a tuberculous kidney removed some years ago, but repeated examinations of catheter specimens of urine have failed to reveal any tubercle bacilli (guinea-pigs were inoculated), and the most recent specimen has yielded an almost pure culture of *Monilia albicans*. There are some small stones in the remaining kidney.

A.—Yeast-like fungi in the urine are more often of the genus *Torula* than *Candida* (*Monilia*), and a frequent predisposing condition is glycosuria: when this exists its abolition is often enough to cure the infection. The precise identity of the organism is of little consequence in treatment, since all yeast-like fungi are entirely unaffected by sulphonamides and antibiotics. This leaves only the urinary antiseptics other than true chemotherapeutic agents, and I am not aware that any of these has been shown to be effective against this class of organism except hexamine. The action of hexamine, which itself is inert, is due to the liberation from it in an acid medium of small quantities of formaldehyde. This liberation is minimal unless the pH of the urine is reduced to below 6.0, and preferably to about 5.0. Sufficient ammonium chloride should therefore be given to attain this degree of acidity in the urine (as verified by an appropriate indicator, or, better, with a pH meter) together with 10 gr. (0.65 g.) of hexamine three times a day. It may prove impossible to eradicate this (or any other) infection permanently if there are, as stated, calculi in the remaining kidney.

Menthol Cigarettes

Q.—A patient has asked me to prescribe menthol cigarettes for him. He tells me that before the war they were used by people forbidden to smoke. I would appreciate some information about them.

A.—Cigarettes containing menthol were at one time available in Britain for discouraging smoking. They were not supplied through pharmacists but were advertised in the lay press, and those wishing to stop smoking were asked to write for the "cure." They were extremely expensive, costing about five guineas for a few cigarettes. It is not known whether they were effective or if they are still available. A trick often played on pharmaceutical apprentices was to place a long crystal of menthol in an ordinary cigarette. The effect of smoking such a cigarette is certainly most unpleasant.

Medicated cigarettes are usually made from one or more of the following herbs: stramonium, belladonna, lobelia, hyoscyamus, digitalis, mullein, sage, eucalyptus, or coltsfoot leaves, cascarilla bark, phellandrus fruit, or cubeb berries. Cigarettes containing menthol could be made with some of these as a basis. Alternatively, thin blotting paper could be soaked in a solution of menthol in methylated spirits, and when dry this could be used to make cigarettes. It is usual to add about 2% of potassium nitrate to aid combustion.

Intra-arterial Transfusion

Q.—What are the indications for, and what is the rationale of, intra-arterial transfusion?

A.—The chief indication for intra-arterial transfusion is a degree of shock so profound that an adequate volume of blood cannot be given sufficiently quickly by the intravenous route. The rationale is that intra-arterial transfusion immediately raises the mean intra-arterial pressure and improves the blood supply directly to brain, heart, and other internal organs. Perhaps the commonest example of the use of intra-arterial transfusion is the cardiac surgeon's insertion of a needle for transfusion into the aorta when cardiac output is impaired in the course of a cardiac operation.

Infirmity Mice

Q.—Do house-mice sometimes spontaneously desert buildings they have long occupied, and, if so, are the reasons for this understood? A large infirmary, previously much afflicted with mice, is said now to have none. The only change in environment noted has been the installation of seven television sets, and some people have suggested that this might account for the migration of the mice.

A.—It would be nice to attribute some useful function to television sets, but, until controlled experiments have been carried out, television will have to find other functions to justify its existence.

There does not appear to be any authenticated case of a mouse population spontaneously deserting a large town-building where there was an adequate supply of food. In the hospital mentioned in the question it is possible that control measures, aided by the local cat population and perhaps unnoticed changes in the handling and storage of possible food materials, have brought about a marked decline in the mouse population.

The British house-mouse is derived from a Central Asian wild species. In Britain there appear to be three fairly distinct groups; the "town-mouse" of our houses, shops, and warehouses; the "rural-mouse" (not to be confused with the various species of field mice and voles); and the "wild house-mouse." The rural mouse lives in and about farm buildings, whereas the wild one keeps to the hedges and fields and rarely invades buildings. A farmhouse may be free from mice during the summer months, but a high population may develop with the onset of autumn. If the hospital is in rural surroundings it is more than likely that very shortly the mice will again become obvious.

Potency and Effectiveness of Adrenaline

Q.—How long does 1 in 1,000 adrenaline solution retain its potency? How can one test this? Does adrenaline in an ampoule retain its potency longer than if kept in a rubber-capped bottle? Recently I needed to give 100 minims (6 ml.) of 1 in 1,000 adrenaline from a bottle to relieve an asthmatic who the day before had been relieved by 1 ml. from an ampoule. Could this discrepancy have been due to loss of potency of the adrenaline in the bottle? It had not changed colour.

A.—One-in-a-thousand adrenaline solution, if protected from light and stored in a cool place in well-filled glass containers complying with the tests for the limit of alkalinity, should retain its potency. In practice, however, adrenaline in rubber-capped bottles is often found to be discoloured after six months, while adrenaline in ampoules, if the ampoules are left in their boxes, retains its potency for much longer. Loss of potency is due to oxidization. Apart from animal assay, the only practical way of judging the potency is by carefully looking for any colour change: active adrenaline is colourless; a pink colour later turning to brown indicates loss of activity.

Since the 100 minims (6 ml.) of adrenaline was colourless, the difference in dose from the previous day was almost certainly not due to loss of potency but to the condition of the patient. The effective dose of adrenaline depends on the severity of the attack. It is quite understandable that an asthmatic on one day might be relieved by 1 ml. of adrenaline, but that on the following day, with the condition worsening, 6 ml. of adrenaline given at the rate of 1 minim (0.06 ml.) per minute might be required and tolerated without side effects.

Heredity in Diabetes

Q.—To what extent is diabetes mellitus an inherited disease? In a family of seven children four have already developed diabetes (two boys and two girls); one of the remaining children was killed in the war. There is no knowledge of the disease in earlier generations on either side. What is the likelihood of the two remaining unaffected children developing the disease, and what is the outlook for the next generation?

A.—Diabetes mellitus is probably not homogeneous genetically. The insulin-sensitive form of early onset behaves as if due to one or more recessive genes with reduced penetrance.¹ The empiric risk for a brother or sister of an affected child, the parents being unaffected, is about 1 in 20.

The remarkable history in the inquirer's family, however, suggests recessive inheritance without any reduction of penetrance. The risk in this family for the remaining two children may well be as much as 1 in 4, but the risk is lessened by the extent to which the children have already passed a fraction of their lifetime risk. The outlook for the next generation in this family is a risk of 2-5% for the children of the affected members of the sibship, and of 1-2% for those of the unaffected members.

REFERENCE

¹ Harris, H., *Ann. Eng.*, 1950, 15, 95.

NOTES AND COMMENTS

Schools for Mentally Backward Children.—Dr. D. M. ZAUSMER (Barnehurst, Kent) writes: In your expert's answer to the inquiry on where information about schools for mentally backward children may be obtained ("Any Questions?" November 3, p. 1070) there is no mention of child guidance clinics. I would suggest that a doctor concerned with an E.S.N. child should first consult the psychiatrist of his local clinic. In addition to the special day and residential schools for E.S.N. pupils mentioned in the answer, there are also special classes for such pupils in some ordinary schools. Other provisions include home tuition in certain cases and remedial teaching by educational psychologists at child guidance clinics.

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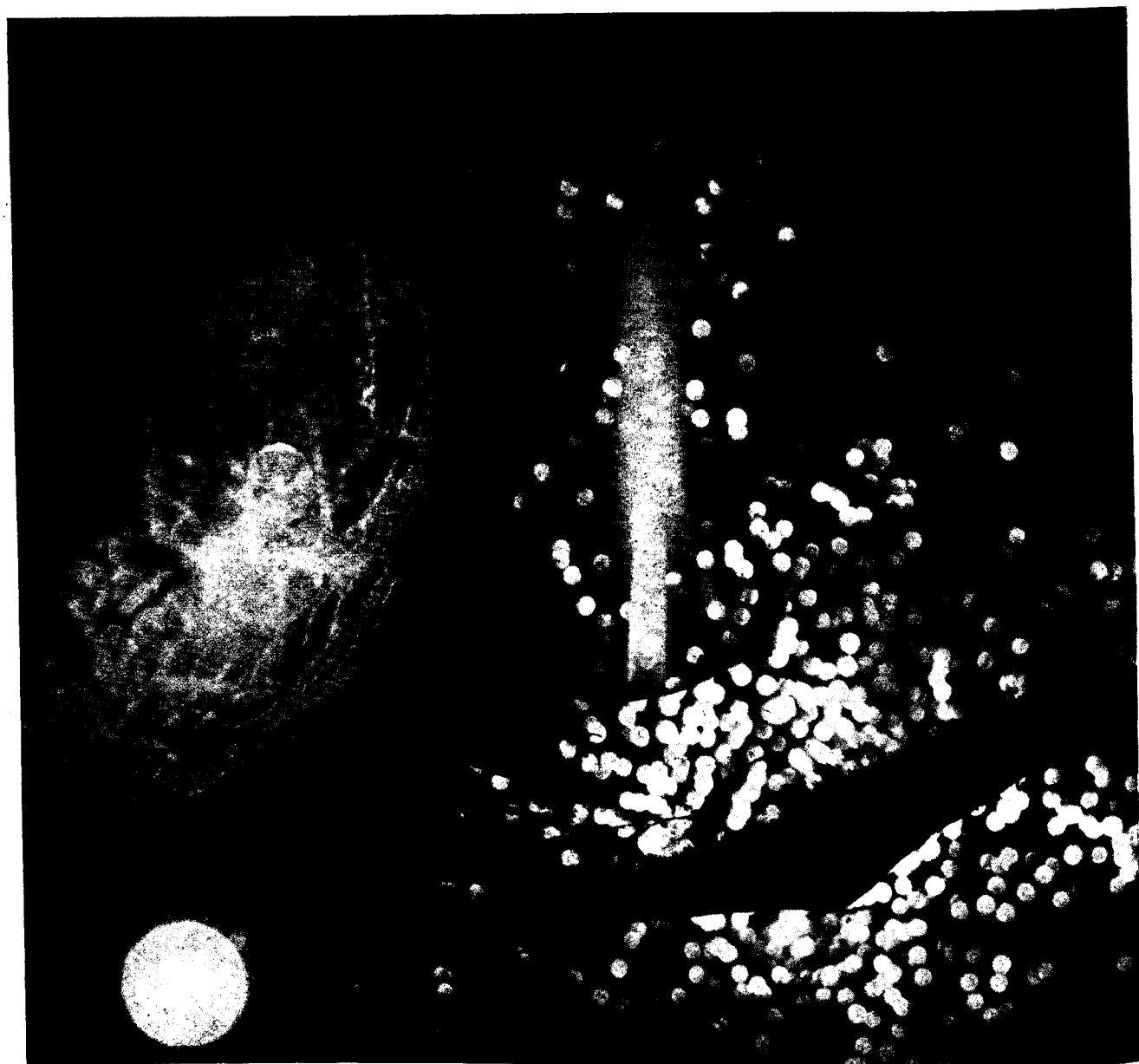


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Does man really have a limited expectation of life?

Is there indisputable evidence that man's term upon this Earth is limited? Could it be that what today is a normal age span will tomorrow seem ludicrous? Admitted, at present a body seems to wear out. But does it really? Or does bodily decline go hand-in-hand with mental stagnation? There have, of course, from time to time been reports from foreign climes of extreme longevity—extreme, that is, compared to normal. And even here in Britain the average expectation of life has risen steadily, thanks to the surgeon, the physician and the march of medical knowledge. But, even so, our allotted time is still only a little more than the traditional 'three score and ten'. We may, of course, cheat the grave by some ten, twenty or perhaps thirty years. But can we in the future live on and on and on? *Who is to say that another age will not produce the elixir of life?* What reasoning precludes "spare parts" for men's anatomy, not merely mechanical prostheses but living, sensate, organs and limbs? And why shouldn't there be new horizons for future medical men to see over? After all, this age has given us antibiotics. Man's life span has been increased by such "wonder drugs" as Terramycin. May not the future hold even broader broad-spectrums? Today we can only hope and search and use those weapons which best help us to fulfil our Hippocratic oath. But think on these things. For who, other than you, can give a man his birthright—the right to live?

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BRITISH MEDICAL JOURNAL

LONDON SATURDAY DECEMBER 1 1956

PRESENT THERAPEUTIC STATUS OF CORTISONE AND ITS DERIVATIVES, WITH SPECIAL REFERENCE TO RHEUMATIC DISEASES*

BY

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The multiple and various applications of cortisone and certain of its derivatives and of corticotrophin currently give these hormones a field of action and versatility "wider than that of any other therapeutic agent" (Hench, 1956). Their specific hormonal value is recognized by their use in about 20 hormonal, endocrinal, or metabolic conditions. The non-specific hormonal effects have been useful in more than 90 so-called non-hormonal conditions. In such circumstances the effects of administration of these hormones are suppressive rather than curative; but the effects are none the less valuable for purposes of treatment or further investigation. As Hench has stated, it is now no longer *if* but when, how, and for what purpose these hormones should be used.

Chief among the non-specific effects of adrenocortical hormones which have been useful clinically are their anti-inflammatory, antirheumatic, and anti-allergic activities. A few examples are given in Table I. The

physicians should learn to use the available hormones as effectively as possible and should obtain the consultation and supervision of experienced specialists whenever indicated.

Improved use of adrenocortical steroids has developed chiefly along two interdependent approaches. One has been by way of the various modifications of methods of administering the hormones. In a sense this has been an approach dictated by necessity, since existing measurements of adrenal cortical and pituitary function (Mason, 1955) were of limited usefulness for presumed non-hormonal diseases. Certain practical aspects of the currently advocated methods of administration are discussed below. The other approach to improved use of the hormones has been made by various chemical modifications of the steroid nucleus. This has resulted already in a number of synthetic steroidal compounds with varying degrees of metabolic and anti-inflammatory activity.

CHEMICAL DEVELOPMENTS AND STUDIES OF EFFECTS

Evolution of Antirheumatic Steroids

Cortisone, the first adrenocortical steroid found to have antirheumatic and other physiological effects, was given to patients with rheumatoid arthritis in 1948 (Hench *et al.*, 1949), and hydrocortisone, or cortisol, in 1949 (Hench *et al.*, 1950). Hydrocortisone has a more certain action than cortisone when administered locally (Young *et al.*, 1954); but it is equal to cortisone in the production of undesired metabolic effects when given systemically (Ward *et al.*, 1952). In 1954, 9 α -fluorohydrocortisone was found to have an antirheumatic effect about 10 times that of cortisone, but also an effect on electrolytes about 50 times that of cortisone (Ward *et al.*, 1954; Thorn *et al.*, 1955). In the same year prednisone and prednisolone were found to have antirheumatic effects about four to five times those of cortisone (milligram per milligram) without an enhanced effect on electrolytes (Bunim *et al.*, 1955).

Trials of other compounds have included Δ -1,9 α -fluorohydrocortisone, a combination of prednisone and 9 α -fluorohydrocortisone which did not prove superior to either of these analogues (Thorn *et al.*, 1955); prednisone aldehyde, which seems to have less antirheumatic effect than prednisone (L. E. Ward, unpublished data); and aldosterone, which in doses used did not have antirheumatic properties, although it did affect electrolytes.

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TABLE I.—Usefulness of Cortisone and Its Derivatives and Corticotrophin in "Non-hormonal" Conditions*

Clinical Effect	Clinical Application: Examples
Anti-inflammatory and antirheumatic	Rheumatic fever Rheumatoid arthritis Systemic L.E. Diffuse myositis Early periarteritis nodosa Acute bursitis Iritis, certain other ocular inflammations Pemphigus vulgaris Acute thyroiditis Non-tropical sprue Chronic ulcerative colitis
Anti-allergic	Status asthmaticus Allergic ocular conditions Severe seasonal pollenosis Serum sickness Sensitivity reactions to drugs
Antitoxic	Snake and insect venoms Acute delirium tremens Acute viral hepatitis Severe bacterial and other toxæmias (e.g., peritonitis)
Regulatory: to regulate haemic equilibrium	Effect on eosinophils in eosinophilic pneumonia Involutionary effect on lymphoid tissue in lymphomas, leukaemias Acute haemolytic anaemia; thrombocytopenic purpura
Regulatory: to inhibit mesenchymal fibroplasia	Control of formation or re-formation of adhesions, strictures, contractures, scar tissue

* From Hench (1956), with additional examples.

hormones also may have regulatory effects on haemic equilibrium and mesenchymal fibroplasia.

Much additional investigation is needed to answer important questions pertinent to the broadening clinical applications and potentialities of these hormones. But

*Read at the Annual Meeting of the British Medical Association, Brighton, 1956.

†The Mayo Foundation, Rochester, Minnesota, is a part of the Graduate School of the University of Minnesota.

Undoubtedly other compounds will be introduced as a result of further intensive chemical modifications of significant portions of the steroid nucleus.

Prednisone: Metabolic Studies

Controlled metabolic balance studies in which the effects of prednisone are compared with those of cortisone or hydrocortisone have shown that prednisone has many similar and only a few different effects compared with other antirheumatically active synthetic or naturally occurring adrenocortical steroids (Ward *et al.*, 1955).

Case 1.—A woman of 51, who had had severe rheumatoid arthritis for one year, was given orally 20 mg. of prednisone daily for 36 days. It was then discontinued for 12 days, after which time hydrocortisone (free alcohol) was administered orally in a dose of 80 mg. daily for 24 days. This was followed by 20 mg. of prednisone again for six days, 17.5 mg. for six days, and 15 mg. for six days. Prednisone and hydrocortisone, in the doses used, produced marked and essentially equal antirheumatic effects.

During administration of prednisone the concentration of sodium, chloride, and carbon dioxide in the plasma remained essentially unchanged (Fig. 1). Plasma potassium increased slightly, although perhaps not significantly. The haematocrit reading increased appreciably and the body weight decreased about 5 kg., both of these changes occurring principally during diuresis of sodium and chloride in the first 12 days of the administration of prednisone.

In contrast, during the administration of hydrocortisone the average plasma concentration of sodium increased slightly and that of chloride decreased slightly, that of potassium decreased notably, and that of carbon dioxide increased greatly. The haematocrit reading and body weight remained essentially unchanged during this period.

Nitrogen balance studies (Fig. 2) revealed that, in comparison with the periods when the hormones were not being administered, the excretion of nitrogen was slightly increased during the first course of prednisone as well as when hydrocortisone was given. During the second

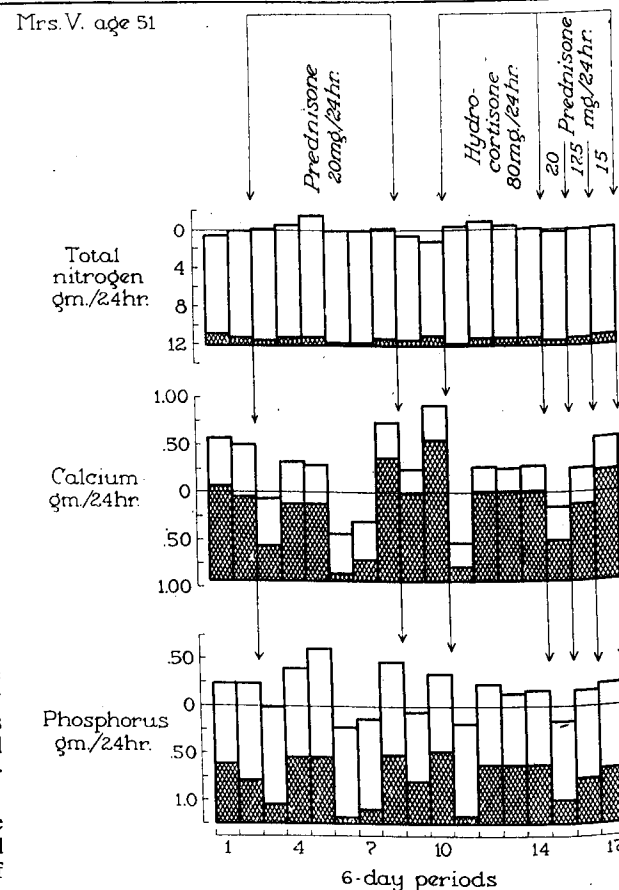


FIG. 2.—Effects of prednisone and hydrocortisone on balances of total nitrogen, calcium, and inorganic phosphorus in same patient as in Fig. 1. The daily intake is measured downward (but not blocked in) from the 0 line and is represented by the distance from the 0 line to the bottom line of the column. The average daily excretion (faecal, hatched column; urinary, clear column) is charted upward from the bottom line. Each column represents a six-day period. A negative balance is indicated by the position of the top of the column above the 0 line, a positive balance by the top of the column below the 0 line.

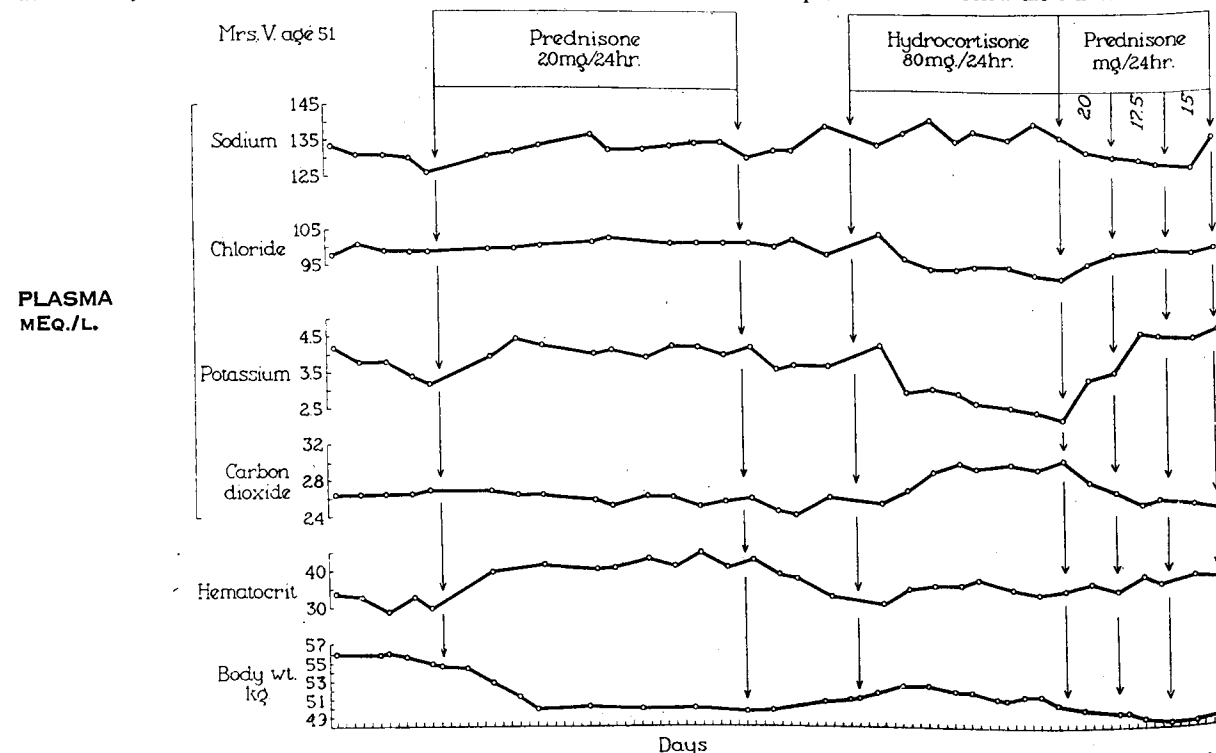


FIG. 1.—Effects of prednisone and hydrocortisone on concentration of electrolytes in plasma, on haematocrit, and on body weight determined in the course of a metabolic balance study on a woman aged 51 with rheumatoid arthritis.

course of prednisone, the nitrogen balance was in approximate equilibrium.

Calcium and phosphorus balances fluctuated irregularly during periods of administration of the hormones; interpretation of the results is difficult on the basis of these data. In general the amounts of calcium lost during the periods when prednisone and hydrocortisone were given were slightly less than in control periods when these hormones were not given.

The effects of 20 mg. of prednisone daily and of 80 mg. of hydrocortisone daily on the sedimentation rate were approximately the same (Fig. 3)—in each instance a prompt, significant decrease to normal. This paralleled the antirheumatic response.

With each of the hormones, total blood lipids increased substantially.

Urinary corticosteroids were increased less with 20 mg. of prednisone a day than with 80 mg. of hydrocortisone daily. Urinary 17-ketosteroids promptly decreased to zero during both periods of administration of prednisone, suggesting inhibition of adrenocortical function at least in respect to those substances metabolized to 17-ketosteroids. The slightly increased level of 17-ketosteroids found during the use of hydrocortisone presumably resulted from metabolism to 17-ketosteroids of part of the administered hydrocortisone.

Undesirable Hormonal Effects

Prednisone (or prednisolone) can produce most, if not all, of the so-called unwanted effects resulting from the use of cortisone, hydrocortisone, or corticotrophin. Effects which have been observed with doses of prednisone or prednisolone even smaller than those usually advocated include euphoria, insomnia, increase of appetite, facial rounding and other deposits of fat, acne, petechiae, hypertrichosis, loss of nitrogen, osteoporosis (with or without fractures), increase of blood fats, aggravation of peptic ulcer, inhibition of normal

reactions in inflammation or infections, and inhibition of pituitary and adrenocortical function.

Thus, although retention of sodium and depletion of potassium may be less when prednisone is administered than when cortisone is administered, chemical alterations of steroid structure to date have not materially solved the problems of hypercorticism.

STUDIES OF HYPERCORTICISM

But what is hypercorticism? The term describes exaggerated physiological hormonal effects; but as used clinically it represents more than a simple excess of cortisone. Hypercorticism from cortisone, for example, is a composite of exogenous hypercorticism plus endogenous hypocorticism and hypopituitarism, while hypercorticism from corticotrophin is a composite of endogenous hypercorticism plus endogenous hypopituitarism. Also involved are the effects on other glands and tissues (Slocumb, Polley, Ward, and Hench, unpublished data).

Hypercorticism was reported in 19 of the first 23 patients with rheumatoid arthritis who were given adrenocortical and anterior pituitary adrenocortical hormones at the Mayo Clinic (Hench *et al.*, 1950). It was more severe in those who had received relatively high doses for more than 50 days than in the other patients and also was more severe in women, especially post-menopausal women, than in men.

Features of Chronic Hypercorticism, and Distinction from Rheumatoid Arthritis

With prolonged administration of excessive hormonal doses, a state of chronic hypercorticism is likely to develop. In rheumatoid patients, particularly, this follows the initial period of stimulating effects and includes not only the familiar manifestations of overdosage but characteristically includes the cyclic occurrence of varying degrees of fatigability, emotional instability, and generalized muscular and articular aching (Slocumb, 1953; Slocumb and others, unpublished data).

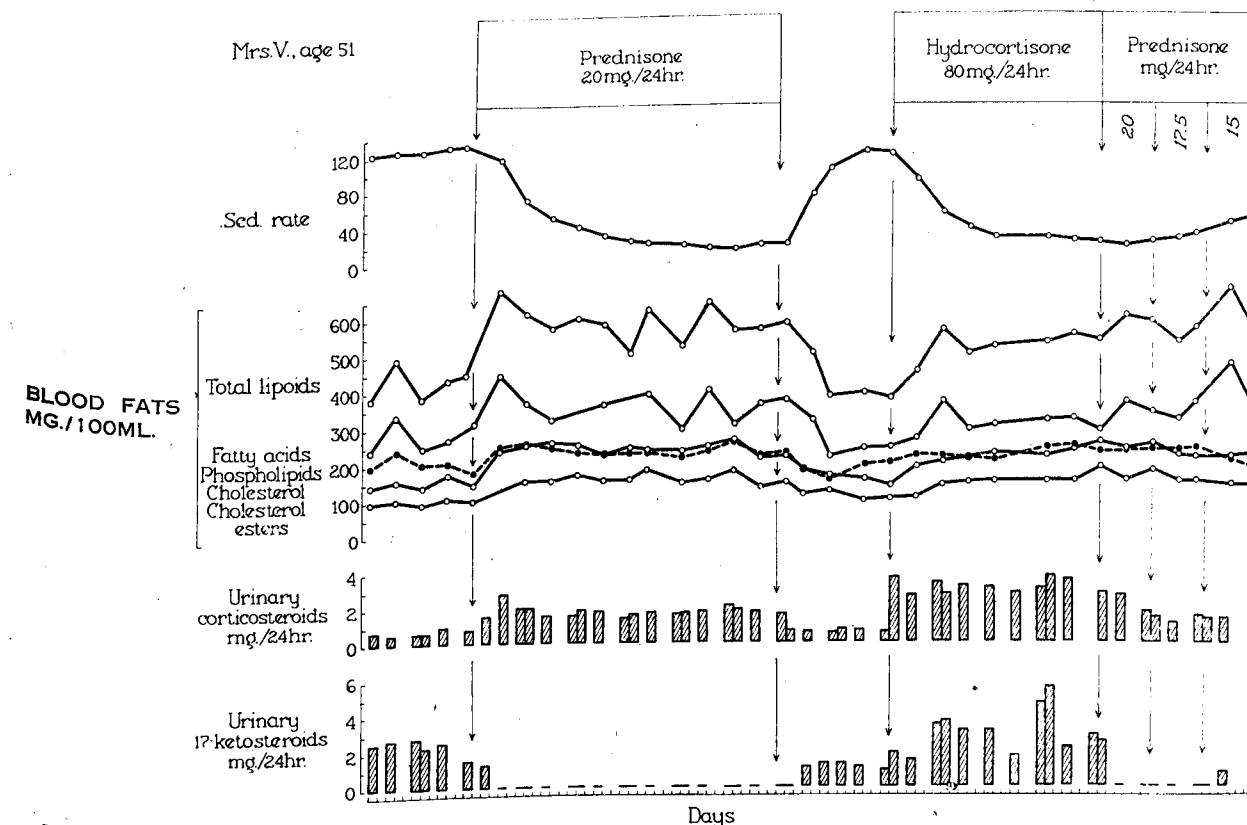


FIG. 3.—Effects of prednisone and hydrocortisone on the sedimentation rate of erythrocytes, concentration of blood fats, and urinary excretion of corticosteroids and 17-ketosteroids in same patient as in Figs. 1 and 2.

These symptoms often become accentuated toward the end of the span of time between doses of the hormone. The next dose or increases in dosage may partially improve the symptoms of chronic hypercortisonism, but only temporarily. Successive increases in dosage accentuate the cyclic variability of symptoms and may complicate the course of symptoms resulting from chronic hypercortisonism.

Detailed clinical analysis indicates that the muscular and articular aching of chronic hypercortisonism is unlike the discomfort of the increased articular inflammation associated with a flare of rheumatoid arthritis. In chronic hypercortisonism, synovitis is minimal or not increased. Symptoms of a rheumatoid flare are referable to joints and fibrous tissue; but the musculo-skeletal symptoms of chronic hypercortisonism are more diffuse and generalized, being referable more to muscles than to joints and fibrous tissue, and associated with generalized hypersensitivity and hyperalgesia.

Rest may worsen temporarily the fibrositic symptoms of a rheumatoid flare, but rest benefits the diffuse cyclic aching of chronic hypercortisonism. Physical therapy or salicylates are helpful for a rheumatoid flare but do not adequately relieve symptoms of chronic hormonal overdosage.

The sedimentation rate may increase in chronic hypercortisonism as well as in a flare of rheumatoid arthritis, and thus it is not of differential value in this problem.

A patient's remark to the effect that "my arthritis is getting worse" requires careful analysis to permit a proper decision for lowering the hormonal dosage or for raising it temporarily.

Severe Mesenchymal Reactions in Chronic Hypercortisonism

Severe diffuse mesenchymal reactions also may develop. These may simulate systemic lupus erythematosus or periarteritis nodosa. In a group of 128 rheumatoid patients with chronic hypercortisonism were 18 patients (14%) who had L.E. cells in plasma or bone marrow or both. Among these 18 patients, fever in excess of 100° F. (37.8° C.) occurred in more than 50% at some time during the reaction, nephritis occurred in 50%, transfusion reactions in 33%, leucopenia in 28%, encephalopathy in 22%, serositis in 17%, purpura in 17%, hypersensitivity to sunlight in 11%,



FIG. 4.—Photomicrograph of characteristic panarteritis found on muscle biopsy from the calf of a man aged 56 who had had rheumatoid arthritis for 17 years and severe chronic hypercortisonism beginning four years before this biopsy. The inflammatory reaction in endothelial, intimal, medial, and adventitial tissues is histologically indistinguishable from that characteristically present in patients with periarteritis nodosa before steroid therapy. (Haematoxylin and eosin. $\times 150$.)

pneumonitis in 11%, false-positive results of serological test on the blood in 7%, and phlebitis in 7% (Frerichs, 1954).

Severe mesenchymal reactions simulating periarteritis nodosa were observed in five rheumatoid patients who had diffuse panarteritis histologically characteristic of periarteritis nodosa (Fig. 4), peripheral neuritis, vascular occlusion, cutaneous ulcers, nephritis, fever, leucocytosis, and hypertension.

In incidence or severity, or in both, these various mesenchymal reactions were more pronounced in the 128 patients with chronic hypercortisonism than in either of two control groups of rheumatoid patients (105 without hormonal treatment and 166 without hormonal excess) observed during the same period.

Chronic hormonal excess seems to disarm or modify in some manner the mesenchymal tissue reactions of patients with rheumatoid arthritis and produces an incidence or severity, or both, of reactions that would not have been anticipated without excessive hormonal treatment. In some instances these severe mesenchymal reactions have been irreversible and death has resulted. In any event the seriousness of chronic hormonal overdosage is increased by severe mesenchymal reactions.

Studies on Plasma 17-hydroxycorticosteroids

Studies of hydrocortisone (cortisol) or levels of 17-hydroxycorticosteroids in the plasma of patients with rheumatic diseases have been undertaken to help determine

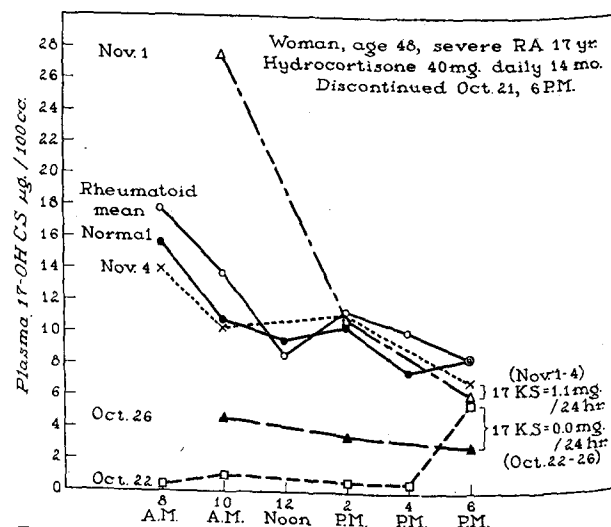


FIG. 5.—Plasma 17-hydroxycorticosteroid (17-OHCS) levels in a woman aged 48 who had had severe rheumatoid arthritis for 17 years. This patient had taken orally 40 mg. of hydrocortisone daily for 14 months and had developed most of the signs of chronic hypercortisonism in the 12 months preceding abrupt cessation of steroid therapy on October 21 at 6 p.m. The solid line with black dots shows for comparison the mean value of plasma 17-OHCS found during the day in normal patients. The solid line with clear dots shows the slightly higher mean value found in patients with rheumatoid arthritis.

some of the mechanisms and effects of hormonal treatment (Hench, Wu, Mason, Slocumb, Polley, Ward, and Mayne, unpublished data). Included in these studies have been certain observations on the plasma levels of 17-hydroxycorticosteroids in patients with rheumatoid arthritis and chronic hypercortisonism.

Fig. 5 shows the levels of 17-hydroxycorticosteroids in plasma found as a result of abruptly stopping administration of hydrocortisone to a 48-year-old post-menopausal woman who had had severe rheumatoid arthritis for 17 years. This patient had taken 40 mg. of hydrocortisone daily for 14 months, and in the 12 months preceding cessation of the treatment most of the signs of chronic hypercortisonism had developed. Although no obvious clinical signs of adrenal insufficiency appeared when the hydrocortisone was stopped

abruptly at 6 p.m. on October 21, the level of 17-hydroxycorticosteroids in the plasma was practically zero for almost 24 hours thereafter.

The level was low on October 22 at 6 p.m., and on October 26. Normal values for plasma 17-hydroxycorticosteroids were found on November 1, 11 days after administration of hydrocortisone was stopped; but excretion of 17-ketosteroids in the urine was still negligible (1.1 mg. per 24 hours), and the clinically evident features of chronic hypercortisonism persisted for five months after treatment with the excessive doses of the hormone was stopped.

Further studies of levels of 17-hydroxycorticosteroids in plasma in rheumatoid and other patients are in progress. However, up to the present there still are no laboratory tests available which would substitute for careful clinical study of patients for whom adrenocortical steroids may be indicated.

OBSERVATIONS ON THE CLINICAL USES OF ADRENOCORTICAL HORMONES

Detailed clinical observations are needed to make treatment with adrenocortical hormones or corticotrophins as satisfactory as possible. Results of such observations over a period of more than six years of increasing use and experiences with these potent preparations have been, as stated above, one of the principal factors in improving current use of these hormones for many conditions.

The choice of hormone and doses to be used will vary with the severity of the disease, the anticipated duration of treatment, the age and sex of the patient, the presence or absence of associated medical conditions which might affect the risk of hormonal treatment, and the experience of the physician.

Indications, Dosage, and Contraindications

Since adrenocortical steroids or corticotrophin is indicated for only certain diseases, and especially only certain rheumatic diseases, an accurate diagnosis is of first importance. When the presence of a disease for which steroid therapy may be useful has been determined, the next aspect to consider is whether the stage of the disease will permit the desired alteration through hormonal treatment. Corticosteroids can affect favourably only the reversible stages of the tissue reactions of the particular diseases—that is, the pathological physiology, not the pathological anatomy of a disease. Attempts to modify the irreversible changes of a

disease process by administration of steroids are generally disappointing and often result in the use of excessive hormonal doses which induce hypercortisonism, with its additional therapeutic problems.

Appropriate dosage of steroids is another important factor to be considered in hormonal treatment. Use of inadequate amounts for fulminating processes may lead to just as unsatisfactory results as the use of too large a dosage for low-grade chronic diseases when long-term hormonal administration may be needed. In general, steroid therapy is used in combination with such other treatment as may be indicated by the particular disease process.

The presence or absence of contraindications to use of adrenocortical steroids also must be considered. These deterrents may be either absolute or relative. Absolute contraindications are few: a psychotic episode or severe emotional instability or severe psychoneurosis, Cushing's syndrome, tuberculosis which is active or has been quiescent only a few years or less, and certain infectious diseases not readily controlled by antibiotics, especially those of viral origin such as acute anterior poliomyelitis and viral encephalitis.

Relative contraindications include other severe or moderately severe infections, diabetes mellitus, duodenal or peptic ulcer, pregnancy, convulsive disorders (except spontaneous hypoglycaemia), less severe degrees of psychoneurosis, osteoporosis, cardiovascular-renal disease, including hypertension, glomerulonephritis, coronary artery disease, and tendency to thrombotic or thrombo-embolic phenomena (Hench and Ward, 1954). In the presence of these conditions the indications for steroid therapy are measured against the potential disadvantages in each patient for whom it is considered.

Treatment With Relatively Large Doses for Acute Conditions

For acute self-limited disease with potentially serious damage as a result of an unchecked inflammatory reaction, it usually has seemed best to give large suppressive doses for the relatively brief period in which hormonal treatment is needed.

In acute rheumatic fever, 200 to 300 mg. of cortisone daily for four to six weeks or so may be needed. When control of the inflammatory reaction is established, the dose is gradually tapered off, but larger doses are resumed if signs of inflammation recur.

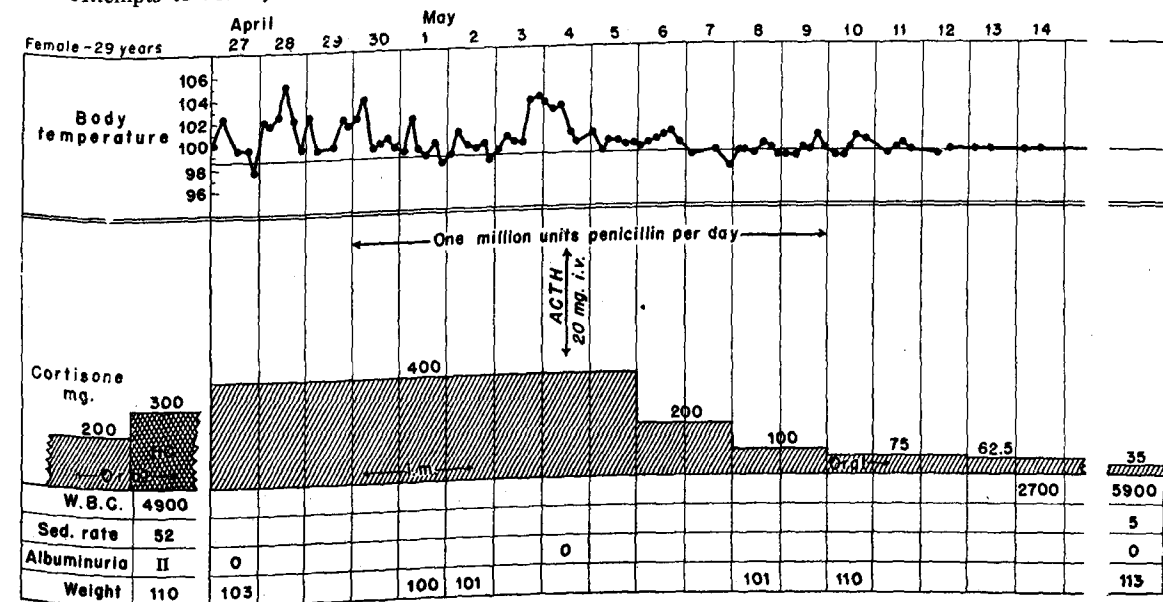


FIG. 6.—Chart showing certain aspects of the course of illness in a woman aged 29 who had had symptoms and signs of systemic lupus erythematosus for 18 months. At the time of a severe crisis with encephalopathy, hydrocortisone was administered orally in doses of 400 mg. daily for nine days and 20 units of corticotrophin (A.C.T.H.) intravenously for one day. The patient responded adequately to this treatment and the hormonal dosage was reduced to 35 mg. of hydrocortisone daily within three weeks.

Systemic lupus erythematosus is another instance in which large hormonal doses may be needed for relatively brief periods of crisis. Fig. 6 shows diagrammatically the use of 400 mg. of hydrocortisone daily for nine days plus 20 units of corticotrophin intravenously on one day, to control a severe crisis of systemic lupus erythematosus with encephalopathy in a 29-year-old woman who had had symptoms and

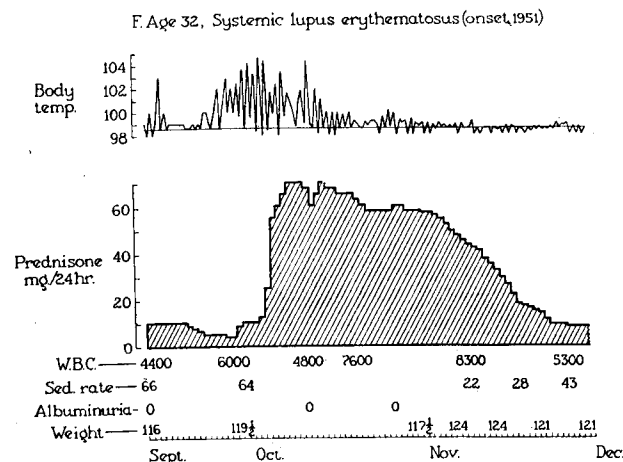


FIG. 7.—Chart of same patient as in Fig. 6 showing use of large doses of prednisone for another severe crisis of systemic lupus erythematosus two and a half years later, when patient was 32 years old. Doses of prednisone ranged from 60 to 70 mg. daily for 28 days, but as improvement occurred the dosage was gradually decreased to 8 mg. daily in the ensuing three to four weeks.

signs of that disease for 18 months previously. Within three weeks after this crisis had subsided, the hormonal dosage had been successfully reduced to 35 mg. of hydrocortisone daily; and hormonal treatment was discontinued completely in another three weeks.

The patient experienced another crisis two and a half years later (Fig. 7), at which time she was treated with prednisone

in large doses—up to 70 mg. daily—followed by gradual decrease to 8 mg. of prednisone daily after three to four weeks.

Prolonged Treatment for Chronic Conditions such as Rheumatoid Arthritis

The problems of steroidal treatment for responsive chronic diseases are peculiar in that treatment may need to be greatly prolonged. Hormonal treatment for rheumatoid arthritis will serve as a suitable example.

Most rheumatologists are agreed that cortisone and related hormones are no more universally indicated for all patients with rheumatoid arthritis than is subtotal gastrectomy for all patients with duodenal ulcer or even insulin for all patients with diabetes mellitus, although in each instance the treatment is of great value when indicated properly.

When hormonal treatment is undertaken for rheumatoid arthritis the schedule of dosage as well as choice of hormone should be individualized. It also should be flexible within each patient's anticipated range of tolerance. This limitation involves use of relatively small hormonal doses. Optimal antirheumatic effects without hypercortisonism are facilitated by avoiding large, stimulating initial doses. Use of the smallest possible dose of the hormone at the start of, as well as during, treatment is advised (Ward *et al.*, 1953). Very gradual reductions of the doses—for example, only 2.5 to 5 mg. of cortisone or only 0.5 to 1 mg. of prednisone—are undertaken at varying intervals in accordance with the response. Most patients with rheumatoid arthritis should anticipate that sooner or later the inflammatory manifestations of their disease can be controlled adequately without supplemental hormonal treatment.

Increasing experience with long-term administration of adrenocortical hormones to patients with rheumatoid arthritis has led to the realization that tolerable doses are smaller than those previously considered satisfactory. These doses vary particularly with the patients' age and sex.

For post-menopausal women, 20 to 30 mg. of cortisone or 3.5 to 5 mg. of prednisone daily is usually maximal. For

FLEXIBLE PATTERN WITHIN INDIVIDUAL TOLERANCE

Gradual adjustment of dose from onset. No fixed doses or "periods"

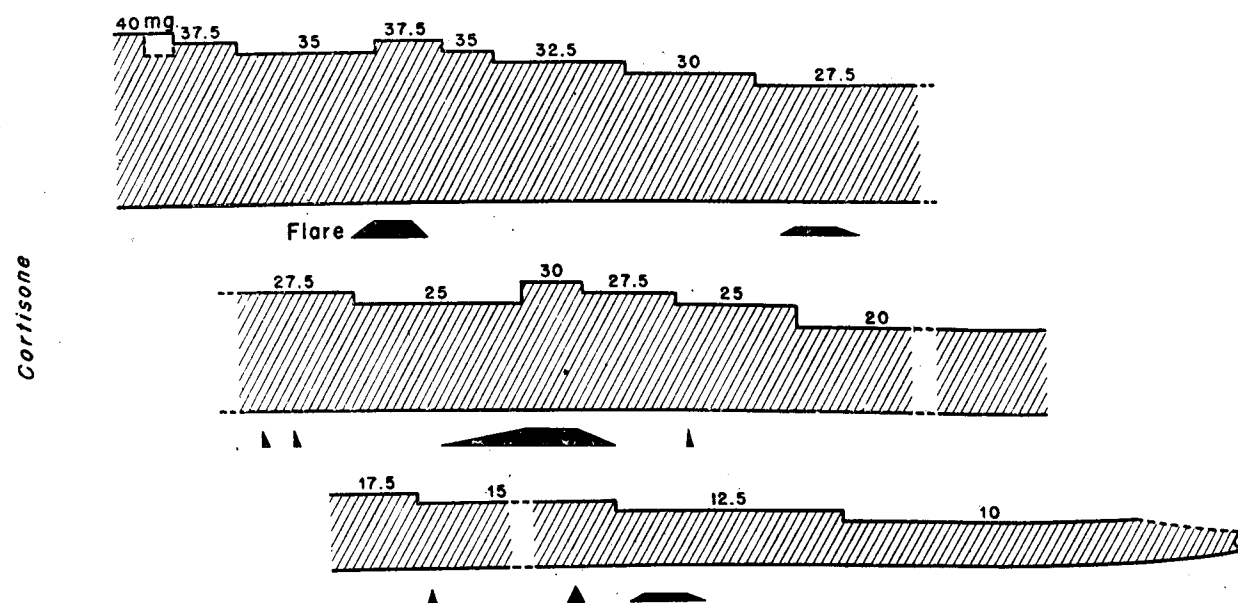


FIG. 8.—Example of flexible pattern of steroid dosage for long-term hormonal administration as used in rheumatoid arthritis. An initial dosage of 40 mg. of cortisone daily is shown. The development of a prompt antirheumatic or stimulating effect indicates the desirability of a prompt initial decrease in dosage as shown in the dotted-line insert. Small gradual reductions of dosage are undertaken in accordance with the patient's progress, but without fixed periods. For some flares, increases of dosage may be needed temporarily; for other flares, only a delay in further reduction of dosage is needed. Ultimately, the dosage for many patients with rheumatoid arthritis may be reduced to zero and control of the disease maintained, at least temporarily, with other basic treatment as indicated.

pre-menopausal women the upper limit has been in the range of 30 to 37.5 mg. of cortisone or 5 to 6.5 mg. of prednisone daily. For adult men, 37.5 to 50 mg. of cortisone or 6 to 9 mg. of prednisone may be maximal if hypercortisonism is to be avoided. In the light of current information it seems unlikely that the effects of doses within these limits are explained by the replacement of an absolute endogenous adrenocortical deficiency.

The improvement in antirheumatic effects reported sometimes on changing from one corticosteroid to another apparently results from relative differences in the dosage used or other factors in treatment rather than qualitative differences in antirheumatic effects of prednisone (or prednisolone), and cortisone (or hydrocortisone).

Use of corticotrophin to "stimulate latent adrenal cortical function" has not seemed to facilitate recovery of both adrenocortical and pituitary function sufficiently to be a routinely useful adjunct.

Individualized Treatment Schedules

An adjustable and flexible but gradually decreasing pattern of hormonal dosage may be used to reduce as well as to prevent hypercortisonism (Fig. 8).

Doses preferably are divided into equal or approximately equal amounts given regularly every six or occasionally every eight hours. Temporary increases of doses, or delays in further reductions, may be indicated for flares from time to time. But ultimately, on this programme, exogenous treatment with hormones is discontinued and the patient's disease is controlled, at least temporarily, with such other basic treatment as is indicated.

Variable and often unsatisfactory responses may be attributed to suboptimal divisions of total daily doses which do not take into account the differences of the intervals in such ordinary schedules as "night and morning" and "with meals," and the like.

When needed for different patients, more individualized symptomatic control may be provided by adjustments of dosage within the limits of the regular six-hour or eight-hour schedule (Table II).

TABLE II.—Alternative Plans for Division of Total Daily Dose

Time	Various Divisions of Daily Dose of 30 mg.			
	Patient 1	Patient 2	Patient 3	Patient 4
6 a.m.	7.5	10	10	10
Noon	7.5	5	7.5	10
2 p.m.	7.5	5	5	10
6 p.m.	7.5	10	7.5	
Midnight				
Alternative hours:	7 a.m.—1 p.m.—7 p.m.—1 a.m.			7 a.m.—3 p.m.—11 p.m.
	8 a.m.—2 p.m.—8 p.m.—2 a.m.			8 a.m.—4 p.m.—12 p.m.

Results of Optimal Hormonal Usage in Rheumatoid Arthritis

Wide variability of rheumatoid inflammation in different patients, variance of indications for use of hormones, and diversity among the plans for hormonal treatment have made it difficult to correlate the data of various authors with regard to the results of hormonal treatment for rheumatoid arthritis (Ward *et al.*, 1953). Experience at the Mayo Clinic indicates that doses are well tolerated by 50 to 60% of the patients for whom hormonal treatment seems indicated, and that their signs of active rheumatoid inflammation can be satisfactorily controlled thus to the degree of 75%, more or less. In an additional 25 to 35% of such patients the results are worth while, with relief from their symptoms to the degree of approximately 50%; but management of patients

in this group is more complicated. There remain about 15% of the patients with rheumatoid inflammation for whom hormonal treatment seems indicated; but for these prolonged satisfactory control of signs is difficult if not impossible to obtain with present methods of utilizing adrenocortical and pituitary adrenocortical hormones.

SUMMARY

The potency of adrenocortical hormones and their newer effective synthetic analogues is great and generally beneficial for more than a hundred acute or chronic hormonal or non-hormonal diseases, but knowledge of how the hormones work and the safest way to use them is still far from complete. Benefits from present-day use of the hormones must still be weighed against the disadvantages, which vary for each disease and patient for whom the hormonal treatment might be helpful.

Physicians, as well as their patients, should anticipate the future development and availability of antirheumatic, anti-inflammatory, and anti-allergic hormonal preparations with increased effectiveness and fewer unwanted side-effects. However, the stage has now been reached where employment of the several potent hormonal compounds at present available can be useful and reasonably safe for a number of potentially serious diseases.

For optimal therapeutic value, use of these hormones should be supervised by physicians who have familiarized themselves with its intricacies in the same thorough manner that they would consider necessary in undertaking any complicated medical or surgical treatment.

The prednisone used in this study was generously supplied by the Schering Corporation, Dr. Edward Henderson, Medical Director.

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The newsletters, circulars, and reports published in connexion with the activities of the Australian faculties of the College of General Practitioners have now been consolidated in a quarterly journal, *Annals of General Practice*, the first number of which appeared in September. In an introductory message, Dr. W. N. PICKLES, the then president of the College of General Practitioners, wishes the *Annals* success. Besides faculty news the issue contains clinical papers on congenital heart disease and infective hepatitis. It is edited from 29, Flaumont Avenue, Lane Cove, N.S.W.

CLASSIFICATION AND CAUSES OF PERINATAL MORTALITY*

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PART II. FACTORS IN PREGNANCY AND LABOUR INFLUENCING PERINATAL MORTALITY

Here some of the factors shown in Table V to be of importance in perinatal mortality are discussed from the clinical aspect.

TABLE V.—Clinical Associations of Major Causes of Perinatal Mortality in 337 Consecutive Necropsies Expressed as the Percentage Incidence

Cause of Death	Toxaemia and Hypertension	Maternal Age of 35 or More	Ante-partum Haemorrhage	Diabetes	Post-maturity (42 Weeks or More)	Labour of 24 Hours or More	Other Complications of Vaginal Delivery	Caesarean Section	Proportion of Primiparae	Multiple Pregnancy	Total Cases
Ante-partum death with maceration only	44*	30*	15*	6.6	1.6	—	—	—	55	11*	61
Intra-partum asphyxia (premature)	28	22	17	Nil	—	11	45	5.6	66	11	18
Intra-partum asphyxia (full-time)	19	19	5.4	2.7	25*	35*	41*	2.7	65	11*	37
Birth trauma (premature)	16	37*	11	Nil	—	16	53*	Nil	65	32	19
Birth trauma (full-time)	22	28*	Nil	—	11	39*	72*	5.5	65	11*	18
Ante-partum asphyxia	42*	31*	53*	5.5	2.8	—	—	—	59	14*	36
Pulmonary syndrome of newborn	22	14	20	Nil	—	7	25	28*	53	11	36
Intraventricular haemorrhage	18	36	9	—	—	12	27	27	45	9	11
Pneumonia	11	16	5.5	—	16	11	F.T. 25.* Prem. 50	F.T. 25.* Prem. 12	47	Nil	F.T. 11. Prem. 8
All births	17	12	3.3	0.3	11	17	10	4.5	67	2.6	10,028
Premature births	27	21	12	0.0	—	11	26	8	57	20	593
Full-time	16	11	2.7	0.3	12	17	9	4.3	59	1.6	9,435

* Statistically significant.

Maternal Age

There was some increase in the perinatal mortality rate when the mother was over 30 years of age and a sharp rise over the age of 35 years both in primiparae and in multiparae (Table VI). This relationship of maternal age to foetal loss is of course well known (cf. Crosse and Mackintosh, 1954).

TABLE VI.—Perinatal Mortality Rate in Different Maternal Age Groups Based on 10,028 Consecutive Births at U.C.H. Between 1948 and 1955

	Maternal Age in Years					
	Less than 20	20-24	25-29	30-34	35-39	Over 40
No. of births	387	2,772	3,622	2,076	972	199
Percentage death rate	1.8	2.7	2.7	3.9	6.3	8.6

Table V shows that babies in the maceration-only, ante-partum asphyxia, and birth trauma groups had a significantly high proportion of mothers over 35 years. In the case of birth trauma both premature and full-time babies were involved. Any other associations of high maternal age apparent in Table V were not statistically significant. It can be seen that high maternal age leads to foetal loss mainly in the ante-partum stage, but that it also increases

*Part I of this paper was printed in last week's issue (p. 1191).

the possibility of fatal birth trauma. The way in which high maternal age operates remains obscure. Toxaemia is a known association of pregnancy in mothers over 35 years (Eastman, 1950) and analysis of our figures suggested that while this association could account for some of the deaths in the group of ante-partum death with maceration only it could not account for the increased loss of babies from ante-partum asphyxia and birth trauma with high maternal age. However, the figures relating to this analysis were not statistically significant.

Over the age of 35 birth trauma was not related to any particular complication of labour. Most of the common difficulties were encountered. In particular, birth trauma after an apparently normal labour bore no relationship to maternal age.

Toxaemia and Hypertension

We have based our definition of these conditions on that of Eastman (1950)—that is, blood-pressure readings of at least 140 mm. Hg systolic and/or 90 mm. Hg diastolic on two or more occasions not less than 12 hours apart and before the onset of labour.

The incidence of maternal toxaemia and hypertension was significantly raised in the groups of ante-partum death with maceration only and ante-partum asphyxia. Any other apparent associations in Table V were not statistically significant.

Toxaemia and hypertension are a known cause of premature labour, but once born the "toxaemic" premature baby is no more at risk than the premature infant born of a non-toxaemic mother. This is shown by the fact that the incidence of maternal toxaemia and hypertension in premature neonatal deaths was 17%, compared with 27% in all premature live births. Indeed, these figures suggest that the risk is less, possibly because "toxaemic" babies tend to be small for their age and therefore more mature for a given birth weight than other premature infants. It is worth noticing from Table V that toxaemia and hypertension do not appear to be a cause of the mysterious pulmonary syndrome of the newborn, except in so far as they cause premature labour.

Prematurity apart, the risk of toxaemia and hypertension to the life of the baby appears to operate only in the ante-partum period.

Ante-partum Haemorrhage

For this we have taken Browne and Browne's (1955) definition of haemorrhage from the genital tract occurring before the onset of labour and after the 28th week of pregnancy. The incidence of ante-partum haemorrhage was significantly raised in the groups of ante-partum death

with maceration only and ante-partum asphyxia. It is of interest that there was an apparently raised incidence of ante-partum haemorrhage in the pulmonary syndrome of the newborn, although the increase was not statistically significant, possibly owing to the relatively small numbers involved.

The nature of the bleeding showed a marked difference in the two groups. In the nine cases of ante-partum haemorrhage associated with foetal maceration only, eight had a small loss, usually extending over a period of days or weeks, the other being a case of type I placenta praevia.

On the other hand, in the 19 cases of ante-partum haemorrhage resulting in foetal ante-partum asphyxia, 15 were severe accidental haemorrhages, one followed an external version, one followed a fall, and only two consisted of slight repeated bleeding. Because of this difference the occurrence of ante-partum haemorrhage in both the maceration-only and the ante-partum asphyxia group does not diminish the validity of their separation into two pathological categories.

Post-maturity

A baby has been considered post-mature when pregnancy has been prolonged 14 days or more beyond the expected date of delivery. The increased risk to the baby of post-maturity is well known (*British Medical Journal*, 1955). Table V shows that in our cases the only significant risk to the baby consisted of an increased liability to intra-partum asphyxia.

The increased rate of fall of oxygen saturation of umbilical-vein blood after the 40th week of pregnancy (Walker, 1954) led us to examine the effect of other factors likely to increase placental insufficiency in post-mature pregnancies. We regard the chief factors to be toxaemia and hypertension and a labour lasting more than 24 hours.

Without these complications, the risk to the baby from post-maturity was no greater than in all non-premature deliveries (Table VII). When, however, the post-mature pregnancy was associated with a labour over 24 hours, a

TABLE VII.—Effect of Toxaemia and Hypertension and Labour Lasting More than 24 Hours in Post-maturity. Ante-partum Deaths are Excluded from All Groups

	Post-mature Pregnancies Only		Full-time and Post-mature Pregnancies	
	No. of Births	Percentage Perinatal Mortality Rate	No. of Births	Percentage Perinatal Mortality Rate
Cases with toxaemia and hypertension	217	3.1	1,543	1.4
Cases with a labour lasting more than 24 hours	237	4.2	1,626	1.8
Cases with neither toxaemia and hypertension nor a labour over 24 hours	745	0.9	6,266	0.9

significantly greater risk to the baby was apparent, while with maternal toxaemia and hypertension the increased risk was of borderline significance ($0.1 > P > 0.05$).

Labour over 24 Hours

Table V shows, as might be expected, a high incidence of labours lasting more than 24 hours in the "full-time" intra-partum asphyxia and birth trauma groups but not in the corresponding premature groups. It is obviously important in considering length of labour in cases of intra-partum foetal death to calculate duration of labour up to the death of the baby and not to its birth. Similarly in assessing the effect of obstetric manoeuvres, manipulations performed after the death of the foetus should be excluded. It is obvious that, post-maturity apart, prolonged labour will extend the period of foetal hypoxia that normally occurs and predispose the infant to intra-partum asphyxia. The association of labour over 24 hours with fatal birth trauma may be due to excessive moulding of the head, especially when disproportion delays delivery, or to injuries occurring during efforts made to save the baby's life.

It is of interest that there was no apparent association between prolonged labour and foetal pneumonia.

Complications of Vaginal Delivery

Under this heading are included forceps delivery, breech delivery, breech extraction, other malpresentations, impacted shoulders, and disproportion, all of which may prove traumatic to the baby. Prolapse of the cord and intra-partum haemorrhage, which are apt to interfere with the supply of oxygen to the foetus, are also included.

The incidence of all complications was significantly raised in the "full-time" intra-partum asphyxia, "full-time" and "premature" birth trauma, and "full-time" pneumonia groups (Table V). There was a suggestion that these complications were also associated with the "premature" intra-partum asphyxia and "premature" pneumonia groups, but the figures were not statistically significant. Obviously, complicated labour may lead to birth trauma, but its association with intra-partum asphyxia seems at first sight to throw doubt on the need to separate these two pathological groups. However, in most cases of intra-partum asphyxia, in which complications of vaginal delivery occurred they were not of the potentially traumatic variety but those apt to interfere with the foetal oxygen supply. This distinction is set out in Table VIII, in which the figures for full-time babies are significant ($P < 0.001$), but not those for premature babies.

TABLE VIII.—Incidence of Potentially Traumatic and Non-traumatic Complications of Vaginal Delivery in Babies Dying of Birth Trauma and Intra-partum Asphyxia

	Full-time				Premature			
	Birth Trauma		Intra-partum Asphyxia		Birth Trauma		Intra-partum Asphyxia	
	No.	%	No.	%	No.	%	No.	%
Potentially traumatic complications	14	78	7*	19.5	10	50	6	33
Non-traumatic complications	4	22	29	80.5	10	50	12	67
Total	18	100	36	100	20	100	18	100

* Two of these seven cases had a secondary degree of birth trauma.

Therefore, to separate the intra-partum asphyxia and birth trauma groups, rather than merge them into one category of "intra-partum stress," may enable the obstetrician to decide which particular event in labour was responsible for the death of the baby.

In the premature babies the relatively high incidence of non-traumatic delivery in the birth trauma group is explicable by the widely held view that the delicate premature structures are easily damaged by the normal stresses of labour.

Of the six cases of potentially traumatic delivery in the "premature" intra-partum asphyxia group, four had a complication apt to produce asphyxia, one was an uncomplicated breech delivery, and in one foetal distress occurred. Further, in four of the cases doubt exists whether the foetus was still alive when the potentially traumatic delivery occurred. One baby had a slight degree of birth trauma insufficient in itself to account for death.

In all four cases of pneumonia in full-time babies associated with complications of vaginal delivery, these were of the potentially traumatic variety. It is clear that manipulations might result in the introduction of infection. It is likely, however, that these manipulations were associated with pneumonia merely because they were often performed for foetal distress, which is in itself an association of pneumonia. The apparently raised incidence of complicated labour in premature babies with pneumonia was not statistically significant.

Caesarean Section

Table V shows the incidence of caesarean section to be raised in the pulmonary syndrome of the newborn, intra-ventricular haemorrhage, and "full-time" pneumonia

groups. The increase is statistically significant in the case of pulmonary syndrome and "full-time" pneumonia and of borderline significance in intraventricular haemorrhage. All babies in this last category born by caesarean section had, in addition to their cerebral lesion, evidence of the pulmonary syndrome of the newborn.

The pneumonia group is characterized by three features: (1) the association with caesarean section is confined to the full-time babies; (2) the operation was performed for foetal distress in labour in three out of four cases, and in the fourth case an obvious source of infection was present; and (3) the membranes had ruptured before delivery in all three cases showing foetal distress. These circumstances suggest that pneumonia is particularly apt to follow foetal distress occurring at term after the membranes have ruptured and that the association of pneumonia with caesarean section is therefore merely coincidental.

Babies dying of the pulmonary syndrome and born by caesarean section differed from the pneumonia group in that 8 out of 10 were premature. The incidence of caesarean section was raised in the pulmonary syndrome in both full-time and premature babies. Another difference between this group and the pneumonia category is that in all 8 cases of premature pulmonary syndrome the operation was performed before the onset of labour when the membranes were intact. The indications for operation were equally divided between ante-partum haemorrhage, and toxæmia and hypertension.

The association of caesarean section with the pulmonary syndrome of the newborn could be due to the operation itself, especially in relation to prematurity, or to the complications for which the operation was performed (although apparently not toxæmia and hypertension) or to both combined. In any case the precise way in which these factors could operate remains obscure.

Multiple Pregnancy

Table V shows the incidence of multiple pregnancy to be raised in all ante-partum deaths, in "full-time" intra-partum asphyxia and birth trauma, and in premature babies dying of birth trauma, although this last figure is not statistically significant. The presence of multiple pregnancy does not increase the risk of premature babies dying of asphyxia during labour or in the neonatal period from any cause.

The additional hazard of multiple pregnancy in labour is well known. Its influence in ante-partum deaths is not so clear, although the association of toxæmia with multiple pregnancy (Eastman, 1950; Browne and Browne, 1955), may play a part. The mothers of all cases in the ante-partum asphyxia group had toxæmia and hypertension. Of the seven babies in the group of ante-partum death with maceration only one was born of a toxæmic mother, another set of twins was associated with maternal hereditary thrombasthenia, and the remainder were born after normal pregnancies.

Of the 24 twins that died in the intra-partum and post-partum periods, 12 were first-born and 12 second-born. This is at variance with the often expressed view that second twins are more at risk, particularly because of birth trauma and intra-partum asphyxia. In fact, both these pathological groups contained exactly similar numbers of first and second twins.

Diabetes

There were 29 cases of maternal diabetes in our 10,028 deliveries, 6 of whom were delivered by caesarean section at 37 to 40 weeks for other maternal complications. The remainder were allowed to go into spontaneous labour (which occurred in 70% by 39 weeks). There were no neonatal deaths, but seven stillbirths, the foetal loss being 24%. This is similar to the foetal loss of 27% reported by Peel (1955), who favours termination of pregnancy before the end of the 37th week and whose fatal cases included a proportion of deaths from hyaline membrane in the neonatal period.

Of our seven stillbirths, three were examples of ante-partum death with maceration only, two of ante-partum asphyxia, one of congenital malformation, and one of intra-partum asphyxia. This last death was directly attributable to the large size of the baby.

PART III. CLINICAL PICTURES IN BABIES DYING IN THE NEONATAL PERIOD

This section is concerned with the correlation of clinical and post-mortem findings and the differential diagnosis of the common conditions causing death. 221 neonatal deaths were studied. They occurred among 9,250 full-time and 593 premature babies born in the Obstetric Hospital, together with 201 infants, all premature save one, admitted from home or other hospitals after birth.

The main causes of death and their distribution according to the babies' birth weights are shown in Table IX. Over four-fifths of the deaths were accounted for by the pulmon-

TABLE IX.—Mortality by Birth-weight Groups, and Cause of Neonatal Deaths, Among Babies Born in U.C.H. Obstetric Hospital and Those Admitted After Birth, 1948-55

Birth Weight (g.)	Live Births	Deaths		Causes of Death Expressed as Percentage of Total Deaths						
		No.	%	Pulmonary Syndrome	Intra-ventricular Haemorrhage	Pneumonia	Intracranial Birth Trauma	Congenital Malformations	Other	
Up to 1,000	52	49	94	23	12	18	16	2	29	
1,001-1,500	89	46	51	44	15	4	15	2	13	
1,501-2,000	203	35	17	43	20	3	14	9	6	
2,001-2,500	449	27	6	26	0	15	19	19	21	
Over 2,500	9,251	64	0.7	9	2	17	24	28	20	
Total	10,044	221	2.1	27	10	12	18	15	18	

ary syndrome (27%), birth trauma (18%), congenital malformations (15%), pneumonia (12%), and intraventricular haemorrhage (10%). Excluding congenital malformations, it was found that the clinical pictures of these four conditions were often similar and consisted essentially of one or more of three symptom-complexes. These were poor condition at birth, respiratory difficulty, and cerebral irritation.

Poor Condition at Birth

More than half the babies showed this feature. The diagnosis was made when the infants were limp and cyanosed, without the usual response to external stimuli; many also showed pallor of the skin. Respiration consisted at first of irregular gasps, and usually their onset was delayed for more than 30 seconds after birth. The clinical course of fatal cases took one of three forms. Some infants died after a period of gasping. In others, irregular gasping gradually or rapidly gave place to normal rhythmical breathing, but after a varying period respiratory difficulty returned. Other babies developed rhythmical breathing, but persistent respiratory difficulty was shown by the grunting character of the respirations. In the last four years of the eight under survey, resuscitation has been attempted by the administration of intragastric oxygen and rocking. Prior to that time oxygen was given by nasal catheter, except in the severest cases, when the intratracheal route was used.

Respiratory Difficulty and Cyanosis

This occurred sooner or later in every case, and was shown at first by unduly rapid respirations. An expiratory grunt was often present. Later there was marked irregularity of respiratory rhythm with apnoeic periods, and, finally, the gasping respirations of severe hypoxia developed.

Cyanosis, either persistent or in attacks, was often present from an early stage. This central cyanosis has to be distinguished from the peripheral type. Cyanosed extremities are common in normal babies during the first few hours of

life, and result from slow peripheral circulation and polycythaemia. The pink colour of the skin of the trunk and normal respiratory movements should prevent confusion with central cyanosis. However, if doubt persists, one limb may be warmed and the skin will then become pink if the cyanosis is peripheral in origin.

Examination of the chest in cases with respiratory difficulty showed varying degrees of inspiratory recession of the lower ribs and sternum, impaired percussion note over the lungs, diminished air entry, and sometimes inspiratory rales.

Cerebral Irritation

The major sign in this group was convulsions, often associated with other indications of cerebral irritation. Less commonly, signs of cerebral irritation occurred without convulsions. These signs included excessive wakefulness, contrasting with the normal baby, who sleeps when not feeding, restlessness, irritability when disturbed, shrill high-pitched cry, tense anterior fontanelle, and alterations of muscle tone, usually spasticity of the limbs or trunk muscles, but sometimes hypotonia.

Convulsions were 17 times more common in premature infants, with an incidence of 4.2% compared with 0.25% in full-time babies. Although sometimes merely a terminal phenomenon, they often occurred 24 hours or more before death.

In only 24% of fatal cases of cerebral irritation was post-mortem evidence of intracranial trauma found, while in 63% the only abnormal findings were in the lungs. In most of the latter group the cerebral signs are probably attributable to the effects of hypoxia and carbon dioxide retention on the brain and cerebral vessels. Among the infants who develop a tense fontanelle are some in whom right-sided cardiac failure, which is accompanied by an increase of cerebrospinal fluid pressure (Friedfeld and Fishberg, 1934), seems to be an important factor. These infants have enlarged liver, and in non-fatal cases of cerebral irritation we have sometimes observed a diminution of liver size and a lessening of fontanelle tension to precede improvement in the babies' condition.

Pulmonary Syndrome of the Newborn

The pulmonary syndrome accounted for 27% of neonatal deaths. Approximately 10% of the babies had a birth weight of over 2,500 g., and these formed 10% of all deaths in full-time infants. Pulmonary syndrome showed its highest incidence as a cause of death (43%) in babies weighing from 1,000 to 2,000 g. at birth. The condition was particularly common after caesarean section and caused 45% of neonatal deaths following this method of delivery.

One-half of the babies were in poor condition at birth, and thereafter showed persistent respiratory difficulty. The condition of the remainder usually deteriorated within 12 hours of birth; indeed, only 3 of the 53 premature infants—two with extensive pulmonary haemorrhage and one with hyaline membrane—first developed symptoms over the age of 12 hours. From the corresponding figure for the age of 12 hours, it will be seen that birth trauma, which are given below, it will be seen that birth trauma, which are given below, it will be seen that the pulmonary syndrome is the least likely diagnosis of the pulmonary syndrome. A sign in favour of a diagnosis of pulmonary syndrome was the blood-stained frothy mucus often produced by infants in whom the main lesion was pulmonary haemorrhage or oedema.

The incidence of cerebral signs was noteworthy. Of the 59 cases, 20 (34%) developed convulsions and a further six cerebral irritation without convulsions. This illustrated the difficulty in differential diagnosis of pulmonary syndrome from intracranial birth trauma. Cerebral irritation in the former condition was more likely to occur over the age of 12 hours, whereas in birth trauma the opposite was true; but this fact is of little value in diagnosis of the individual case.

Donald and Steiner (1953) have described a sequence of radiological changes in the lungs which indicate the presence of a hyaline membrane. However, in our series, such membranes were found in 42% of babies with intraventricular haemorrhage and in 44% of premature infants with intracranial birth trauma. Therefore the presence of characteristic radiological changes of hyaline membrane does not exclude the presence of other pathology. In our opinion the main value of radiology is twofold. Firstly, in babies who recover from respiratory difficulty, it may indicate whether or not a hyaline membrane was present. Secondly, it will exclude the presence of congenital malformations, such as diaphragmatic hernia, which is mentioned below, and also of a pneumothorax.

Deaths occurred after an illness lasting from a few hours up to nearly three days; only one baby was alive at the age of 3 days, and she died 12 hours later.

Intraventricular Haemorrhage

This condition accounted for approximately 10% of the neonatal deaths, but was confined almost entirely to babies weighing less than 2,000 g. at birth. A similarity between the clinical picture of this condition and that of the pulmonary syndrome was to be expected, because 62% of primary deaths from intraventricular haemorrhage showed evidence of the pulmonary syndrome as well. However, it might be thought that all cases of intraventricular haemorrhage would show cerebral signs, especially a tense anterior fontanelle, but in our experience such signs have been no more frequent than in the pulmonary syndrome occurring alone.

Approximately half the babies were in poor condition at birth, and in 18 out of the 21 the onset of respiratory symptoms was before 12 hours of age. Two-thirds (14 out of 21) died in the first 24 hours of life and it was rare for survival to exceed three days, although one baby lived for 13 days, having occasional cyanotic attacks from the age of 2 days.

It will be clear that there was no distinguishing feature clinically between babies dying from intraventricular haemorrhage and those with the pulmonary syndrome.

Pneumonia

Pneumonia occurred in 12% of deaths, and was seen most often in previable and full-time babies. Three-fifths of the infants were in poor condition at birth, but some appeared to recover after resuscitation, only to develop further respiratory difficulty after an interval of up to several days. Five of 11 full-time and 3 of 16 premature infants (30% of the total cases) were free of respiratory distress in the first 12 hours of life.

It is important to note that cerebral signs were a feature in 9 of the 27 cases, 6 of whom had convulsions.

Over half the babies (15 out of 27) died in the first day, half (8) of these being previable. Seven babies (25%) lived over three days, but five were full-time infants, so that this tendency to longer survival probably does not represent a true difference from cases of pulmonary syndrome occurring mostly in premature babies.

Possible predisposing factors to pneumonia in these infants were investigated. The mothers of five babies suffered from an acute infection during or immediately preceding labour, while in another five cases the membranes had ruptured more than 18 hours before delivery. Three more babies were known to have had foetal distress during delivery, and another 11 were in poor condition at birth. Thus in 24 out of 27 deaths from pneumonia there had been maternal infection, rupture of the membranes for a considerable period before birth, or evidence of foetal hypoxia which might have led to the inhalation of infected material during delivery. After the first five and a half years of the period under survey, we considered that maternal infection, premature rupture of the membranes, foetal distress, and poor condition at birth should be indications for the

administration of prophylactic antibiotics to the baby, even in the absence of clinical signs. Finally, in view of the difficulty of making a clinical diagnosis of pneumonia, all babies who showed respiratory difficulty after birth were treated with antibiotics in addition to any other method used. Penicillin and streptomycin were given by intramuscular injection.

Before following these principles a primary diagnosis of pneumonia was made in 23 out of 154 deaths (15.6%), whereas subsequently the figure has been 4 out of 67 deaths (6%). Further, two of the last four babies with pneumonia died within 15 minutes of birth before antibiotics could be given.

Intracranial Birth Trauma

This was found in 18% of deaths. Among full-time babies the majority (13 out of 15) were in poor condition at birth and eight died in the first hour of life. In contrast, although 19 of the 25 premature infants were in poor condition, only two died within an hour. The common causes of death within an hour of birth were intracranial birth trauma and intra-partum asphyxia. A history of a forceps delivery, especially if a difficult one, breech delivery, or breech extraction was found to be strongly suggestive of intracranial birth trauma.

Among cases surviving over one hour, less than half of the premature babies developed cerebral irritation, but respiratory difficulty was a constant feature and almost always the presenting sign, frequently dating from birth (in three the first symptoms occurred after the age of 12 hours). The clinical picture was therefore indistinguishable from that of the pulmonary syndrome, intraventricular haemorrhage, or pneumonia. The majority of full-time infants surviving more than one hour developed cerebral signs, but again always accompanied by respiratory disturbances. The birth histories of these babies were of much less help in diagnosis, because the delivery had been apparently normal in many cases.

Three-fifths of the 40 babies died in the first day, and only three survived for more than three days.

Differential Diagnosis of the Pulmonary Syndrome, Intraventricular Haemorrhage, Pneumonia, and Intracranial Birth Trauma from other less Common Conditions

It will be clear that it is often impossible to distinguish between birth trauma, the pulmonary syndrome, pneumonia, and intraventricular haemorrhage in premature babies, and between the first three in full-time infants. However, the four conditions may be confused with less common abnormalities, including some congenital malformations which may cause respiratory difficulty in the first three days of life. The differential diagnosis from certain malformations is particularly important. Oesophageal atresia and diaphragmatic hernia, for example, are often amenable to immediate surgical treatment.

Oesophageal atresia should be suspected when an infant brings up an excess of frothy mucus for several hours after birth or when the mother has had hydramnios. Diaphragmatic hernia usually causes marked displacement of the cardiac impulse and absent air entry on the affected side of the chest, but sometimes the condition is revealed only by radiology. Congenital heart disease should be considered when there is central cyanosis out of proportion to the degree of respiratory difficulty, or dyspnoea with rales in the lungs and enlargement of the liver.

In another small group of babies poor condition at birth is due to foetal haemorrhage from placental incision during caesarean section for anterior placenta praevia (Butler and Martin, 1954). Correct diagnosis is important, because blood transfusion may be life-saving.

Finally, two rare conditions—bilateral renal agenesis and massive adrenal haemorrhage—have caused difficulty in diagnosis. Renal agenesis may be suggested by the characteristic facies (Potter, 1952), but adrenal haemorrhage is not usually suspected during life.

Prognosis

In view of the difficulty in distinguishing between the pulmonary syndrome of the newborn, intraventricular haemorrhage, pneumonia, and intracranial birth trauma in life, the prognosis of these conditions individually is uncertain. The problem in practice is to estimate the prognosis of a baby showing respiratory difficulty which may be due to one of these four conditions.

In premature infants the birth weight is an important factor in prognosis. Mortality in birth-weight groups in the present series is shown in Table IX and requires no further comment. The second factor is the time that the baby has survived. In general, prognosis is much improved when the fourth day of life is reached. Thus in fatal cases, 87% of 31 full-time babies and 96% of 113 premature infants died before the end of the third day. The next factor is the degree of inspiratory recession of the lower sternum. Severe recession, producing a funnel-shaped deformity, was usually unfavourable. Finally, the occurrence of convulsions was a bad prognostic sign, especially in premature infants, the mortality being 79% as opposed to 42% in full-time babies (Table X). The total death rate from convulsions in the

TABLE X.—Mortality in Babies With Convulsions

	Full-time	Premature	Total
Total No. of cases	24	33	57
Died	10	26	36
Percentage	42	79	63

neonatal period was 63%, which compares unfavourably with that of Burke (1954), whose rate was 37.5%, but the proportion of premature infants was two and a half times greater in our series.

Conclusion

It has been shown that the four conditions (pulmonary syndrome of the newborn, intraventricular haemorrhage, pneumonia, and birth trauma) which caused two-thirds of all neonatal deaths in our series could not usually be distinguished in life. In a few cases consideration of the birth history and the signs shown by the baby, including their time of onset, strongly indicated the correct diagnosis. A vital task for the doctor confronted with a baby showing respiratory difficulty in the first hours of life is to exclude the presence of certain congenital malformations which may be amenable to surgical treatment.

It is important to note that cerebral irritation, even with convulsions and a tense anterior fontanelle, does not necessarily mean that intracranial trauma has occurred, and that such cases may not be hopeless.

Finally, it will be clear that, congenital malformations having been excluded, all babies showing respiratory difficulty, with or without cerebral irritation, in the first few days of life should receive any specific therapy that is known for the four conditions mentioned above. Thus, in addition to symptomatic treatment, all such infants should be given antibiotics in case pneumonia is present, and vitamin K (1 mg.) to try to prevent or diminish haemorrhage. Similarly, all will have to receive any treatment that may be discovered in the future for the pulmonary syndrome of the newborn.

SUMMARY

The post-mortem and histological examination of 406 stillbirths and neonatal deaths has enabled these deaths to be divided into 11 pathological categories forming a classification of perinatal mortality. The importance of necropsy is discussed. Each pathological group is defined and the diagnostic features are described.

The introduction of the term "pulmonary syndrome of the newborn" to include hyaline membrane, intra-alveolar haemorrhage, and pulmonary oedema is explained. Strict criteria for the diagnosis of intra-

RELIEF OF NEUROLOGICAL SYMPTOMS AND SIGNS BY RECONSTRUCTION OF A STENOSSED INTERNAL CAROTID ARTERY

BY

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cranial birth trauma have been used, and the value of distinguishing such cases from the intra-partum asphyxia group is stressed. A diagnosis of prematurity or previability is considered undesirable, and was made in only 2% of the present series.

The clinical associations of each category are enumerated, and the aetiology is discussed. In most cases there was a specific association between a given pathological group or groups and at least one feature of pregnancy or labour. Thus, the classification is not merely academic, but should also be of practical value to the obstetrician and paediatrician. It is felt that the general adoption of such a system throughout the country would assist the collation of valid statistics on the causes of perinatal mortality.

In addition to the classification of death, certain factors in pregnancy and labour have been re-examined in order to determine in what way and at which stage they cause foetal and neonatal loss.

Finally, a study has been made of some clinical aspects of babies dying in the first week of life. The pulmonary syndrome of the newborn, birth trauma, pneumonia, and intraventricular haemorrhage, which together caused two-thirds of the neonatal deaths, could not usually be distinguished during life. Successful prophylaxis of pneumonia during the latter part of the period covered by this study is described.

Our thanks are due to Dr. R. E. Bonham Carter, Professor G. R. Cameron, F.R.S., Professor W. C. W. Nixon, and Dr. B. E. Schlesinger for their advice and encouragement. A special acknowledgment is also due to the late Dr. R. H. D. Short for his contribution to the study of foetal and neonatal mortality at U.C.H.

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"English is now more widely used and studied throughout the world than it, or any other language, has ever been before. It has been estimated that over half of the literate population of the world speak English as a first or second language, or use English as an indispensable instrument for vocational purposes, or are studying (or have studied) English. It is increasingly the international language of science and technology. In recent years about half of the world's output of literature on scientific research has been published in English. To a degree hitherto unknown it is recognized, and not only in the Western world, as the language of opportunity, of affairs, and of international communication."—Annual Report (1955-6) of the British Council.

Clinical History

The patient, aged 56, was captain of a large ocean liner. In October, 1955, he felt a sudden lack of control of the right arm and leg, accompanied by tingling over the right side of his body which felt strange in a way he could not describe. He could walk during this episode and the symptoms cleared after about ten minutes. Two weeks later a second and similar attack occurred, lasting this time for less than five minutes, and two weeks after that his third attack occurred.

On January 23, 1956, five minutes after getting up from bed and while shaving, he suddenly lost control of his right arm and leg and found that his speech had become slurred. He could walk, but he staggered to the right; he was able to get back into bed. Neither in this nor in the three previous attacks did he suffer from impairment of consciousness or visual disturbance. He was transferred to the Royal Perth Hospital in Australia, where Dr. J. C. Anderson saw him and reported as follows: "On examination: slight cyanosis, pulse 100 a minute; right upper limb showed weakness of grip and of flexion but good power of extension. Right lower limb showed weakness of all movements with poor co-ordination in heel-to-toe test. Knee-jerks present, plantar response flexor. Tongue, no deviation. Eyes, pupils equal and react to light. Cardiovascular system, heart sounds muffled, blood pressure 150/80. Three hours later his speech was completely coherent and he was able to write clearly. All the cranial nerves appeared normal except for a dulling of sensation over the right cheek and forehead. Slight deviation of mouth to the right. Knee-jerks, right brisker than left. Plantar response flexor. Blood pressure 165/110."

Six hours later—that is, nine hours after his initial examination, Dr. Anderson reported: "Condition deteriorating.

Slurred speech, tongue protrudes to the right. Unable to write, but grip good. Unable to perform finger-to-nose test satisfactorily. Numbness of the right side of the face more marked. Weakness of right leg as noted at initial examination. Blood pressure 170/110."

He was then admitted to the neurosurgical unit of the Royal Perth Hospital, where the surgeon and physician in charge expressed the view that he was suffering from intermittent arterial occlusion as the cause of his symptoms. He was rested, and during the next 48 hours a steady and noticeable recovery in the power of his limbs took place, also in his ability to speak. As the weakness cleared he experienced a tingling sensation in the fingers of his right hand, particularly the middle finger, and touching this finger provoked a tingling sensation. This was a symptom that he had noticed before. A telephone discussion was held between Perth and Melbourne, where Dr. A. Schweiger expressed the opinion that the condition was probably a partial occlusion of the internal carotid artery. The patient was by this time so much better that it was thought advisable to return him to his home country before undertaking further investigations. He was accordingly flown home to England and was admitted to the Dreadnought Hospital under the care of one of us (C. E.).

On examination he showed evidence of difficulty in speaking fluently, and he complained that he could not write satisfactorily, and in particular that he found it difficult to sign his name and that his signature bore no resemblance to the normal. He also found difficulty in walking because he had not full control of his right leg. The right finger-to-nose test showed slight incoordination and there was impairment of skill in rapidly executed finger movements of the right hand. His gait showed a slight disturbance of rhythm due apparently to a minimal relative increase in tone of the muscles in the right leg, and the right knee-jerk was slightly brisker than the left. Rapid movements with the right foot were impaired.

The central nervous system was normal in response to all other routine tests, with flexor plantar responses and completely normal sensory responses everywhere. His blood pressure was 160/100. It was thought that the left internal carotid pulse was much decreased in volume when compared with the right, and it was difficult to feel at all. All the other peripheral pulses were normal. The cardiovascular system showed no other abnormality; there was no evidence of atherosclerosis elsewhere, his retinal vessels were normal in appearance, and his electrocardiogram showed nothing abnormal. Physical examination of his other systems revealed nothing abnormal.

The E.S.R. (Wintrobe) was 15 mm. in one hour. On lumbar puncture cerebrospinal fluid pressure was not raised and the fluid was of normal content, with protein of 28 mg. per 100 ml. and less than 1 cell per c.mm. The Wassermann and Kahn reactions were negative and the routine blood count was normal.

The patient was then transferred to the West End Hospital for Neurology and Neurosurgery, where an electroencephalogram showed a 10 c/s alpha rhythm disturbed in all leads by 22 c/s activity. There were runs of 5 c/s waves showing symmetrically over both temporal lobes and there was no evidence of any single focal abnormality. Plain skull x-ray films were normal and a left common carotid arteriogram was performed by Dr. A. Fisher; this was reported on by Dr. Douglas Gordon as follows: "Complete filling of both internal and external carotid vessels, but the branches of the latter were relatively large and of the former narrow, tortuous, and numerous. At the lowest point in the neck capable of being included, a small filling defect was seen partially blocking the internal carotid artery. There was a localized dilatation of the internal carotid artery immediately distal to the filling defect." The patient was then transferred to St. Mary's Hospital for operation by one of us (C. R.).

Operation

On March 21, 1956, the patient was anaesthetized and the body temperature reduced to 28° C. (82.4° F.) by surface cooling (Dr. Alan Cheate). In our view hypothermia is a valuable aid to surgery of the carotid arteries; without it the prolonged clamping of these vessels which may be needed in this type of operation can produce permanent cerebral damage, but with hypothermia it is safe to occlude one carotid artery for a long period and the surgeon has adequate time to reconstruct the internal carotid artery. It is of course unnecessary to use hypothermia when a carotid artery is completely occluded before operation.

The bifurcation of the common carotid artery was exposed and the common, internal, and external carotid vessels were dissected free. A sufficient length of these vessels was freed to allow the application of clamps well away from the lesion. The constriction in the internal carotid artery could easily be felt and the artery at this point was adherent to the adjacent vein. The diseased segment of artery was resected; it consisted of a crescent-shaped plaque about 1 cm. long in the main axis of the internal carotid artery, and it projected into the lumen so that this was reduced to less than 20% of its normal calibre. The common, internal, and external carotid arteries were of normal appearance above and below this stenosed segment. Continuity was restored by a direct anastomosis between the common and internal carotid arteries; it was not necessary to ligate the external carotid artery. A satisfactory pulse returned to the internal and external carotid vessels and the wound was closed. Anticoagulants were not used.

Post-operatively the patient rapidly recovered consciousness and his body temperature reached 36.9° C. (98.5° F.) in five hours. At this time a superficial examination of his central nervous system showed no obvious abnormality. The next morning, 24 hours after the beginning of his operation, a full examination of his central nervous system was made and the findings were remarkable. The most striking thing was the fact that the patient had signed his name about fifty times on his morning paper in his joy at finding that he could write normally for the first time since the onset of his major symptoms two months before. And his pleasure at this, plus the usual euphoria seen after operations under hypothermia, produced an elation which can seldom have been equalled.

All the abnormal physical signs which had been present the day before had disappeared; his speech was as normal as was his handwriting. The right finger-to-nose test was normal and he was able to perform rapid fine movements with both his hands. The increased tone in the right leg had disappeared and his knee-jerk was now normal. He made satisfactory progress and left hospital ten days after the operation.

Five weeks later he was examined for his employers, the shipping company; he had no abnormal physical signs of any kind in his central nervous system and he did not complain of symptoms. His handwriting continued to be fluent and normal. He was certified as medically fit to resume charge of the liner he had captained, but his employers considered it unsound business to allow this when so many passengers and crew had known that he had had a "stroke." Accordingly he was promoted to a higher ranking shore-based administrative post in the company.

The pathologist's report (Dr. H. C. Barrett) on the portion of carotid artery was: "Part of the carotid artery in which there is a semilunar valve-like structure protruding into the lumen. Microscopically this is seen to be a hyaline thickening of the intima. The two recesses on either side of this membrane have been the site of both an old and a recent haemorrhage. Although there are a few small collections of round cells, mainly in the media, this structure is probably not inflammatory. It is consistent with a post-traumatic lesion."

The electroencephalogram was repeated on October 3 and showed improvement. The 5 c/s waves were no longer present and the 22 c/s activity was limited to the anterior halves of the hemispheres.

Discussion

The first point of interest is the lesion in this artery. This was considered by the pathologist to be traumatic in origin, but there was no history of injury. One of us (C. R.) believes that this lesion was a localized plaque of atheroma, both because of its appearance and because of its situation at the common site near to the origin of the internal carotid artery.

The next and most striking finding was the immediate disappearance of well-marked pyramidal signs and symptoms once a normal flow through the internal carotid artery had been re-established. The explanation of this and of the temporary episodes of disturbance of function in the central nervous system which occurs in patients with a partial occlusion of the internal carotid artery is of interest. In our view the most likely explanation is that the narrowing of the lumen reduces the internal carotid blood flow. In our patient this, coupled with a greater reduction of flow due to haemorrhage into the arterial wall at the time of the onset of his major attack, was enough to maintain the symptoms and signs of pyramidal insufficiency but not enough to cause complete death of the cerebral cells.

The same type of explanation will account for the transitory attacks which occurred earlier in this patient, in the patient reported by Eastcott *et al.* (1954), and in those reported by other authors, including Chambers (1954) and Millikan and Siekert (1955). In these the narrowing of the carotid reduces the flow. Under ideal conditions this is sufficient to maintain normal cerebral function, but when the flow is further reduced by such events as a change of posture or a reduction of blood pressure transitory symptoms of cerebral ischaemia may result. Others have postulated that these attacks of transitory carotid ischaemia are due to spasm of the carotid vessels. It is possible that this may occur, but in the presence of an organic reduction in the size of the internal carotid artery a further reduction in flow by some general or local cause other than spasm is more likely. Another explanation is that thrombi may form on the narrowed part and peripheral emboli result, but this again is unlikely in view of the short duration and repeated occurrence of similar attacks.

We believe that the correct treatment of a patient with a partial occlusion of the internal carotid artery is surgical because of the disability it causes and because of the great risk of complete carotid occlusion; this view is shared by Denman, Ebner, and Duty (1955). By this means we have completely relieved three patients, greatly improved two others, and six patients with complete occlusions have been made no worse by exploration of this vessel; there has been no mortality. The alternative is to treat these patients with long-term anticoagulant therapy. We believe that this measure should be used after operation to reduce, if possible, the occurrence of further thrombosis in this vessel or elsewhere.

An important step in the diagnosis of this lesion is the correct interpretation of the carotid arteriogram. This should always show the bifurcation of the common carotid artery, and as much attention should be paid to this region as to the intracranial vessels.

The actual operation is aimed at restoring the flow through the internal carotid artery. This may be achieved by either a direct anastomosis, a thrombo-endarterectomy, or an arterial graft or transplant, depending on the type of abnormality which the surgeon encounters. We have employed each of these procedures with success in patients requiring reconstruction of the carotid arteries. In our view hypothermia is a valuable aid to this type of surgery, but the body temperature need not be reduced below 28° C. (oesophageal temperature).

Summary

The case of a man with a partial occlusion of the left internal carotid artery is reported; as a result he was unable to sign his name, suffered from difficulty in speaking, and had abnormal pyramidal signs and symptoms in his right upper and lower limbs. These neurological abnormalities had been present for eight weeks. Reconstruction of the internal carotid artery was followed by immediate and complete relief of his neurological abnormalities. We believe that this is the first report of the complete recovery of definite and persistent neurological symptoms and signs due to internal carotid obstruction. In 1954 a similar case was reported by Eastcott, Pickering, and Rob, but in this case the neurological abnormalities were intermittent and not persistent.

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TREATMENT OF ULCERATIVE COLITIS WITH LOCAL HYDROCORTISONE

BY

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A number of reports exist indicating that oral cortisone is a useful agent in the treatment of ulcerative colitis. In a controlled therapeutic trial carried out through the co-operation of many physicians, it was found that patients treated with oral cortisone were nearly three times as likely to be in clinical remission at the end of six weeks' treatment as patients in the control group (Truelove and Witts, 1955). In view of the fact that cortisone and, more particularly, hydrocortisone have been found useful when applied locally in several eye conditions, joint conditions, and skin diseases, it seemed worth while assessing the value of local treatment in ulcerative colitis.

Hydrocortisone is an active principle of the adrenal cortex and is the principal corticosteroid found in human plasma. Under ordinary conditions it is present in the blood and other body fluids at a concentration of about 5-10 µg. per 100 ml. Under conditions of stress, or following injection of corticotrophin, its concentration may rise to 50 µg. per 100 ml., or even higher. Hydrocortisone appears to act directly on the tissues of the body, where it is constantly being broken down into inert metabolites. When cortisone is given orally or by injection it acts because it is converted into hydrocortisone. For cortisone to be locally effective the appropriate enzyme for this conversion must be present in the tissues being treated. For local application hydrocortisone has the additional advantage over cortisone that it is water-soluble, though not to a high degree. (The foregoing paragraph is based on the findings presented in a number of scientific papers, such as those by Nelson *et al.* (1951), Nelson and Samuels (1952), Cote and Delbarre (1953), Hellman *et al.* (1954), Silber and Porter (1954), and Peterson *et al.* (1955). A good general account is included in an article by Gope (1955).)

TABLE I.—*Brief Clinical Details and Results of Treatment in the First Six Patients Treated With Local Hydrocortisone (Each Course of Treatment Lasted Three Weeks).*

Case No.	Previous History	Immediately Before Treatment	Response to Treatment	Progress During One Year Follow-up Period
1. Female aged 30	In 1951 began to pass blood and mucus per rectum, and had bouts of diarrhoea. In 1954, inflamed rectum and lower sigmoid colon up to 25 cm. found on sigmoidoscopy. Then treated with corticotrophin and went rapidly into remission, which lasted several months. Symptoms recurred; treated with oral cortisone, she again went into remission for several months; then began to pass blood per rectum, without diarrhoea	<i>Clinical:</i> Passing blood per rectum twice a day <i>Sigmoidoscopic:</i> Very active inflammation of rectum with less severe changes above recto-sigmoid junction	<i>Remission:</i> Excellent response. Rapidly became symptom-free. Much improved but not entirely normal	Remained almost entirely well. Occasional passage of trace of blood per rectum. Sigmoidoscopy showed mild inflammation up to 20 cm. from anal margin, thereafter shading off into normality
2. Female aged 38	In Feb., 1953, had a sudden attack of diarrhoea with blood in motions, lasting for 5 months. Thereafter fairly well, but would often pass blood and mucus per rectum, although without diarrhoea. In Sept., 1955, recurrence of diarrhoea, with 5 motions a day containing much blood. This settled down to two motions a day with blood and mucus present	<i>Clinical:</i> 2 motions a day with blood and mucus present <i>Sigmoidoscopic:</i> Marked changes in rectum up to 18 cm. from anal margin	<i>Remission:</i> Excellent response. Rapidly became normal. Much improved but not normal	Remained almost entirely normal, with mild inflammation in lower half of rectum only, for 8 months, when she suddenly relapsed with diarrhoea and gross blood in stools. After 5 weeks of these symptoms she was again treated with local hydrocortisone (see Treatment 20 in Table II)
3. Male aged 34	In March, 1955, gradual onset of diarrhoea with 5-10 motions a day, with occasional blood present. Symptoms had eased off somewhat before present treatment began	<i>Clinical:</i> 4 unformed motions a day with much mucus. Colicky abdominal pain preceding each motion. Barium enema showed involvement of transverse and descending colon <i>Sigmoidoscopic:</i> Moderate inflammation extending as far as could be seen	<i>Remission:</i> Excellent response. 2 stools a day, rather soft but otherwise normal Improved but not normal	Remained symptom-free regarding bowel action for 11 months, but with mild inflammation of colonic mucosa extending as far up as could be seen with a sigmoidoscope. 2 months after end of treatment developed ischio-rectal abscess, treated by surgical drainage; healed well. After 11 months bowel symptoms recurred, treated with local hydrocortisone hemisuccinate sodium (to be reported)
4. Female aged 30	In August, 1952, gradual onset of diarrhoea with 6 motions a day containing blood and mucus. After 1 year had a complete remission lasting 3 months, but symptoms then recurred. Admitted in Feb., 1954, with 6 motions a day containing blood; haemoglobin, 66%; and evidence, on barium enema, of ulcerative colitis affecting transverse and descending colon. Improved on general medical treatment, but diarrhoea recurred, and in 1955 was treated with oral cortisone with improvement but not complete relief. Barium enema showed widespread involvement of colon	<i>Clinical:</i> Intermittent diarrhoea with blood present in stools <i>Sigmoidoscopic:</i> Moderate inflammation extending as far up as could be seen	<i>Remission:</i> Excellent response. Entirely normal symptomatically. Much improved. Slight hyperaemia only	Remained well for 6 months, although sigmoidoscopic appearances were those of moderate activity. After 6 months had a sharp clinical relapse, which was treated with local hydrocortisone (see Treatment 15 in Table II)
5. Female aged 42	Since 1952 has passed large quantities of mucus and blood per rectum each time bowels were opened and at other times also. No diarrhoea. Barium enema showed evidence of ulcerative colitis affecting the rectum and sigmoid colon	<i>Clinical:</i> No diarrhoea but passing considerable amounts of blood and mucus with every motion, and also at other times <i>Sigmoidoscopic:</i> Severe inflammation extending as far up as could be seen	No change No change	Treated with corticotrophin gel by intramuscular injection; passed into complete clinical remission, with much improved sigmoidoscopic appearances. After 7 months' remission relapsed and was treated with oral cortisone combined with "salazopyrin," with gradual remission
6. Female aged 35	In 1943 developed ulcerative colitis, for which she was discharged from the Women's Auxiliary Air Force. In remission from 1945 to 1949, when symptoms recurred and she was in hospital for 2 months. Fairly well until June, 1955, when diarrhoea recurred with up to 12 motions a day containing blood and pus. Barium enema showed involvement of descending and sigmoid colon. Treated with oral cortisone with slight improvement only	<i>Clinical:</i> 6 unformed motions a day with blood present, and also passing blood at other times <i>Sigmoidoscopic:</i> Moderate inflammation extending as far up as could be seen	No change No change	Treated with systemic corticotrophin gel with little effect. Then treated with salazopyrin with no effect. Subsequent slight improvement, but had 6 stools a day until 8 months after present study began, when she went gradually into remission and has since been symptom-free

Present Investigation

With these considerations in mind it was decided to use hydrocortisone for the local treatment of ulcerative colitis. It was supplied for trial by Glaxo Laboratories in bottles containing 250 mg. of hydrocortisone (free alcohol) dissolved in 50 ml. of 50% ethyl alcohol, in which it is much more soluble than in water. For therapeutic use one of these bottles was emptied into a standard intravenous infusion bottle containing 500 ml. of normal saline. The hydrocortisone is soluble enough to be held in this dilution, and the resulting solution of 4.5% ethyl alcohol in saline was judged not to be an irritating fluid for the colonic mucosa. The infusion bottle containing hydrocortisone was suspended close to the patient's bed and the hydrocortisone dripped into the rectum through a standard blood transfusion giving-set, slightly modified to carry a rubber catheter for insertion into the rectum. The use of a controllable drip mechanism permits the solution to be run into the rectum at a slow and steady rate, so that the chance of its acting as an enema is much reduced. The method described was also easily mastered by those patients who

treated themselves in their own homes, and none of them experienced any difficulty in applying the treatment.

The patients now reported on were all mild or moderate cases of ulcerative colitis. Patients with the severe form may have much superadded infection with pyogenic bacteria. In view of the fact that cortisone encourages the spread of pyogenic infections, it was thought advisable to confine the local use of hydrocortisone, at any rate initially, to less severe cases. Although the hydrocortisone was used in low concentration compared with what has been found optimal in skin diseases, there are reasons to suppose that the concentration used would be adequate for local action in the colon. The mucosa of the colon is covered with a single layer of epithelial cells as opposed to the numerous layers of cornified cells covering the skin. The colon absorbs water and saline avidly, and hence the hydrocortisone would be drawn into contact with, or actually into, the mucosa in the process. (It has recently been shown by Liddle (1956) that $\Delta^9\alpha$ -fluorohydrocortisone ($\Delta^9\text{FF}$) can be used to study the absorption of hydrocortisone by virtue of its capacity to suppress the normal secretion of corticotrophin and thus reduce blood levels of endogenous

hydrocorticoids to nearly zero. By this method, 26% of hydrocortisone was absorbed from the rectum compared with 2% from the skin, although Liddle specifically mentions that absorption across an inflamed mucosa has not been measured.) With these points in mind, a solution containing hydrocortisone at a concentration approximately 1,000 times that found in body fluids seems sufficient to have some local effect.

The treatment was given each night and was carried out with the patient in bed immediately before settling down for his night's sleep. On the first night one-quarter of a bottle was given—that is, approximately 125 ml. of liquid containing 60 mg. of hydrocortisone. During treatment the amount was increased up to half a bottle each night. The length of each course was originally three weeks, but later this was reduced to two weeks.

Results

Two groups of patients are here reported on. First, a group of six patients who were treated in October, 1955, and who have been observed for one year since. These patients were studied with particular care, for at least one sigmoidoscopic examination with biopsy was carried out before treatment and further biopsy examinations were made at weekly intervals during treatment, and on isolated occasions during the period of follow-up, by means of a special biopsy instrument (Truelove *et al.*, 1955). Their

course of treatment lasted three weeks. Secondly, an additional 15 treatments, each of two weeks' duration, have been given to patients without such close study and with shorter periods of follow-up. These 15 treatments include four instances of repeat treatments on patients who had previously responded to this form of therapy but had subsequently relapsed.

The results for these two groups are shown in Tables I and II. It will be seen that the patients often went into clinical remission during treatment, the net result of the total of 21 treatments being clinical remission in 14 cases, improvement in 1 case, and no change in six cases.

Almost all the patients who went into clinical remission with the treatment did so with great rapidity, commonly during the first few days of treatment. It is well known that symptoms may rapidly abate in any patient with ulcerative colitis, but the occurrence of very rapid remission in two out of every three patients within a few days of starting a particular form of therapy is decidedly exceptional, even if we allow for the fact that most of the patients in the present study had only mild symptoms. Rapid clinical remission was not confined to those patients with mild symptoms. For example, the patient described under Treatment No. 15 was experiencing a sharp attack of symptoms with gross bloody diarrhoea, rapidly falling haemoglobin, general malaise, and a sigmoidoscopic picture of acute inflammation. She nevertheless had complete

TABLE II.—*Results of Next 15 Courses of Treatment With Local Hydrocortisone (Each Course of Treatment Lasted Two Weeks).*

Treatment No.	Previous History	Immediately Before Treatment	Response to Treatment	Subsequent Progress
7. Male aged 46	In October, 1955, developed dull abdominal pain with fever and sweating lasting about a week. Since then has been passing 2 stools a day, watery, with much mucus present and occasional blood. Barium enema shows evidence of ulcerative colitis in rectum and sigmoid colon	<i>Clinical:</i> 2 liquid motions a day, with much mucus and occasional blood <i>Sigmoidoscopic:</i> Marked hyperaemia, granularity, numerous petechiae and shallow erosions, as far up as could be seen. Mucosal fragility much increased	<i>Remission:</i> Excellent response. After a few days was passing one normal stool a day Much improved, but mild hyperaemia and granularity still present	Remained symptom-free for 3 months, then had relapse and was again treated with local hydrocortisone (see Treatment 14)
8. Female aged 28	In March, 1955, had one week's diarrhoea with 7-8 loose motions a day containing blood; gradual improvement followed. Aug., 1955, bloody diarrhoea recurred, then gradually cleared up. Recently has been constipated but passing much blood and mucus per rectum, with occasional diarrhoea	<i>Clinical:</i> Passing considerable amounts of blood and mucus per rectum. Much lower abdominal pain <i>Sigmoidoscopic:</i> Well-marked hyperaemia, granularity, and exudate with the mucosal fragility much increased. These changes extended beyond 23 cm. from the anal margin	<i>Remission:</i> Good response. Steady improvement and was normal after one week Greatly improved. Mild hyperaemia and granularity only	Remained well for 6 weeks, but developed acute sinusitis which was followed by relapse of ulcerative colitis with passage of blood per rectum, abdominal pain, and sigmoidoscopic evidence of activity. Oral cortisone brought good response. Remained almost symptom-free on oral cortisone at the end of study
9. Female aged 36	Two years' history of passing blood and mucus per rectum every few days. Usually constipated. Lower abdominal pain	<i>Clinical:</i> Passing blood and mucus per rectum, but without diarrhoea <i>Sigmoidoscopic:</i> Marked inflammation of the rectum, becoming mild above rectosigmoid junction	<i>Remission:</i> Symptom-free in a few days Much improved—nearly normal	Symptom-free (6 months' follow-up)
10. Male aged 28	In Jan., 1954, had diarrhoea with 6 motions a day containing blood and mucus. Diarrhoea stopped after 6 weeks, but intermittent rectal bleeding persisted. Sept., 1954, 7 weeks' diarrhoea. Dec., 1954, period of severe rectal bleeding. Feb., 1956, bleeding per rectum recurred followed by diarrhoea with up to 12 motions a day and loss of 1 stone (6.4 kg.) in weight. Barium enema showed evidence of ulcerative colitis from rectum to transverse colon	<i>Clinical:</i> Diarrhoea with blood and mucus present. Barium enema showed widespread involvement of colon <i>Sigmoidoscopic:</i> Hyperaemia and well-marked granularity of the mucosa extending up as far as could be seen	<i>Remission:</i> Became symptom-free in a few days. Gained 1 stone (6.4 kg.) in weight	Remained symptom-free for a month, then relapsed with 4 unformed stools daily containing small amounts of blood. Again treated with local hydrocortisone (see Treatment 21)
11. Female aged 57	Recurrent attacks of diarrhoea with blood and mucus since 1917. Recent attack began 2 months before present treatment, with diarrhoea of up to 18 stools a day with blood and mucus present. Anaemic and treated with blood transfusion before hydrocortisone therapy was begun. Also suffered from chronic pyelonephritis with hypertension	<i>Clinical:</i> Severe bloody diarrhoea as described in previous column <i>Sigmoidoscopic:</i> Marked hyperaemia and granularity of mucosa with numerous tiny erosions. Much purulent exudate. Mucosa very fragile with bleeding on slight trauma. These changes extended as far as could be seen	<i>Remission:</i> Rapid response to treatment; became symptom-free in a few days Greatly improved, but still showing hyperaemia with mildly increased fragility of mucosa	Recurrence of diarrhoea with blood in stools. These symptoms persisted until end of present study

TABLE II.—Continued.

Treatment No.	Previous History	Immediately Before Treatment	Response to Treatment	Subsequent Progress
12. Female aged 51	Five months' history of passing blood and mucus per rectum but without diarrhoea	<i>Clinical:</i> Passing much blood and mucus per rectum up to 8 times a day <i>Sigmoidoscopic:</i> Marked hyperaemia of mucosa as far up as could be seen, with increased fragility and patchy exudate	<i>Remission:</i> One normal stool a day without blood or mucus Much improved. Slight hyperaemia and slightly increased fragility	Remained perfectly well (6 months' follow-up)
13. Female aged 30	In 1955 had a severe attack of ulcerative colitis associated with pregnancy, and was treated in hospital for 5 months with corticotrophin followed by oral cortisone, followed by salazopyrin. Was symptom-free on discharge in Dec., 1955. Remained in clinical remission and with sigmoidoscopic findings within normal limits (apart from some residual scarring) until April, 1956, when sharp relapse began possibly related to change of diet	<i>Clinical:</i> Three loose stools a day with much blood and mucus present <i>Sigmoidoscopic:</i> Marked hyperaemia and granularity with purulent exudate present. Numerous mucosal petechiae. Mucosal fragility much increased	No change Not done	Symptoms persisted in spite of variety of treatments, including oral cortisone, salazopyrin, and blood transfusion
14. Male aged 46	See Treatment No. 7	<i>Clinical:</i> For past two weeks had 3 loose stools a day with much mucus present <i>Sigmoidoscopic:</i> Hyperaemia and granularity with numerous petechiae present	<i>Remission:</i> Immediate response, to treatment with 1 normal stool a day after first instillation Much improved but residual hyperaemia and granularity present	Remained well for 3 months, then began to pass 3 loose stools a day with much mucus present. Treated with local hydrocortisone hemisuccinate sodium (to be reported)
15. Female aged 30	See Case 4 (Table I)	<i>Clinical:</i> Six unformed stools a day with much blood present. Hb has fallen from 95% to 75% in past fortnight <i>Sigmoidoscopic:</i> Marked hyperaemia with very extensive petechiae and purulent exudate. Extreme mucosal fragility	<i>Remission:</i> Immediate response to treatment. Diarrhoea less after 1 day. No bleeding after 2 days. One motion a day without blood after 3 days Much improved but still showed hyperaemia and granularity	Remained symptom-free (5 months' follow-up)
16. Male aged 46	Intermittent attacks of bloody diarrhoea since 1949. Three admissions to hospital. Two weeks before present treatment he had diarrhoea with small amounts of blood and pus present and with much lower abdominal pain	<i>Clinical:</i> Diarrhoea, with small amounts of blood and pus present in stools and lower abdominal pain <i>Sigmoidoscopic:</i> Well-marked hyperaemia, granularity, and mucosal fragility as far up as could be seen	<i>Remission:</i> Abdominal pain ceased after 2 days and diarrhoea after 5 days. Thereafter had entirely normal motions	Remained well (5 months' follow-up)
17. Male aged 46	Attacks of ulcerative colitis since 1953, for which was twice admitted to hospital. On second occasion in Dec., 1955, when he improved on treatment but continued to get 4-6 motions a day with occasional blood and mucus present. These symptoms persisted until present treatment began	<i>Clinical:</i> 4-6 loose motions a day with occasional blood and mucus present <i>Sigmoidoscopic:</i> Marked hyperaemia with numerous petechiae and purulent exudate. Mucosal fragility increased	No change: At first improved and became almost symptom-free, but symptoms recurred during treatment No change	Symptoms persisted in spite of a variety of treatments
18. Male aged 24	Developed first attack of ulcerative colitis in Dec., 1955. In Feb., 1956, was admitted to hospital with 15 motions a day containing much mucus and blood. Barium enema showed changes throughout the whole descending colon. Treated with corticotrophin with much improvement but without going symptom-free. Thereafter treated with oral cortisone as out-patient, but became rather worse with 6-7 motions a day containing small amounts of blood. Oral cortisone was tailed off at beginning of hydrocortisone treatment	<i>Clinical:</i> 6-7 motions a day with small amounts of blood present <i>Sigmoidoscopic:</i> Marked hyperaemia, granularity, and purulent exudate. Mucosal fragility much increased	Improved: One normal motion each morning; no further bowel action until evening, then he passed small amounts of mucus and a little blood No change	Mild symptoms persisted in spite of treatment with salazopyrin, which was apparently beneficial
19. Female aged 62	Four months' passage of mucus per rectum with occasional blood and increasing frequency of defaecation	<i>Clinical:</i> 5 motions a day containing blood and mucus. Intermittent fever up to 101° F. (38.3° C.) <i>Sigmoidoscopic:</i> Well-marked hyperaemia and granularity	No change No change	Treated with systemic corticotrophin. Deteriorated. Developed severe fungus infection of mouth. Then gradually improved and was almost symptom-free at end of present study
20. Female aged 38	See Case 2 (Table I)	<i>Clinical:</i> Diarrhoea with gross blood and mucus in stools <i>Sigmoidoscopic:</i> Severe inflammation extending up to 20 cm. from anal margin and then shading off into normality	<i>Remission:</i> Symptom-free after a few days Much improved but not normal	Remained well for 2 months, then began to pass blood and mucus per rectum. Treated with local hydrocortisone hemisuccinate sodium (to be reported later)
21. Male aged 28	See Treatment No. 10	<i>Clinical:</i> Diarrhoea with 4 unformed motions a day, containing blood <i>Sigmoidoscopic:</i> Marked inflammation as far up as could be seen	No change No change	Treated with oral cortisone until end of present study, with improvement after 6 weeks

symptomatic relief in three days from the onset of therapy, which was self-administered at home.

The sigmoidoscopic changes throughout treatment corresponded roughly to the clinical response, in that all the patients experiencing a clinical remission showed an improved sigmoidoscopic picture, which the others did not. However, in only one patient did the sigmoidoscopic appearances become entirely normal, although in some of the others the abnormal changes were slight at the end of treatment.

By contrast, the histological appearances of biopsy specimens taken throughout treatment showed no such corresponding improvement. In general, the mucosal changes appeared much the same at the end of treatment as at the beginning, even among those patients experiencing complete symptomatic relief and with greatly improved sigmoidoscopic appearances. In some cases the surface epithelium appeared more gravely disturbed during treatment than before it. Whether this was due to the effects of the hydrocortisone itself or whether the vehicle of 4% ethyl alcohol was exerting a noxious influence is at present uncertain.

The patients who passed into clinical remission were liable to suffer from recurrence of symptoms during the follow-up period, although a relapse during the first few weeks after stopping treatment was not common. Among those who responded well to the treatment the sigmoidoscopic picture often showed some worsening after treatment was stopped, but this might occur without simultaneous clinical relapse. Four patients who relapsed clinically some months after a successful first treatment were treated a second time. In the case of the first three patients so treated, the second course of treatment was rapidly effective in suppressing symptoms, but the fourth patient showed no response to the second course.

It might be supposed that local treatment applied by a rectal drip would be effective only in patients in whom the disease was limited to the rectum or lower colon. In other words, the treatment might be efficacious only in those varieties of ulcerative colitis which have been labelled "haemorrhagic proctitis" and "recto-sigmoiditis." Many of the patients fell into these categories, as was to be expected in view of the fact that severely ill patients were excluded from the study. However, not all these patients with limited disease responded to the treatment, and, by contrast, there were other patients with radiological evidence of widespread involvement of the colon who did respond. The geographical extent of the disease is therefore not the important element in determining response to treatment. The reason for this becomes plain when we consider the extent to which substances dripped into the rectum will spread through the colon.

Extent of Spread of Rectal Drip

In order to determine how far along the colon the hydrocortisone solution travels when it is dripped into the rectum with the patient supine, each of the first six patients treated was examined radiologically after a dilute suspension of barium sulphate had been dripped into the rectum under similar conditions. It was found that a suspension of 15 g. of barium sulphate in 250 ml. of normal saline was sufficient to yield clear radiographs. The patient set up the rectal drip with the dilute barium suspension while lying on the x-ray table and remained there until the radiological examination was completed some three and a half hours later. The barium sulphate suspension was dripped into the rectum at the usual rate, and radiographs were taken at the end of the administration, followed by additional radiographs at intervals of one hour, two hours, and three hours after its completion.

The barium sulphate suspension was found to travel extensively through the colon, in all cases travelling as far up at least as the splenic flexure and, in some, across the transverse colon and into the ascending colon. A typical

radiograph taken one hour after the conclusion of the rectal drip is shown in the accompanying illustration. This wide spread is presumably due to the occurrence of non-propulsive contractions of the colon such as have been demonstrated both in animals and in man (Templeton and Lawson, 1931; Adler *et al.*, 1941). It demands only the application of simple physical principles to see that if the anal sphincters remain closed during such contractions any liquid contents are likely to be widely dispersed through the colon. It is clear that if a local treatment can be found which is efficacious against ulcerative colitis it can be applied effectively by rectal drip over the bulk of the colonic mucosal surface, provided the patient is not rectally incontinent.

Discussion

The present study has shown that about two out of every three patients with mild or moderate symptoms of ulcerative colitis experience complete symptomatic relief when treated with nightly instillations of hydrocortisone into the rectum. The clinical response has shown a well-marked pattern. Either the patient responds swiftly to the treatment so that symptomatic relief is obtained in the first few days or he is left unchanged by it. Whether this difference reflects any fundamental difference in the nature of the disease in different patients is entirely uncertain. However, it is a pattern of response which has commonly been observed when hydrocortisone has been employed as a local treatment on the skin, in the eyes, and in joints. For example, Sulzberger and Witten (1954) reported a study of the effect of hydrocortisone in 252 patients with skin diseases, in many of whom the lesions were symmetrically bilateral, so that one side of the body could be treated with an inert



Radiographic appearances one hour after dripping a weak suspension of barium sulphate into the rectum with the patient supine.

ointment and used as a control. In those patients who showed a good response to hydrocortisone the effect was quickly apparent, visible improvement occurring in 24 to 48 hours.

Although the sigmoidoscopic picture showed improvement during therapy in all those patients going into clinical remission, only one patient had entirely normal sigmoidoscopic findings at the end of treatment. A more marked discrepancy was seen in the case of the histological picture of the mucosa as judged by examination of small specimens taken for biopsy from the neighbourhood of the recto-sigmoid junction, for it was exceptional to find improvement. This finding emphasizes that this form of treatment can be regarded only as a means of symptomatic relief and that the disease continues in those who pass into complete clinical remission. However, this is probably true of all forms of medical treatment in present use, and Truelove and Richards (1956) have reported that more than half of the biopsy specimens taken from patients in clinical remission show evidence of inflammation.

The fact that the present form of treatment is in no sense a cure of the disease should not be taken to mean that it is useless. If symptoms can be promptly checked in a considerable proportion of patients, particularly by the use of a method which they can carry out in their own homes, it is a valuable addition to therapy. So far, there has not been sufficient opportunity to see whether repeated short courses of local hydrocortisone administered as soon as symptoms recur will keep patients in a good state of general health for a prolonged period. Four patients in the present study who relapsed some months after a successful course of treatment were treated a second time, with rapid relief of symptoms in three of them. It is highly desirable that further experience along these lines be gained.

Although the results now reported seem reasonably favourable, it is not claimed that the form of hydrocortisone used is necessarily the best for local treatment. Hydrocortisone (free alcohol) has a very limited solubility in water and was therefore supplied by the manufacturers in solution in 50% ethyl alcohol. This was diluted 10 times with saline, but, even so, it is conceivable that the resulting weak alcohol solution which acted as a vehicle for the hydrocortisone was not entirely innocuous to the inflamed mucosa. A form of hydrocortisone which is freely soluble in water may therefore prove to be superior for local use in ulcerative colitis. One such preparation, hydrocortisone hemisuccinate sodium, is being tried at present.

It will be appreciated that the opinion expressed that the present study has shown local hydrocortisone to be frequently effective in bringing about symptomatic relief in mild attacks of ulcerative colitis is no more than a presumption based on clinical judgment. It is conceivable that the rectal drip might aid in the relief of symptoms merely by lubricating the colon and thus minimizing the damage caused by defaecation, just as preparations such as "isogel" and "normacol" may be useful in mild cases of ulcerative colitis. Alternatively, those who believe ulcerative colitis to be a psychosomatic disorder will find a ready explanation of the apparent benefit in the use of any treatment which is novel. Yet a third possibility is that a rectal drip of hydrocortisone is no more than an inconvenient and expensive way of allowing hydrocortisone to be absorbed to exert its systemic effects. These possibilities could be assessed by a properly designed therapeutic trial. Such a trial may be advisable, but at present it seems best to form clinical judgments on various preparations of hydrocortisone so that the one found to be most efficient can be put to a formal test in due course.

Summary

A group of patients suffering from ulcerative colitis in a stage of mild or moderate severity have been treated by the introduction of a solution of hydrocortisone into the rectum by means of a slow drip. Those who were

severely ill were not included. Treatment was given nightly, originally for three weeks, latterly for two weeks.

Twenty-one courses of treatment have been given to 17 patients, four having been treated twice.

In 14 instances rapid clinical remission occurred, this change occurring in the first few days after starting treatment. In one instance the patient was much improved but not in complete clinical remission. In the remaining six instances the treatment had no effect.

The sigmoidoscopic changes roughly corresponded with the change in clinical state, for all those patients going into clinical remission showed an improved sigmoidoscopic picture, although in only one instance did the sigmoidoscopic findings become entirely normal.

By contrast, the histological findings met with in small biopsy specimens did not in general show a corresponding improvement.

The effect of the treatment is not permanent, although a successful immediate outcome may be followed by a period of clinical remission lasting at least for several months. In the case of four patients who suffered clinical relapse some months after an excellent response to treatment, the institution of a second course of treatment brought about clinical remission in a few days in three of them, so that repeated courses of treatment whenever symptoms recur may prove to be effective in some of those patients who respond to the first course of treatment.

This method of treatment appears to be a useful addition to the treatment of ulcerative colitis, particularly as it can be carried out by patients in their own homes.

I am grateful to Glaxo Laboratories for making a gift of the hydrocortisone; to Miss Shirley Thomas, who assisted at the sigmoidoscopic examinations and in other ways; to Mr. D. Jerome, of the Dunn School of Pathology, who prepared some of the histological specimens through the courtesy of Professor Sir Howard Florey; to Dr. M. A. Jennings, of the Dunn School of Pathology, who examined some of the specimens; and to my radiologist colleague, Dr. K. Lumsden, who arranged for the special barium enema examinations to be carried out. It is a pleasure to record my appreciation of the first six patients treated. They were plainly told that the treatment was experimental and that if they took part they would undergo repeated sigmoidoscopy with biopsy; none refused treatment.

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The West London Medico-Chirurgical Society has decided to discontinue the *West London Medical Journal* and to revert to an annual volume of proceedings, the first issue of which will appear in January, 1958. The *West London Medical Journal* first appeared in 1896, succeeding the *Proceedings of the West London Medico-Chirurgical Society* (1882-96).

OBSTRUCTION OF THE SUPERIOR VENA CAVA IN CARCINOMA OF BRONCHUS

BY

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The increasing incidence of carcinoma of the bronchus in recent years, and the undisputed fact that only a small proportion of patients can be permanently cured, makes the palliation of some of the grave symptoms of this disease assume great importance. One of the most unpleasant complications of carcinoma of the bronchus is obstruction of the superior vena cava, and the purpose of this article is to report our experiences in the management of 107 patients with this condition seen at Hammersmith Hospital during the four-year period November, 1949, to October, 1953.

There seems little doubt that the superior vena caval syndrome is more commonly encountered now than it was in the past. Hinshaw (1949) remarked on its rarity when he reported that, in analysing 85,000 consecutive admissions to the White Memorial Hospital in Los Angeles, he could find only four examples of the condition. McIntire and Sykes (1949) reviewed the literature up to 1946; they report Fischer's (1904) collected series of 252 cases and add a further 250 cases from the literature from 1904 to 1946. Furthermore, the aetiological background of the syndrome has undergone a gradual change. Many conditions have been identified as the cause of superior vena caval obstruction; among those most frequently encountered have been aortic aneurysm, carcinoma of the bronchus, chronic mediastinitis (syphilitic, tuberculous, or of unknown aetiology), carcinoma of the thyroid, malignant lymphoma, metastatic carcinoma, and thrombosis with no apparent underlying cause. Whereas aneurysm of the aorta, including the complication of perforation of the wall of the sac into the right atrium or superior vena cava, was apparently the commonest cause reported in the older literature, clearly carcinoma of the bronchus now accounts for the majority of cases, certainly in Great Britain.

In a previous article (Bromley and Szur, 1955) we outlined the work of the Bronchus Tumour Clinic at Hammersmith Hospital and reported that during the four-year period (1949-53) 732 patients were seen. Among these were 107 who presented with superior vena caval obstruction—that is, 14.6%. It is interesting to note that Roswit *et al.* (1953), reporting 38 cases, state that these represent 15% of their series of carcinoma of the bronchus.

Clinical Features

The majority of patients presented with pulmonary symptoms antedating those of superior vena caval obstruction, but in a small number the latter were the first indication of the presence of carcinoma of the bronchus. The main complaint of the patients was dyspnoea. This may have been present for some time, but it had rapidly worsened with the onset of caval obstruction. In addition, the patients complained of a sense of fullness in the head, swelling of the neck, and puffiness of the face. Headache, vertigo, and drowsiness were symptoms often present; these

were possibly the result of increased cerebral venous pressure. The classical physical signs were present in all cases in varying degree. These included venous engorgement of the neck; congestion of the face with suffusion of the conjunctivae; frank oedema of the face, neck, and often of the arms; as well as evidence of a collateral circulation (Fig. 1). These symptoms and signs were aggravated by lying flat, some patients finding the horizontal position untenable for more than a few moments.

The diagnosis of superior vena caval obstruction in our patients was made primarily on clinical grounds. Infra-red photographs were taken to demonstrate collateral channels in some patients (Fig. 2) and in a few angiography was performed (Fig. 3). Estimation of the venous pressure in upper and lower limbs was not made, as we did not feel that this procedure was essential for diagnosis or a necessary aid to the planning of treatment.

The age incidence of the 107 patients (90 males, 17 females) suffering from superior caval obstruction is shown (Fig. 4). It will be seen that over 70% occurred between the ages of 45 and 64. Table I shows the side and site of

TABLE I.—Side and Site of the Primary Growth

	Total	Main Bronchus	Upper Lobe Bronchus	Lower Lobe Bronchus	Middle Lobe	Not Known
Left	22	5	14	3	—	—
Right	85	26	44	10	1	4

the primary growth. Although some authors report a slight preponderance of left-sided carcinomas, the majority agree that right-sided primaries are the predominant cause of this syndrome, and our series shows a proportion of nearly 4:1. The right main bronchus and right upper lobe accounted for 65.4%.

Bronchoscopy was performed in 70 patients and was not accompanied by any serious morbidity. In 58 of these it was done before treatment was started and in the remaining 12 during or at the end of treatment. It was our agreed policy to carry out bronchoscopy in all patients before their assessment at the bronchus tumour clinic. The reason for this was to determine the extent of the primary growth, to obtain evidence of the degree of tracheal or carinal deformity, if such existed, and, finally, to secure histological confirmation. This was the only group in which bronchoscopy was not always possible or desirable. In 37 patients bronchoscopy was not done. This was because they were too gravely ill (a few being almost moribund) or it was considered that the procedure might be hazardous owing to the presence of gross venous congestion of the head and marked respiratory embarrassment. Also, in several cases, histological confirmation was readily obtainable by cervical node biopsy.

The results of the bronchoscopies can be summarized as follows: positive histological evidence was obtained in 20 patients; in 37 there was strong presumptive evidence of malignant disease of the lung; in 13 the examination yielded no positive information. It is interesting to compare this with a series of 66 patients with carcinoma of the bronchus who had radical radiotherapy followed by pneumonectomy (Bromley and Szur, 1955). In the overwhelming majority of these, histological proof was obtained at the first bronchoscopy, whilst in the group under discussion this could be obtained in only 29%. The reason why it was so often unobtainable, even in the presence of advanced carcinoma of the bronchus, was that tracheal and carinal deformity and rigidity of the main bronchi made a full examination technically impossible.

Histology

Table II shows the histological findings. The absence of positive histological proof in about a third is explained by the difficulties in investigating this group of patients as previously outlined. The majority of the patients died at

home and necropsy was performed in only 38. In these, however, a bronchial carcinoma origin was confirmed in every case, and thus we feel that it is unlikely that more than a very few could have been due to any other condition, although this cannot be entirely excluded. Whilst it is

though a few of them were in a very advanced condition. Indeed, it is our impression that superior vena caval obstruction is one of the few emergencies of radiotherapy and that on occasion remarkable relief of symptoms can be achieved in a short time. Only five received radical treatment, based

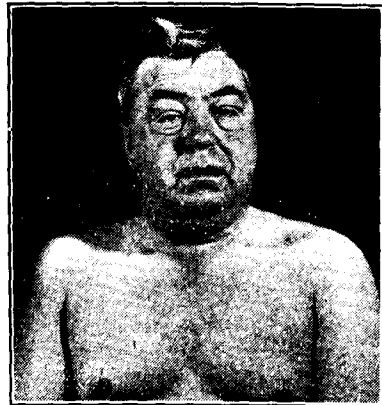


FIG. 1.—Typical appearance of a patient with superior vena caval obstruction.

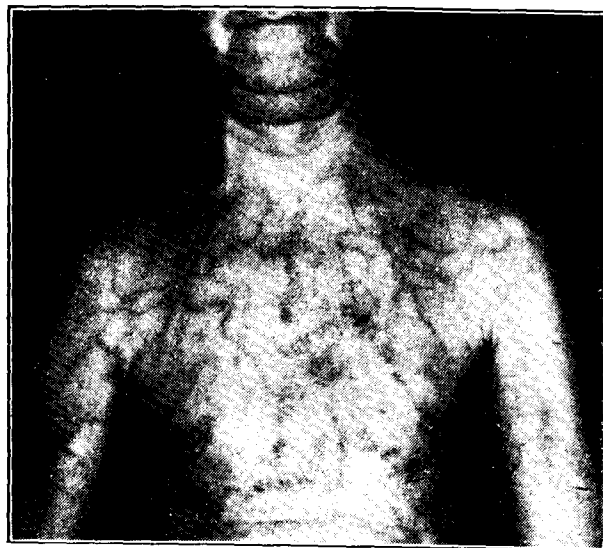


FIG. 2.—Infra-red photograph showing collateral venous channels on the anterior chest wall.

regretted that a high proportion remained without confirmation of the diagnosis, it does not seem likely that this affects the conclusions which can be drawn from the series as a whole.

TABLE II.—Histology of the Growths in 107 Patients

Not Known	Squamous	Oat	Adeno-carcinoma	Anaplastic and Others
38	12	27	—	30

It will be seen from Table II that most of the patients were affected by undifferentiated forms of carcinoma (oat or anaplastic). Only 12 out of 69, proved histologically, could be classified with certainty by the pathologists as squamous growths. This is 17%; and should be compared with the usual incidence of about 60% reported in most general series of carcinoma of the bronchus.

Radiotherapy

In view of the distressing nature of this syndrome it was our policy to treat all patients who presented with it, even



FIG. 3.—Venous angiograms: (A) before and (B) after treatment, showing return to patency in the superior vena cava.

on multiple small fields and careful beam direction. These patients were in exceptionally good general condition. In most of the others a four-field set-up was used; in only a few were two fields employed. The main aim of the treatment was to relieve the superior vena caval obstruction; the primary site of the growth bore only secondary consideration in planning the fields. In the great majority of the cases, however, it was possible to include the right main bronchus and the upper lobe stem in the maximum tumour dose area. Field sizes were usually 15 by 10, 15 by 7.5, or rarely 20 by 10 cm. The apparatus then available provided a kilovoltage varying between 190 and 250. The half-value layer in all cases was 2 mm. of copper. In some patients treatment could not be completed because of further deterioration of their condition or death. The dose generally aimed at was about 3,000 to 4,000 r in about three to four weeks. It was not considered desirable to stop treatment as soon as the symptoms were relieved, as is advocated by some radiotherapists, because it was our belief that continued treatment to a higher dosage makes the likelihood of a recurrence of the obstruction much less. However, we tried to avoid any significant skin reactions or radiation oesophagitis.

Results of Treatment

The effects of treatment on the caval obstruction can be shown as follows: (1) No change or continued deterior-

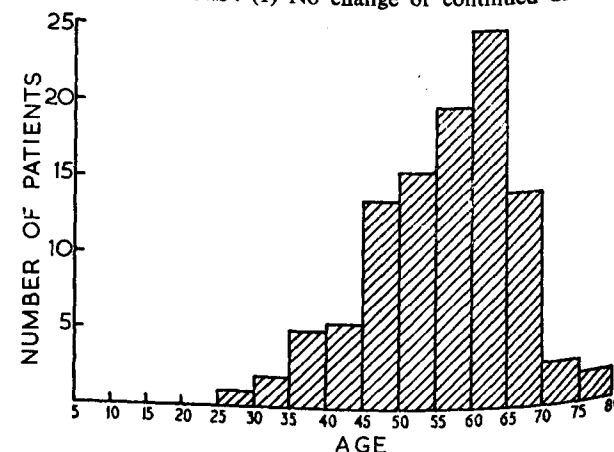


FIG. 4.—Age incidence in the 107 patients.

ration occurred in 33 patients. (2) Improvement took place in the remaining 74—(a) half of these (37) were classified as showing considerable improvement in their symptoms, with complete disappearance of the signs of caval obstruction; a small number of them were able to return to full employment; (b) the other half showed slight or moderate improvement; in the majority of these the clinical signs of caval obstruction disappeared. Thus 69% of the patients responded to the treatment and, so far as the caval obstruction was concerned, derived benefit from radiotherapy. The symptoms of the underlying primary tumour were often improved to a great extent but seldom completely disappeared.

Table III shows the survival time in months from the start of treatment. It will be seen that 80 (74%) of the patients died within the first six months and only three survived

TABLE III.—Survival Time in Months from the Start of Treatment

-1	1-3	3-6	6-9	9-12	12+
14	37	29	17	7	3

longer than a year. The longest survivor lived for 18 months. It is difficult to assess whether the treatment actually prolonged the life of the group as a whole, although it undoubtedly did so in individual cases. Rosenbloom (1949) reports the fate of nine untreated cases: eight died within 10 weeks and one survived 14 weeks. Although his is a small series and it is not possible to draw any definite conclusions from it, it seems probable that the expectation of life after the onset of caval obstruction is to be measured in weeks rather than in months.

Recurrence of Obstruction.—Of those patients who showed considerable improvement, 31 had no recurrence prior to death, 5 developed a recurrence, and in 1 there was insufficient information to arrive at an assessment. Of the 37 patients who showed slight or moderate improvement, 28 had no further deterioration of the symptoms or signs of caval obstruction, 8 did show evidence of progression of the syndrome after an initial phase of improvement, and in 1 there was insufficient information to arrive at an assessment.

Nature of the Obstruction

We were interested to find out, if possible, the anatomical cause or nature of the obstruction. Necropsy was done in 38 patients, but information about the state of the vena cava and its tributaries was complete enough to form an opinion in only 23. Understandably, the majority of necropsies were performed on those who had not responded to treatment and died in hospital. Table IV shows the

TABLE IV.—Findings at Necropsy in 23 Patients

Direct Infiltration by Primary	Thrombosis	Pressure of Primary or Glands	Normal Superior Mediastinum
4	8	13	6

findings in 23 patients. It will be seen that some patients had the superior vena cava affected by more than one of the possible causes for the obstruction. It was interesting to find that direct infiltration of the vessel with growth in its lumen was noted in only four. The six who had a normal superior mediastinum all belonged to the considerably improved group.

Discussion

In Great Britain carcinoma of the bronchus is undoubtedly the commonest cause of superior vena caval obstruction and probably accounts now for at least 80% of the cases. This great vein is anatomically so placed as to be particularly vulnerable to pressure effects from an intrathoracic malignant growth. This is due to its close relationship to the right main bronchus and to the right paratracheal group

of glands which receives a considerable volume of the lymph drainage from both lungs. The obstruction of the vein leads to the establishment of a collateral circulation in which, amongst others, the azygos, the internal mammary, and the superficial thoracic veins participate. In most patients the collateral circulation is inadequate, and this accounts for the signs and symptoms of the condition.

The fully established clinical picture is so characteristic that it can be readily diagnosed. Whilst investigations are often necessary and histological confirmation is of great value in proving the underlying aetiology, it is our belief that unnecessary time should not be spent on a variety of diagnostic procedures. The patient is often in so poor and advanced a condition that treatment is urgently indicated. Some of the investigations may be carried out at a slightly later stage, when the symptoms and signs have been at least partially relieved. For example, bronchoscopy in the early stages may be a procedure that carries a certain degree of risk. In our series it was performed only in 58 patients before the start of treatment and in only 20 was positive histological proof obtained. It might, therefore, be regarded as almost an academic investigation, and should be done only if there is no obvious risk to the patient or if there is real doubt about the underlying cause of the obstruction.

Radiotherapy is generally, though not universally, accepted as the treatment of choice for the relief of caval obstruction (Price Thomas, 1950; Brooks *et al.*, 1951; Roswit *et al.*, 1953; Hilton, 1955). Of our 107 patients, 74 (69%) improved with treatment, half of these showing marked improvement with complete disappearance of the symptoms and signs of their caval obstruction. The continued deterioration in the remaining 31% did not appear to be accelerated by the treatment given. As the treatment was planned to be palliative, skin reactions and irradiation oesophagitis were avoided. Of the 74 patients who benefited by treatment, 59 (79%) had no recurrence of the obstruction prior to death, the latter being usually due to metastases or intercurrent infection. Whilst it is difficult to assess whether the treatment prolonged the survival time in many cases, there is no doubt that the quality of the remaining life was considerably improved. Clinicians who have seen patients with superior vena caval obstruction will agree that the mode of death in this condition is most distressing and that, on the whole, less suffering is experienced when death is due to generalized metastases. When first seen 21% of our patients already had clinical or radiological evidence of extrathoracic metastases; almost all had extensive intrathoracic disease. Our experience in the management of this condition has confirmed our belief that treatment should be given to all patients even though the expectation of life is very short.

The majority of the patients had tumours situated in the right main and right upper lobe bronchi and there was a very high incidence of anaplastic growths. A case might be made, therefore, for very close observation of patients who fall into these categories and who are not suitable for thoracotomy or radical irradiation. Radiotherapy might be regarded as having a place early in the development of such a tumour, either on diagnosis or at the earliest appearance of caval obstruction. In this way the misery of the fully developed syndrome might be avoided.

Summary

Of 732 patients seen at the Bronchus Tumour Clinic at Hammersmith Hospital, 107 presented with superior vena caval obstruction. These were treated with irradiation. Clinical, pathological, and radiotherapeutic details are described and the results of treatment presented. Benefit was derived from this treatment in 69%, and in four-fifths of these there was no recurrence of the obstruction prior to death. It is concluded that treatment should be attempted in all patients suffering from this condition.

We should like to express our gratitude to Dr. Constance Wood and Mr. W. P. Cleland, who were responsible for the general guidance of the work of the clinic; also to Dr. P. B. Woodyatt, who treated many of these patients.

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CLINICAL TRIAL OF BUCILIZINE HYDROCHLORIDE FOR VOMITING OF PREGNANCY

BY

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Many drugs have been used in attempts to relieve nausea and vomiting of pregnancy. Except in sporadic cases the results are disappointing, which is not surprising when the cause of this condition continues to be obscure. In mild degree these symptoms are accepted by most patients as a necessary evil; in moderate degree they cause considerable distress; in severe degree hyperemesis gravidarum results, a condition which may threaten life and which requires urgent treatment.

Bucilizine hydrochloride ("vibazine") has the chemical formula 1-(p-chlorobenzhydryl)-4-(p-tertio-butylbenzyl)-diethylene-diamine dihydrochloride and is an antihistaminic of low toxicity (Schiller and Lowell, 1956). It has been shown to be effective in cases of allergy (Blatt, 1955), post-operative vomiting (Klein-Vercautere, 1954), and motion sickness (Chinn, 1955), and it seemed likely that it might be equally efficacious in vomiting of pregnancy.

In carrying out a clinical trial to investigate this, cases of moderate degree were chosen, the response of those of mild degree being too difficult to elucidate and the occurrence of those of severe degree being too rare to obtain sufficient material. An occasional case of severe nausea with slight vomiting and a few cases of hyperemesis gravidarum, which occurred during the time of the investigation, were included.

Material

Between January 25 and December 11, 1955, 1,267 new patients attended the antenatal clinics at Willesborough, Folkestone, and Buckland Hospitals; 33 of these had symptoms severe enough to include them in the investigation. During the same time three patients were seen in their own homes. One patient is included twice in the series, excessive vomiting occurring at the eighth and again at the thirty-seventh week. The age of patients varied from 18 to 36 years. Their distribution according to parity is shown in Table I, according to symptoms in Table II, and according to stage of pregnancy in Fig. 1.

TABLE I.—Parity of 36 Patients

Gravida	1	2	3	4	6	7
No. of cases	17	11	4	2	1	1

The duration of vomiting before treatment was between 3 and 70 days, the average being 30 days. One patient complained of it for 120 days! The severity varied from vomiting twice a day to vomiting "everything." Of those cases occurring between the sixth and ninth weeks, 50% had been vomiting for a week, 25% for two weeks, 25% for

TABLE II.—Symptoms

Symptoms	No. of Cases
Nausea, severe	3
Excessive vomiting	30
Hyperemesis gravidarum	3

four weeks. In the group between the tenth and fourteenth weeks, the majority of patients had been vomiting three to four times daily for at least four weeks. Most of the patients treated after the thirty-fifth week had suffered throughout pregnancy from intermittent vomiting, which had become severe shortly before treatment.

Acetone was detected in the urine in eight patients; unfortunately it was not tested for in some cases.

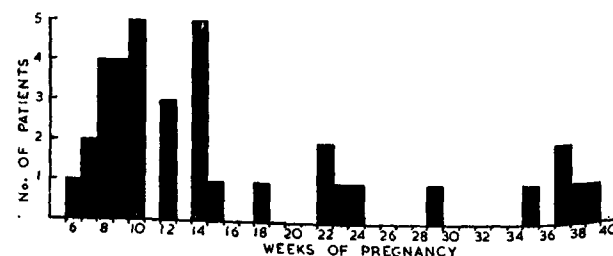


FIG. 1.—Distribution of patients according to stage of pregnancy.

Treatment

Prior to treatment all patients were examined to exclude an organic cause for vomiting. At the beginning of the investigation the dose of buclizine hydrochloride prescribed was 50 mg. nocte, this being supplemented after three days by 25 mg. mane if the response was not satisfactory. Later, 50 mg. nocte and 25 mg. mane was prescribed at the outset, as this was found more effective. Twenty patients were treated with 50 mg. nocte, 13 with 50 mg. nocte and 25 mg. mane, two in-patients and two out-patients with 50 mg. nocte and 25 mg. t.d.s., and one in-patient and one out-patient with 25 mg. t.d.s. One patient of her own accord found she obtained the best result by taking 25 mg. nocte and 50 mg. mane. The only contraindication to these higher doses seemed to be that sleepiness was induced in some patients in the daytime.

Six patients were treated in hospital. Four of these were admitted on account of the severity of their vomiting, one for treatment of bronchiectasis, and one for social reasons.

The duration of treatment varied from five days to three months, the average being two weeks.

Results

An analysis of the results is shown in Table III. The time interval between the onset of treatment and patients

TABLE III

Result	No. of Cases
Complete relief	19 (53%)
Marked improvement	5 (14%)
Improved	7 (19%)
No effect	2 (5.5%)
Worse	3 (8.5%)

TABLE IV

Days prior to improvement	1	2	3	4	5	6	7
No. of patients	10	12	3	4	1	1	1

experiencing relief was short in most cases, many patients stating that they were greatly relieved the following day. An analysis of the number of days between the onset of treatment and response is shown in Table IV.

The distribution of the results according to the stage of pregnancy is shown in Fig. 2. Of the two patients who did not experience any effect, the mental approach and environment of one were unstable and difficult. No treatment proved of any avail other than separating her from her home surroundings. The other patient stated that she

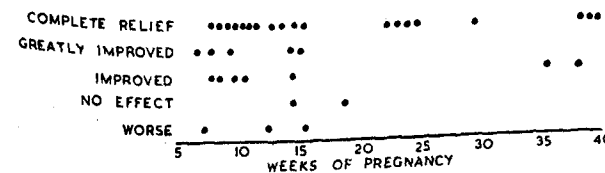


FIG. 2.—Results according to stage of pregnancy.

continued to vomit all the time regardless of any treatment, but at no time was her general condition affected. Of the three patients who stated they were worse following therapy, one vomited violently four hours after taking buclizine hydrochloride and did not take any further tablets, one thought her vomiting was more violent during her week's treatment, and one felt ill but took the tablets for only three nights. Unfortunately there was no opportunity to analyse the last patient's statement, as her frame of mind was such that she departed from the out-patient department with her notes.

One patient in the successful group complained that her vomiting was more violent after the first two nights, but she then experienced relief and was pleased to continue with the treatment.

In the successful group two patients had a previous history of hyperemesis gravidarum. One had had a therapeutic termination for hyperemesis at the second month in 1950, and, during her second pregnancy in 1951, treatment in hospital for 14 weeks from the sixth week had been necessary. During the present pregnancy promethazine hydrochloride had already been tried; buclizine hydrochloride was started at the ninth week and continued until the seventeenth week, but at no time was admission indicated. The dosage at first was 25 mg. t.d.s. and 50 mg. nocte, but eventually it was found that 50 mg. on waking in the morning and 25 mg. at midday gave the desired result.

The other patient had been admitted during her first pregnancy at the sixth, twenty-second, and twenty-sixth weeks for hyperemesis. During the present pregnancy a buclizine hydrochloride was started at the eighth week on a dosage of 50 mg. nocte and 25 mg. mane. Treatment was continued for three months, during which time she vomited on only four occasions. After the first week it was found that 50 mg. nocte was sufficient.

In six patients who had received treatment for seven to ten days, vomiting recurred at the end of the course. In five this was controlled as soon as treatment was restarted; in the sixth, a patient at the eighth week of pregnancy, vomiting ceased spontaneously after three days, no further treatment being required.

Comment

In drawing any conclusion from a survey into the value of a drug for vomiting of pregnancy it is essential to remember that the aetiology of this condition is not understood and is probably multiple. It is well known that many patients suffering from vomiting will improve after reassurance, and may improve on inert therapy.

All the patients in this survey were given their tablets direct from the hospitals concerned. In most cases it proved impossible to keep from them the fact that the medicine prescribed was not in general use, as normally patients are referred to their own doctors for drugs.

Even after taking into account the possible improvement resulting from "suggestion therapy," the high percentage of patients benefiting would appear to indicate a good thera-

peutic response to buclizine hydrochloride. Many of these patients had previously been treated with other drugs, including antihistamines.

The only adverse factors were drowsiness, when 50 mg. nocte and 25 mg. t.d.s. were prescribed for out-patients, and the incidence of violent vomiting in two patients mentioned.

Summary

The results of a clinical trial into the value of buclizine hydrochloride ("vibazine") for excessive vomiting of pregnancy are analysed.

Thirty-six patients out of 1,267 attending antenatal clinics were treated.

The results showed that 53% of the patients were completely relieved, 14% were much improved, 19% were improved, 5.5% were the same, and 8.5% were worse.

I wish to thank Mr. John Buttery for allowing me to include patients under his care and Messrs. Pfizer Ltd., Folkestone, Kent, for making this clinical trial possible by their generous supply of vibazine.

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BAD GASTRECTOMIES

BY

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The first gastrectomy for ulcer was performed in 1881, by Rydygier in Poland. The main modifications of the operation were worked out in Europe in the nineteenth century and appeared in the European textbooks in 1900. The modification which I use to-day was described by Krönlein, of Zürich, in 1885. In those early days, before the placement of stoma and loops was well understood, various forms of obstruction were encountered. To deal with these Braun, of Königsberg, described in 1892 an anastomosis between afferent and efferent limbs, which now bears his name. Kappeler, of Münsterlingen, in 1898 described an improvement, a "suspension method" designed to prevent rather than to cure, in which the afferent limb of the loop is fixed above the stoma in such manner that kinking is prevented and the stomach empties its contents into the efferent limb. The stitches used for this suspension are now called after Kappeler.

A Keen Rivalry

By the end of the nineteenth century operative techniques had been established, and then began a critical long-term evaluation of end-results which covered the first two decades of the century. In 1906, at a surgical congress in Berlin, Rydygier showed in good digestive health, and 25 years after operation, the first patient ever to have had gastrectomy for ulcer. A keen and critical rivalry sprang up between the great European schools of gastric surgery, most of them directed by pupils of Billroth. Wedge resections, sleeve resections, gastro-enterostomy, pylorotomy, and extended resection battled for the mastery. By 1920 the advocates of extensive gastrectomy, led by Finsterer, Eiselsberg, and Haberer, had won the day, and this operation.

because of its excellent late results, was accepted as the operation of choice for intractable ulcer, whether gastric or duodenal.

But surgeons in Britain and America questioned it. C. H. Mayo expressed the opinion that "if a surgeon threatened me with a partial gastrectomy for a small duodenal ulcer he would have to run faster than I can." Judd and Nagel, of the Mayo Clinic, in 1926, devised their excision of duodenal ulcer with modified pyloroplasty. Rose and Carless, in 1927, advocated gastro-enterostomy, with excision of gastric ulcers and inversion of duodenal ulcers. Clare in 1923 advocated gastro-myotomy; Braithwaite in 1926 gastro-cholecystostomy. For penetrating ulcers Carson and also Roberts, in 1927, advocated jejunostomy, and Moynihan devised a combination of gastro-enterostomy with jejunostomy, although he used gastro-cholecystostomy in some patients. During this period gastrectomy was tried, at least in those ulcers which were not penetrating the liver or pancreas. But, in general, the mortality was high. Thus *St. Bartholomew's Hospital Reports* (Vol. 69) revealed a primary mortality, from 1919 to 1931, of 16.9% in partial gastrectomy for peptic ulcer.

In 1926 Finsterer attended the annual meeting of the B.M.A. in Nottingham and advocated gastrectomy for ulcer. Unfortunately, he also attempted to demonstrate his highly specialized techniques torn from the proper setting in which they had been elaborated, and met with failure, as have others in like circumstances. In 1928 he added a personal appeal to Hurst on behalf of this operation. He reported that gastrectomy could be done even for the so-called inoperable ulcers penetrating liver and pancreas (if the viscera were separated and the base of the ulcer left behind), and that, even including these, since 1919 he was able to achieve a mortality of 2.6% in 532 patients (4% in the 175 gastric cases and 2% in the 357 duodenal cases), 87 of them between 60 and 78 years of age. In support he quoted Eiselsberg's mortality of 3% in 449 patients. These two surgeons were indeed worthy disciples of their great master, Billroth. But Finsterer met with a cold reception. Hurst (1929) wrote of gastrectomy for duodenal ulcer that "the operation is so formidable, and the mortality is likely to be so high, that it is very improbable that it will ever gain wide popularity." Moynihan (1928) was even more emphatic, and wrote that gastrectomy for duodenal ulcer "is dangerous even in the hands of its warmest advocates; a mortality of 5 to 10 per cent. [sic] is, in my judgement, prohibitive . . . there is certainly not a great degree of freedom from the only serious sequel, gastro-jejunal ulcer. My own unequivocal and most confident opinion is opposed to it. It is one more evidence of the familiar Teutonic capacity for finding a difficult way of doing easy things. I regret that the wise and cautious judgement, the sanity of outlook, and care for the individual patient, which hitherto have always characterized British surgery, have not rendered all our surgeons immune from rash and most intemperate persuasions by Continental and transatlantic operators." Lewison was probably one of the "transatlantic operators." Moynihan, in quoting mortalities, ignored the masters and went instead to Louria, an American visitor to Haberer's clinic in Graz. Haberer's mortality was high, because he attempted total resection of the difficult ulcers, even those penetrating liver and pancreas. Meantime Finsterer had avoided such dangerous steps, by the method of resection-with-exclusion for duodenal ulcers, and of peeling the stomach off the base of the ulcer in gastric cases—methods which still have their place to-day.

By the way, there is no justification for calling the first of these methods "Bancroft's operation." Finsterer (1918) first described it, including the excision of "as much as possible of the [antral] mucosa." Later he taught that, even without this, the acid could be sufficiently reduced if enough stomach were resected towards the cardiac end. Neglect of the masters has, as we shall see, wrought much harm to gastric surgery. It is of interest to speculate about the number of stomal ulcers caused by overlooking this particular point.

The Treatment of Choice for Ulcer

But time and a critical testing of results justified the Viennese surgeons. After a delay of about 25 years, gastrectomy became at last established in Britain as the operation of choice for ulcer, thanks to the superiority of its results and to the efforts of younger surgeons, such as Ogilvie. At the same time, in the U.S.A., the younger surgeons at the Mayo Clinic were able to dispel the doubts of its great founder and to report that the late results were excellent in 95% of cases (Deller, 1948). Meantime Moynihan can be taken as representative of the transition period. In spite of his condemnation of gastrectomy for duodenal ulcer he described it as an "almost flawless operation" for gastric ulcer (1926), and later he reported (1930) that he had "yet to meet a case in which the ultimate result was disappointing, and secondary operations are almost unknown."

Such was the position when my own series began in 1937. At that time I felt that the long-term follow-up could only prove what was already well known—namely, the excellence of the end-results. But the position changed. When gastrectomy became accepted as the treatment of choice for intractable ulcer, it was widely taken up by general surgeons, irrespective of their training and special interests, of their knowledge of gastric pathology and surgery, and of their sympathy with the complex related problems of technical and psychological reconstruction. In this way the development of gastric surgery has suffered, in comparison with cerebral, pulmonary, and cardiac surgery. These have enjoyed the benefits of a proper specialism, including a proper and rigorous training for their practitioners, who undertake the work only in response to a special vocation. A veritable rash of reports of small series appeared in the literature. Immediate mortalities of 8%, 10%, and 15% were not uncommon. Surgeons went ahead without effective tuition and without a proper understanding of the operation. The more gifted of them, by a method of trial and error, succeeded in detecting and eliminating their worst faults, finally achieving good results. Thus Hedley Visick (1948) had a mortality of 12% in his first 75 patients and of 3.3% in his last 480 patients, his overall mortality being 4.5%. There were no deaths in his last 123 cases, and there can be little doubt that in these he treated the efferent loop more circumspectly than in those patients who suffered from his "question-mark deformity." His figures exclude emergency operations, and in only one-third of his patients had the ulcer penetrated all coats of the viscus.

But what about the survivors? Soon the end-results came under scrutiny. Widespread dissatisfaction was manifested, for it was evident that a new disease was coming into being. The results of the great masters were not being duplicated.

Two Schools of Thought

So to-day, once again, we find gastrectomy flanked by two schools of thought: on the one hand the supporters of the operation, who get good results and would retain it; on the other its critics, who would supplant it because their results are bad.

Porritt (1952) writes: "95% of patients who have a gastrectomy are satisfied." This corresponds with the experience reported many years ago by Finsterer, who found "symptoms of the small stomach" in 7% of patients, and these usually avoidable by taking frequent small feeds. Ogilvie (1925) wrote: "I have spoken of gastrectomy as a uniformly successful operation. I have found it so. My friends have found it so. Their patients and mine are a happy crowd and are never tired of saying so. The unhappy ones are equally vocal, but they are so rare that they hardly cloud the picture." "Recurrent ulceration at the stoma . . . I have seen no instances" (except when the antrum and its mucosa were mistakenly left). Tanner (1951) finds partial gastrectomy "100% successful for gastric ulcer and 97-98% for duodenal ulcer." Hollenbach (1950) in his last 1,148 cases found the end-results to be good in 90%; there

were no recurrences, but 39 patients had gastro-jejunitis, necessitating second resection in 4, and a few complained of palpitations and heat relieved by lying down for 20 minutes. According to Maingot (1955) the final results "leave little to be desired." Barclay and McIntyre (1954) find that post-gastrectomy complaints are rare.

My own experience after 280 gastrectomies for ulcer (Kinsella, 1955) is that the results, twelve months and later, when the operation had been properly performed, are uniformly successful. A few patients still complain of bile vomiting, sometimes with headaches; a few others had occasional bouts of vomiting small amounts of clear or food-stained slimy fluid, sometimes in the early morning when cleaning their teeth or following coughing; a few others were intolerant of certain foods. In all these cases the records revealed that the same symptoms were present before operation. It must be strongly stressed that a post-gastrectomy follow-up, perhaps delegated to a registrar, is of little value unless correlated with a carefully and fully recorded pre-operative history, aimed particularly at the analysis of gastric symptoms. It should be remembered that when an appendix is removed for pain in the right iliac region, and when the pain persists after operation, the patient always dates the pain from the operation. Partial gastrectomy cannot cure a migraine or gastro-duodenal-jejunitis or food allergies. But nevertheless patients are delighted that their pain has gone, that meals and sleep can now be enjoyed, and that work, interrupted for years, can now be resumed.

But, as mentioned already, there are other clinics in which the late results have been bad; in some so bad that the operation, in spite of its substantial background, is given up and patients are subjected to new and untried methods. Thus Gilbert and Dunlop (1947) found 5 patients in 45 so disabled after gastrectomy that they were totally unfit for employment. Grayton-Brown and Wood (1955) found that 20% of their patients suffer from "considerable disability . . . daily attacks of nausea followed by vomiting of bile . . . accompanied by considerable loss of weight and lack of energy." Such reports could easily be multiplied.

Causes of Bad Results

An analysis of the literature thus reveals a dichotomy of opinion about late results. It would be of still more value if the search could throw light upon the cause of the bad results, so that they may be avoided. Barclay and McIntyre (loc. cit.) suggested that bad results are frequent in England because of the faulty nutrition of the people. But this is unlikely, for the people are not so badly nourished; some English surgeons get good results and some Australasians bad ones. Ogilvie (loc. cit.) has "come to believe that the bad results of gastrectomy are the results of bad gastrectomy." The high primary mortalities often reported support this conclusion. But does the literature throw any light upon the details at fault? I believe that it does, thus providing further evidence for the truth of Ogilvie's opinion. I have already mentioned the efferent-loop obstruction, or "question-mark deformity," recognized and pointed out by Visick himself. But there are many other examples in textbooks and journals.

Among the textbooks we may select *Abdominal Operations*, by R. Maingot, published in 1955. He describes two modifications of the Billroth II operation: with full-width and with part-width stoma. The description of the first type is defective in that the principle of Kappeler has been ignored, thus ensuring at least partial obstruction of the afferent jejunal loop at the point where it meets the lesser curvature of the stomach. This obstructive kink is clearly seen in Fig. 15-25 showing the completed operation. It is the main cause of the so-called "dumping syndrome." (Maingot secures good results in his personal series because he, like Ogilvie, uses the second method, not the first. In the second method the principles of Kappeler have already been incorporated by Hofmeister and Finsterer. But, as we

shall see later, it is even possible to misuse this second type of anastomosis.) This criticism of the latest and best British textbook applies *a fortiori* to the others.

Likewise Custer, Butt, and Waugh (1946) found that "dumping" followed the full-width stoma, but was only mild and transient with the half-width stoma. They recognized that the jejunum is the source of the symptoms, but express themselves as puzzled by the fact that all the patients show rapid emptying of the stomach into the efferent loop but only a few experience dumping. They have forgotten the more important afferent loop.

Mimpriss and Birt (1948), in a series of 130 patients, lost one from an obstructive kink at the lesser curvature and saved two others by immediate re-operation; a fourth was relieved of dumping by late re-operation. They then refer to the method which would have prevented these complications and attribute it to Maingot, writing in 1948. It is the suspension method described by Kappeler just 50 years previously.

Capper and Butler (1951) report a 12% incidence of early "dumping," and give an excellent description of it, showing, in their own patients, the obstructive kink of the afferent loop at the lesser curvature, the dilated and hypertrophied bowel proximal to this, the symptomatic relief due to temporary release of the obstruction when lying down, and the associated discharge into the stomach of large quantities of bile, which may or may not be vomited. They then cause their patients discomfort by introducing mercury into the stomach, and argue from this that the normal mechanism of dumping is the drag upon the stomach remnant by the heavy jejunal loop. This conclusion is quite invalid, because the specific gravities of mercury and of jejunal loops are quite different. A heavier jejunal loop, floating in the fluid contents of the abdomen, would not drag if its greater weight were compensated by a greater volume. Moreover, "dumping" occurs after total gastrectomy. The jejunal loop causes the symptoms, not because it is a heavy loop dragging on the stomach, but because it is an obstructed loop; and if it is obstructed it causes the symptoms whether the stomach is there or not. The obstruction is the essence of the matter. The loop is heavy because it is obstructed, not obstructed because it is heavy; and the obstruction, not the heaviness, causes the symptoms. However, they hit upon a happy solution: they design an operation to suspend the heavy loop, and incidentally they undo the obstruction. In fact they have, 53 years later, rediscovered Kappeler's suspension method.

Goligher and Riley (1952) find that 75% of their patients suffer from dumping, 12.5% severely. They recognize that distension of the jejunal loop is the cause. They conclude that the efferent limb of the loop is responsible, because "dumping" appears even when there is no reflux into the afferent limb. Custer *et al.* forgot the afferent limb altogether. Goligher and Riley have not forgotten it, but they have forgotten that it can be distended through obstruction as well as through reflux. Their skiagrams show barium passing back into the afferent limb of the loop and stopping sharply at the point of obstruction, unable to trickle down towards the duodeno-jejunal flexure. Other skiagrams show bulging of the jejunum opposite the stoma, suggesting partial obstruction of both afferent and efferent limbs. It is evidently possible to obstruct the afferent limb even when using the Hofmeister-Finsterer method.

Schofield and Anderson (1953) report that "a new disease is being created," and give some inkling of the method of creation. They describe their operation as an "antecolic Polya-gastrectomy with a Hofmeister valve." Actually the Polva operation is retrocolic with no valve, and the Hofmeister is also retrocolic. Although they include only the early post-gastrectomy syndrome, they find a "large proportion" of bad results. In their series (number of cases unspecified) they find seven patients with such severe "dumping" that re-operation is required for afferent-loop obstruction. They perform an anastomosis between the afferent and efferent limbs of the jejunal loop and call this "the

procedure of Illingworth (quoted by Muir, 1949)." As we have seen, it was devised by Braun in 1892. It was useful in the early teething stages of gastrectomy, but nowadays it should no longer be necessary. The "new disease" of Schofield and Anderson was understood, treated, and prevented in the nineteenth century; forgotten, and then recreated. But it has not yet been recognized by the twentieth-century surgeon as very largely the product of his own technical failure; instead he has ascribed the fault to the operation itself.

Wells and McPhee (1954) introduce their article with the remark that "very little is known about the late results of the operation ten or more years after surgery." This is astonishing, in view of the history of the operation as briefly outlined at the beginning of the present article. (I have myself seen a patient who was quite symptom-free, so far as his stomach was concerned, after partial gastrectomy by Lorenz of Vienna forty years ago.) The authors go on to describe 24 cases treated by "high gastric resection with an antecolic Polya operation, and Finsterer-Lake valved anastomosis." They state that "such cases are quite representative of the modern technique." At least the terminology is representative of modern confusion. The operation described by Polya was retrocolic with a full-width stoma, and the Hofmeister-Finsterer ("Finsterer-Lake" so-called) is retrocolic with a valved anastomosis. The authors go on to report their five patients with recurrent ulcers out of 25 treated by a "limited Polya" operation; and their six patients with recurrent ulcers out of 11 treated by a "limited Billroth I." That the limited operation is followed by frequent recurrence was stressed by Finsterer and others in the first two decades of this century.

Placement of the Jejunal Loop

The jejunal loop, in full-width stoma operations, should pass in a slight, even curve from the duodeno-jejunal flexure to a point on the lesser curvature immediately below the oesophagus, about 2 cm. above the stoma, where it is fixed by Kappeler stitches. These should fix the anterior and posterior surfaces of the jejunum to the corresponding surfaces of the stomach, so that, as the jejunum descends, it lies in the same plane as the gastric surfaces. This is necessary to avoid minor obstruction by kinking or torsion of the afferent limb of the loop, as, for example, if the apex of the loop were fixed to the anterior surface of the stomach. Moreover, if this loop is too long it may kink; if it is too short the tension will result in the gradual cutting out of the suspension sutures, if nothing worse. From this point above the stoma, which should be the summit of an even curve, the jejunum should continue in the same straight line, downwards and to the left, past the stoma and into the efferent loop. This is the normal anatomical direction of the first loop, as can be seen in pre-operative skiagrams, and it should be maintained whether in gastrectomy or in gastro-enterostomy. Disregard for this direction will result in minor obstructions, as in the series reported by Holt and Robinson (1955). So also will rotation at the stoma, produced, for example, by an oblique incision into the jejunum. Finally it is desirable to place the omentum so that the limbs of the loop cannot adhere either to each other or to the incision in the abdominal wall.

Before the Kappeler stitches are inserted the slight kink in the afferent loop may be seen. If the stitches are properly inserted they do not merely result in displacing this kink to a higher level, but they convert it into an even curve.

Substitute Operations and Basic Pathology

There are many ways of doing each of the many steps in gastrectomy, and the number of possible combinations of these is very large indeed, but only a few of these will give consistently good results. Those clinics in which the results of gastrectomy are bad are faced with the necessity either of eliminating the detailed steps which have contributed to their bad results or else of inventing a new approach. New approaches may be divided into two groups.

In the first group are operations of increased difficulty and magnitude, in which a separated loop of jejunum or colon is used to replace the stomach. The most fantastic of these comes from Japan (Tomoda, 1952); it is for use after total gastrectomy. It includes five anastomoses, two of which are fashioned so as partially to obstruct the new "stomach," a jejunal loop, which therefore gradually distends, and can be triumphantly shown in the skiagrams as large as the original stomach. The natural aim of treatment is thus reversed and function is made to await upon form. The words of Moynihan applied to gastro-enterostomy 30 years ago may well apply to gastrectomy to-day. "In this operation, as in all others, the keynote of success is simplicity. The great variety of suggestions as to 'new methods,' many of them uncouth, shows beyond doubt that the principles underlying the operation have not been adequately appreciated" (1926). These operations violate the principle that, in a given operation, increased difficulty and complexity lead to increased mortality and morbidity.

In the second group an effort is made to conserve much, or even all, of the stomach. A gastro-enterostomy or a pyloroplasty is done. To prevent the grave hazard of recurrent ulcer surgeons may do nothing (for example, Wells and McPhee), or add vagotomy, or the worse than doubtful hazard of radiotherapy. Holt and Robinson (1955) describe their gastro-enterostomy as horizontal and isoperistaltic, which means that the first loop of the jejunum is displaced from its normal downwards and outwards course, so that difficulty in emptying results, and 19 of their 110 patients suffer from the vomiting of bile. These authors remark that "not the least" advantage of their method is that it can be used by surgeons of limited experience. It appears that the sufferer from peptic ulcer is to be denied the advantage of specialism which is given to those who suffer from disease of the urinary tract, of the bones and joints, of the thoracic organs, or of the brain.

But even more important than the technical defects in these methods is the fact that they have been-fashioned in disregard of basic pathology. Their authors consider only the acid-peptic factor. But this is not the basic factor, for ulcer is found in the less acid parts, and even when there is no acid. The basic cause is an organ defect, or, more properly, a defect in part of an organ. "Organ" must, of course, be taken to include not only the local tissues but also their vascular and nervous connexions. The exact nature of this defect is unknown, but it is known that chronic gastritis is in some way associated with it. The results of Aylett's operation will therefore be bad. As for radiotherapy, there is little hope that it will prevent ulcer in the ulcer-prone areas, for it does no more than temporarily substitute gastro-duodenitis for acid, one ulcer factor for another.

Already the harvest of recurrences is beginning. In Melbourne, even after 12-18 months, Grayton-Brown and Wood (1955) report 4 recurrences in 79 patients. In Liverpool, Bennett-Jones and O'Domhnaill (1955), after a short follow-up, found 11 patients with symptoms of recurrent ulceration, 7 of these needing re-operation, out of 95 patients who had had gastro-enterostomy with vagotomy. All the reports now coming to hand show not only a high recurrence rate, but also an excessive incidence of other complications, following the use of this method. A similar crop of recurrences and hour-glass deformities is, for the reasons given above, likely to follow the sleeve resections now being advocated by Grayton-Brown (1955) for high gastric ulcers. This operation was tried by Riedl in 1904 and by Payr in 1909, and soon given up.

The basic soundness of partial gastrectomy lies in its removal of the ulcer-prone part of the organ. And this is indeed the best that can be done, until we learn the cause and prevention of the disease or until medicine can effect a cure. But partial gastrectomy is a precision operation and more than an anatomical exercise. It differs from most other major operations in the extent and delicacy of the

reconstruction which must follow the ablation, and which demands of the surgeon a special sympathy with the object of his work.

Chronic Gastritis and End-results

Although this article deals with technique and end-results, reference should be made to chronic gastritis, because it has this in common with the technical niceties, that end-results are jeopardized by neglecting its importance.

In patients with ulcer the symptoms come from (1) the ulcer; (2) the diffuse gastro-duodenitis which so often accompanies ulcer, especially gastric, and sometimes simulates it; and (3) the mind of the patient. Many physicians and surgeons have failed to understand the fundamental importance of chronic gastro-duodenitis in diseases of the stomach and duodenum. This failure is due to the fact that they have relied upon the naked eye, either direct or through the gastroscope, for the diagnosis, not realizing that the disease is essentially microscopical. The disease may ruin the health or take the life of the patient and still remain imperceptible to the naked eye. These clinicians have falsely argued that the changes indicating chronic gastritis (the excessive cellular infiltration, with deformity and destruction of the epithelial and glandular elements) may be present without symptoms and are therefore without significance. The same argument could be applied to carcinoma in many organs, to ulcer, to gall-stones, and to chronic nephritis. Such a defective comprehension of gastric diseases leads in some cases to faulty selection, and in others to post-operative disappointment, because the symptoms due to diffuse chronic gastro-duodenitis may not disappear after operation.

Summary

There are two schools of opinion in regard to the late results of partial gastrectomy for peptic ulcer. The history and recent literature are briefly surveyed in an effort to explain this divergence. This survey confirms the opinion of Ogilvie that "the bad results of gastrectomy are the results of bad gastrectomy."

The commonest fault in technique is an improper placement of the afferent loop. This results in the so-called "dumping syndrome." The proper placement of the loop is described.

Substitute operations aimed at conserving ulcer-prone tissue are based upon an inadequate conception of the pathology of ulcer and will result in an excessive crop of recurrences and other complications. Substitute operations which include replacement of stomach by isolated loops of bowel are unnecessary and should therefore be abandoned.

In gastric surgery bad results and confusion reign to-day because insufficient attention has been paid to the old masters who fashioned the operation.

Gastric surgery should be left to those surgeons who have received a special training over and above that required for the general surgeon. Gastrectomy involves a more extensive and delicate reconstruction than that required in most major operations, and for this a special sympathy is required.

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PERONEAL MUSCULAR ATROPHY WITH MENTAL DEFECT AND MYOPATHY IN SIBLINGS

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Peroneal muscular atrophy is characterized by the gradual onset and slow advance of atrophic weakness in certain groups of muscles. The disease begins in adolescence. According to Bell (1935) the mean age at onset is 10.93 years where neither parent is affected, but 18.95 years where one parent is affected. Atrophy of the peroneal and anterior tibial groups, with bilateral foot-drop, is an early finding in the disease. Progressive wasting spreads gradually, to involve the muscles of foot and leg, terminating at the knee or in some cases at the lower third of the thigh and producing the "inverted champagne-bottle" leg. Involvement of hands and forearms occurs some time after the onset of the disease in the legs, and here also can be seen a slow spread up to the elbows. Reflexes are generally diminished or absent following the atrophic weakness of muscles. Sensory changes include impairment of vibration sense, with often some diminution of postural and tactile sensibility. Mental defect is a frequent accompaniment, the grade of defect varying from moron to imbecile.

The disease is most commonly dominant in its transmission and only occasional instances have been described of its transmission by an unaffected carrier. In some cases a recessive mode of inheritance has been suggested, although Pratt (1953) has pointed out that the absence of disease in either parent may be due to low penetrance.

In the family under review three out of five siblings are affected with a progressive muscular atrophy beginning in the feet and legs and associated with a marked degree of mental defect. In order of birth the defective members are the first, second, and fourth. The third and fifth members are regarded as normal physically and mentally. At school the affected offspring were unable to progress beyond the lowest grades, 2, 3, and 4 respectively. On removal from school they were incapable of gainful employment and were kept at home until the burden became too great for the surviving parent. Both the remaining siblings, with no physical abnormality, satisfactorily completed their school grades and were gainfully employed as stenographers until marriage.

The family history, which has been extremely difficult to obtain and is admittedly incomplete, provides no

apparent evidence of similar mental or physical disability in parents or grandparents. The parents were not blood relations. The father died at the age of 67 from chronic nephritis, whilst the mother at the age of 66 was described as alert physically and mentally. Paternal and maternal grandfathers died at 57 and 84 respectively after apparently healthy lives. Paternal and maternal grandmothers, on the other hand, died at the early ages of 25 and 24 respectively, and no accurate information is available of their state. The possibility cannot be excluded that one or other may have carried the disease in a mild initial phase, and that low penetrance in their offspring may have accounted for absence of the malady in a parent of the affected siblings. An examination was carried out on two of the affected siblings.

Case 1

The patient, a man aged 39, showed no obvious physical abnormality until the age of 7 years, when awkwardness in walking was noticed. Schooling began at 6; and at 15, not having advanced beyond grade 4, he was removed from school as incapable of further progress. At home his combination of mental retardation and slowly increasing physical disability prevented him from obtaining work; his only activity was acting as a voluntary organblower in his church. On admission to the Manitoba School in 1945 the abnormalities found were wasting of the feet, claw-toes, pes cavus, and a noticeable slenderness of the limbs, together with an extensor plantar response on the right side. His I.Q. on the revised Stanford-Binet scale was 46. A year after admission it was recorded that his physical health was good and that he was working well in the laundry.

On present examination it became clear that considerable extension of the disease had occurred. There was drop-foot with inversion on both sides, and the feet were fixed in a position of pes equinovarus and pes cavus. The toes were fixed in a position of extension at the metatarso-phalangeal joint and flexion at the interphalangeal joints, giving the claw-toe appearance. Atrophy of the small muscles of the feet was accompanied by destruction of muscle tissue up to the knee, involving all compartments of the leg and producing the "rooster" leg. In spite of loss of movement at the ankle-joint the patient could move around fairly well with a steppage gait. In the upper extremities the hands were extensively involved, with pronounced wasting of the thenar, hypothenar, and interosseous muscles. Abduction and adduction of the fingers were virtually impossible, opposition of the little finger was lost, and opposition, abduction, and adduction of the thumb were grossly impaired.

Movements at the wrist-joint were weak and reduced in range, as were pronation and supination. In addition, the pectoralis major on both sides was the seat of extensive atrophy involving the sterno-costal portions. The face had also become involved. It was expressionless, with smoothed-out wrinkles and slightly open mouth. The patient could not blow out his cheeks properly or purse his lips for whistling, and his transverse smile showed weakness of the zygomatics. Closure of the eyes was weak, closure of each eye separately was impossible, and raising of the eyebrows was impaired. Apart from facial involvement the only other abnormality in the field of the cranial nerves was a bilateral nystagmus on lateral gaze. There was no ataxia. With the exception of the ankle-jerk deep reflexes were present; abdominal and cremasteric reflexes were present but no plantar response could be elicited. Sensation showed only slight loss over feet and legs, mainly impairment of vibration and delayed recognition of passive movement. Sphincters were unaffected. Vasomotor disturbance was apparent in the coldness and cyanosis of the right hand, brought on by exposure to cold. The x-ray report indicated osteoporosis and claw-feet. The E.E.G. was reported to be within normal limits.

Case 2

This sister, now aged 44, of the patient in Case 1 was not thought abnormal in any way until she went to school at the age of 6. She proved unable to make any progress with school work and never got beyond the second grade. Physical involvement apparently developed later, its onset probably so insidious that the relatives failed to observe difficulty in walking until not long before her admission to the Manitoba School in 1946. On admission it was noticed that her gait was unusual, and examination showed that the toes did not fully extend, the ankle-jerks could not be elicited, although the knee-jerk and other tendon reflexes were brisk, and the plantar response was doubtful enough to give rise to suspicion of upper motor neurone damage. After admission the patient was found capable of simple routine employment. Her intelligence quotient, estimated on the revised Stanford-Binet scale, was 34.

On present examination the disease process was found to have made considerable extension. Drop-foot, inversion, and pes cavus were present on both sides. Movement of the toes was practically impossible, apart from the left great toe, slight extension of which was possible at the metatarso-phalangeal joint. Slight movement was still possible at the ankle-joint. The gait was of steppage type. Wasting of the small muscles of the feet was accompanied by a generalized atrophy of leg muscles, not so marked as in her brother, and by atrophy of thigh muscles extending up to the lower third of the limb. In the upper extremities the hands were extensively involved. There was pronounced wasting of the interosseous, thenar, and hypothenar muscles, with loss of abduction and adduction in the fingers and thumbs. Movements at the wrist-joints were weak and diminished in range, and pronation-supination was impaired. Paresis was evident in the face, but was less advanced than in her brother's case.

Movements of the orbicularis oculi were weak: the patient was unable to close her eyes tightly or to shut them separately. Similar weakness was present in the region of the mouth. She could not blow out her cheeks, whistling was impossible, and involvement of the zygomatics had produced a transverse myopathic smile. Apart from the facial, none of the other cranial nerves showed obvious abnormality. Precision of movement was impaired owing to weak paretic muscles, but otherwise no ataxia was present. In the sphere of reflexes ankle-jerks were absent, knee, biceps, triceps, and radial jerks were exaggerated, and abdominal reflexes were barely elicitable. The right plantar response was absent, but on the left side, where movement of the great toe was still possible, the response was unmistakably extensor. With regard to sensation the patient complained of a feeling of pins-and-needles in the legs. Vibration was impaired over hands and feet, and minor degrees of passive movement could not be appreciated in the affected digits. Vasomotor changes were apparent in the frequent coldness and cyanosis of extremities, whilst callosities under the great toes were the possible forerunners of trophic sores. The x-ray report indicated osteoporosis with claw-feet. The E.E.G. showed extensive abnormality with paroxysmal characteristics, the pattern consistent with the presence of widespread organic brain damage.

Case 3

It was not possible to examine this sibling, and repeated attempts to trace him through his normal sisters have been unsuccessful. He was the eldest, and if still alive, which is doubtful, would now be 47 years of age. It is recorded of him that he could not learn at school and that he was troubled with his feet and legs in the same way as his brother and sister. When last heard of he had been admitted to an institution as a case of creeping paralysis.

Discussion

The patients examined had peroneal muscular atrophy, with typical involvement of both upper and lower extremities and the mild sensory loss characteristic of the disease. In

both cases, and in the third sibling, whose description accords with the disease, mental defect of imbecile or low moron grade was an accompaniment. This was in striking contrast to the mental state of the physically normal members of the family. In Case 2 mental defect was noted, moreover, some considerable time before physical signs became apparent.

Additional features were present. In Case 1 there was extensive bilateral atrophy of the costo-sternal portion of the pectoralis major. Wasting of this muscle in peroneal muscular atrophy has been mentioned by Brain (1947). Both patients showed involvement of the face. This is not a common accompaniment, but its occasional presence has been remarked on by Kinnier Wilson (1940). The same authority records the incidental occurrence of nystagmus and epilepsy. In both cases earlier examination indicated abnormal plantar responses. With increasing atrophy of muscles, however, it is now only possible to elicit an extensor response unilaterally in one member. In this connexion Perkoff and Tyler (1953) have noted that certain pedigrees are characterized by spasticity and increased tendon reflexes, evidence of spinal cord lesions involving the pyramidal tracts. Ford (1952) has also recorded the occurrence of hereditary spastic paraplegia with peroneal muscular atrophy.

In the differential diagnosis various rare syndromes have to be considered. A similar distribution of atrophy occurs in familial hypertrophic polyneuritis, Gower's distal myopathy, and in the syndrome described by Roussy and Levy (1926). The lack of palpable thickening of the peripheral nerve trunks, the absence of ataxia, and the presence of such myopathic features as atrophy of the sterno-costal portion of pectoralis major and involvement of the facial musculature would appear to contraindicate familial hypertrophic polyneuritis. Sensory and reflex anomalies are sufficient to exclude Gower's distal myopathy, whilst the absence of cerebellar ataxia is against a diagnosis of the equally rare hereditary ataxia with muscular atrophy of Roussy and Levy.

Summary

Three out of five siblings have been recorded as having a progressive muscular wasting beginning in the feet and associated with marked mental defect. In the two cases examined the pattern was characteristic of peroneal muscular atrophy, with some additional features only occasionally described in the disease.

I am indebted to Dr. H. S. Atkinson, medical superintendent of the Manitoba School, for permission to make use of the institutional facilities.

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A move is being made to establish a national body to co-ordinate the work of societies concerned with the welfare of deaf children. A resolution to this end was passed unanimously at a recent conference in London of the Deaf Children's Society and other organizations working in this field. Delegates at the conference represented the Scottish Association of the Deaf (Edinburgh and Glasgow branches), the North Western Deaf Children's Association, the South Wales Parents' Association for Parents of Deaf Children, the Oxford and Districts' Association for Parents of Deaf Children, and the Herefordshire and Worcestershire Association for Parents of Deaf Children. A preliminary committee was formed to draw up a constitution and was given full terms of reference to deal with the setting up of the national body.

AN ALTERNATIVE APPROACH TO THE PROSTATE

PRELIMINARY REPORT

BY

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Since the introduction in 1945 of the retropubic operation for prostatectomy by Millin (1947) many surgeons have come to regard it as the standard procedure. That it had certain drawbacks, however, was shown by the continued use of the suprapubic and other routes by others. These various operations were well discussed by Winsbury-White (1948) and by J. Cosbie Ross (1954).

The two other most favoured alternatives to these operations are the perineal and per-urethral routes, each with its own complications and presenting difficulties of execution to any except the most expert.

It was found that the principal drawback to the retropubic operation was the difficulty in closing the capsule after removing the gland; this was not obviated when using a vertical incision into the prostatic capsule, as when it was opened the tension retracting the side of this incision caused the lower end of it to split down further and made it very difficult to close. Another drawback was the difficulty of seeing the ureters easily. The Wells operation was found to be much more satisfactory and simple to perform, except when securing haemostasis, when it was impossible to guarantee a good view of the prostatic bed; on the other hand, the ureters were easily seen and it was possible to inspect the interior of the bladder without the necessity of using a cystoscope beforehand.

Bearing this in mind, the procedure described below was adopted; this gives all the advantages of the Wells operation and also allows the same excellent view of the prostatic bed as is obtained in the Millin operation. Closure is easy, since the incision is a vertical one and can be closed with an ordinary needle-holder and half-circle needle; also, as is shown below, there is no tension that is likely to cause a split downwards at the bottom of the incision. Haemostasis is easier by this route than by any other tried.

Operative Procedure

Preparation for the operation is the same as that normally followed for prostatectomy. Catheterization should be kept to a minimum; therefore we do not routinely empty the bladder or cystoscope the patient. Unfortunately many of the patients were admitted with acute retention of urine, having already been catheterized several times. Intravenous pyelograms and blood chemistry estimations are carried out and arrangements for transfusion are made, although this last should not normally be necessary. Operation is carried out under general anaesthesia with the patient in the supine position; a slight Trendelenburg tilt is occasionally helpful, but not absolutely essential.

The usual skin incision is employed, preference being given to the transverse one, but there is no necessity to use this. The muscles are retracted and the peritoneum is pushed up in the normal way. Next, the bladder is freed below by swab pressure to display the puboprostatic ligament and the upper part of the gland. Then, while the bladder is gently drawn up by the pressure of a gauze swab, a thread suture is inserted to encircle the vein coming up on the front of the gland. The ligament should not be torn while this is done

or there will be troublesome bleeding. The stitch should also be deep enough to take a firm bite into the capsule of the gland; this serves to prevent the capsule splitting downwards later on and causing difficulty in its repair. This suture is left long as a guide when the wound is closed.

The bladder is picked up about 1½ in. (4 cm.) above the prostate and opened with a scalpel. Any urine inside is sucked out and the incision extended with scissors, downwards to the prostate and upwards enough to allow the introduction of a self-retaining retractor such as the Millin type. Two catgut stay sutures are inserted at the bottom of this incision on either side, passing through the muscle layers only

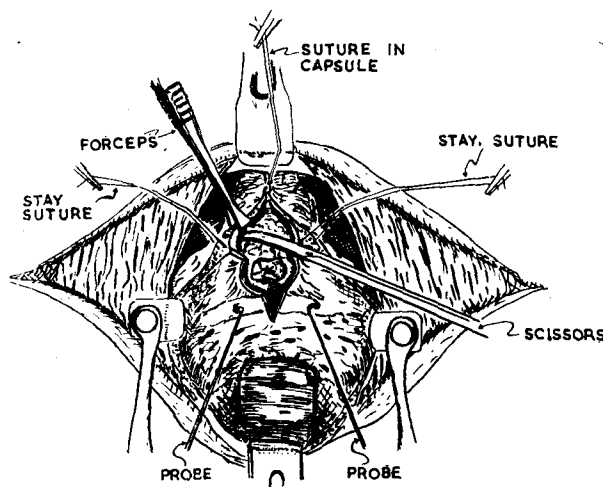


Diagram illustrating technique of the operation.

and not through the mucosa. The prostate is infiltrated with a solution of normal saline (about 20 ml., to which a few drops of adrenaline may be added with advantage). This makes separation of the adenoma easier and reduces bleeding. A small silver probe is inserted into each ureter as a guide to its position in the next stage (this is easier if the last ½ in. (1.3 cm.) of the probe is bent to a right angle). A circular incision of ½ in. (1.3 cm.) radius is then made around the internal urethral meatus, using the diathermy needle. Posteriorly a notch is cut back between the ureters. When the correct depth has been reached a plane of cleavage appears, usually at about ½ in. (0.6 cm.). At this stage the probes are removed from the ureters.

The incision is continued forwards in the midline to the bottom end of the incision in the anterior bladder wall and

over the front of the prostatic capsule between the stay sutures to within ¼ in. (0.6 cm.) of the thread suture inserted earlier (see Fig.). The adenoma is freed on all sides, using a long pair of scissors and dissecting forceps, until it is held only at its apex by the urethra; as this is being done the prostatic vessels are seen on each side and are clamped and coagulated by diathermy. The adenoma is then drawn gently up with a vulsellum and the urethra divided under direct vision. A gauze pack is inserted into the prostatic bed and left for a few minutes. It is then withdrawn and any bleeding points are coagulated. A whistle-tip catheter is passed through the urethra. The wound is closed with a continuous plain No. 1 catgut suture through the prostatic capsule and the muscular layers of the bladder only. It is started at the bottom of the incision in the prostatic capsule, and, after reaching the top, returns as a second layer invaginating the first. A few further sutures are used over these for reinforcement and the stay sutures are tied together. The cave of Retzius is drained for forty-eight hours. The wound is then closed in the usual way.

The bladder is washed out with a solution of sodium citrate before the patient is returned to the ward and a few ounces of the solution are left in the bladder for the first few hours. The bladder is subsequently washed out only if necessary, and the urethral catheter is removed in about forty-eight hours, or when the urine is clear.

In cases where long-standing distension of the bladder has made it likely to be atonic, the catheter is sometimes left in a little longer; some of these cases respond very well, however, to small oral doses of carbachol.

Illustrative Case Records

Case 8.—This patient, aged 53, first presented with clot retention of urine and a history of haematuria for seven months; he had had frequency of micturition day and night for several years and a very poor stream. He refused operation and was treated as an out-patient by his own doctor for a week by catheterization. At operation a large benign gland with a prominent middle lobe was removed, together with six bladder stones. The urine was infected with *Staphylococcus aureus*, which was sensitive to penicillin. Urine was passed on the second day without any difficulty within two hours of removal of the catheter. The infection cleared rapidly on penicillin.

Case 9.—After a partial gastrectomy for a high lesser-curve ulcer, this patient, aged 78, developed acute retention of urine on the third post-operative day. Owing to his age and the absence of previous urinary symptoms he was catheterized repeatedly, but still failed to pass urine after ten days. At operation a small adherent gland was removed.

TABLE I

Case No.	Age	History	Hb (%)	Previous Cath.	Blood Urea (mg./100 ml.)	Infection (Pre-operative)	Anti-biotics	P.U. (Days)	Wt. of Gland (g.)	Pathology
1	73	Many years' difficulty. D/N=12/4. Acute retention 1 day	82	+				3	40	Benign
2	88	Several years' frequency. Acute retention 2 days	104	+	33	+	S, A, O	4	90	"
3	84	Several years' frequency. Acute retention 2 days	78	+	48	+	S	3	—	Adenocarcinoma
4	82	1 month's frequency and difficulty. Acute retention 2 days	94	+	28	+	S	3	50	Benign
5	65	Several months' frequency. Acute retention 3 days		+		+	S, C	2	60	"
6	70	2 years' frequency. Acute retention 5 days	114	+	51			2	42	"
7	72	No frequency. Acute retention 8 days	77	+	27			5	26	"
8	53	Gross frequency. 7 months' haematuria	98	+		+	P	2	90	Benign; bladder stones present
9	78	Acute retention 3 days after partial gastrectomy	86	+	45	+		3	17	Adenocarcinoma
10	63	Cardiac failure 1 year, with pre-renal uraemia. Acute retention 2 days	50	+	265			3		Benign with calculi
11	69	Acute retention 1 day		+	41	+	S	2		Benign
12	61	Several years' frequency. Acute retention 1 day	74	—	54			4		"
13	81	Acute retention 2 days	70	+	83			2	90	"

P=Penicillin. S=Streptomycin. A=Chlortetracycline. C=Chloramphenicol. O=Oxytetracycline.

Urine was passed on the third post-operative day, within two hours of removal of the catheter. The infection of the urine (*Streptococcus faecalis*) was resistant to all antibiotics but cleared spontaneously within a few days of operation. Histology showed an adenocarcinoma of the gland.

Case 10.—This patient, aged 63, was under treatment for cardiac failure and chronic bronchitis; there was gross oedema and venous congestion, and when first seen he was uraemic, with a blood urea of 190 mg. per 100 ml., and semi-comatose. Catheterization, however, showed that, although there had been a past history of frequency and difficulty in micturition, the uraemia was due to renal failure. A week later the urinary output improved and he developed acute retention of urine. He was then slightly more conscious, although his blood urea had risen to 265 mg. per 100 ml. At operation a very small adherent fibrous gland, containing calculi, was removed. Urine was passed on the third post-operative day, but the bladder was somewhat atonic and it was necessary to give carbachol orally for a week before normal micturition was fully established. The cardiac and renal functions improved slowly but steadily.

Case 11.—On admission this patient, aged 69, had acute retention of urine due to a large diffuse hypertrophy of the prostate; there had been no urinary symptoms until a few days before admission. He had been catheterized several times. At operation a large gland was found and enucleation was easy. Urine was passed on the second post-operation day, within two hours of removal of the catheter; an infection with *Staph. aureus* cleared spontaneously after operation. (Streptomycin was given, but it was later found that the organism was resistant to this antibiotic.)

Discussion

The operation described above compares favourably with other standard routes. The results of the cases so treated are summarized in Table I. There have been no operative deaths in this series, despite the fact that patients up to the age of 88 (Case 2) and with blood urea levels as high as 265 mg. per 100 ml. (Case 10) have been treated. The greatest difficulty has been caused by infection from pre-operative catheterization. No other complications have occurred to date, although it is of course possible that pyelonephritis, renal failure, and reactionary or secondary haemorrhage could occur in these cases under propitious circumstances. The improved exposure, of course, makes the likelihood of haemorrhage much less than in either the retropubic or the suprapubic route. Suprapubic leak has not been a problem, owing to the fact that it is much easier to close this incision than a retropubic one; it is more difficult to close, in fact, than an ordinary suprapubic cystotomy. In no case has control of micturition been impaired.

The indications for this operation are the same as for any form of prostatectomy, as the advantages of both suprapubic and retropubic approach are combined. There does not seem to be any type of prostate which cannot be dealt with by the anterior route. The only contraindications are those affecting the patient's general health, although here again the greater ease with which the operation is carried out gives the surgeon a much wider scope. Infection, though troublesome, is not a contraindication, and often appears to

settle much more rapidly after the operation than would be expected merely from the administration of antibiotics—for example, Cases 9 and 11, where the organisms were "resistant." A brief analysis of the results is given in Table II.

The only other operation which allows a view of the bladder and prostatic bed is that described by Ogier Ward (1948, 1949), but the prostatic capsule is not opened in front and the field of view is much more restricted than in the operation described above. It is felt that the advantages of this operation lie principally in the fact that it is simple to perform and less likely to give rise to trouble in the hands of the general surgeon than the other more complicated operations at present in use.

Summary

A new but simple method of exposing the prostate was sought to combine the advantages of the retropubic and suprapubic routes. In the former, difficulty in closing the capsule is a problem, but there is an excellent view of the prostatic bed. In the latter, closure is easy but haemostasis difficult; there is, however, a good view of the bladder and ureters.

In this operation both bladder and prostatic capsule are opened by a vertical incision. A suture at the lower end prevents a split downward. Incision of the bladder mucosa, enucleation of the adenoma, coagulation of vessels, and division of urethra are all done under direct vision. Closure is by continuous suture.

The results of a small series of cases are given which compare favourably with those of other methods in current use. There were no complications.

The advantage of this approach is that all steps are taken under direct vision and the operation is therefore made much easier.

I thank Professor F. A. R. Stammers and Mr. Hugh Donovan for their help while I was preparing this paper; Mr. D. M. Morrissey for his constant encouragement; Mr. J. B. Leather, Mr. A. Innes, and Dr. C. F. Hawkins, who kindly allowed me to operate on their patients; and, not least, Sister Jones, on whom fell the burden of post-operative care.

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The World Federation for Mental Health has now published the proceedings of its eighth annual meeting, held in Istanbul, August, 1955, under the title "Family Mental Health and the State." The proceedings are divided into seven parts, the first being devoted to the inaugural ceremony with the addresses of welcome by Dr. BECHET UZ, Turkey's Minister of Health and Social Welfare, and Professor F. K. GÖKAY, Governor-Mayor of Istanbul, and the presidential address on the peaceful use of human power by Dr. F. FREMONT-SMITH. The second section, on mental health and family life, has papers on normal, delinquent, and handicapped children. Contributors are Dr. K. SODDY, Dr. E. NOYAN and Dr. H. BILGINER, Professor N. KUNTER, Dr. J. RIOCH, Dr. A. REPOND, Professor A. C. PACHECO E SILVA, and Dr. P. DOUSSINET. Dr. R. SPITZ's contribution on emotional stress and its consequences makes the third section. The fourth section is on education, the contributors being Mr. C. HAMBRO, Dr. B. ARKAN, and Mr. M. ENÇ. Section five deals with cultural change and mental health, Dr. MARGARET MEAD introducing a panel session with speakers from Turkey, Thailand, Lebanon, Israel, Iran, Yugoslavia, Cyprus, and Malaya taking part. Finally there are reports of the work of the United Nations and its specialized agencies, and an account of the closing session. A copy of the report may be obtained from the W.F.M.H., 19, Manchester Street, London, W.1, price £1.

TABLE II

Total No. of cases	13
Average age	72 years
Pathology	Benign 11 Malignant 2
Average weight of gland	56 g.
Cases of acute retention	12
" catheterized pre-operatively	12
" with infected urine following previous catheterization	7
Cases developing infection post-operatively	0
" receiving antibiotic	6
" more than one antibiotic	2
Blood urea average	68 mg./100 ml.
Micturition post-operatively:	Average 3 days On second day 5 cases On third day 5 Over three days 3

ADHESIVE STRAPPING FOR UMBILICAL
HERNIA IN INFANTS

CLINICAL TRIAL

BY

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The infantile type of umbilical hernia is a common condition. Its frequency has been estimated as about 1:6 in English babies (Woods, 1953), and 40% of American negro babies are affected (Crump, 1952). While it is a benign condition so far as complications are concerned, strangulation being very rare, it is often a cause of much anxiety on the part of the mother both because of the disfigurement and because various symptoms such as "wind" and "colic" are attributed to it. It is known that almost all these hernias disappear spontaneously during the first few years of life (Browne, 1952; Crump, 1952; Gross, 1953; Woods, 1953), but in spite of this there is a difference of opinion amongst authorities concerning methods of treatment, or indeed whether any treatment is necessary at all. Whereas it is generally agreed that operation should be delayed until it is fairly certain that natural resolution is not going to occur (3 years of age was suggested by Barrington-Ward, 1947), there is little agreement about the advantages of mechanical reduction by the aid of adhesive strapping. Barrington-Ward (1947), Browne (1952), and Gross (1953) stated that adhesive strapping hastens disappearance of the hernia, but Woods (1953) felt that strapping is not only useless but in fact delays natural cure.

This paper is the report of a clinical trial carried out over a period of two and a half years to determine whether the application of adhesive strapping to umbilical hernias affected the natural cure rate.

Method

Only babies who were less than 12 months of age when they were first seen were accepted for the trial, and babies whose hernias had previously been kept efficiently reduced were excluded. (Elastic adhesive plaster and "pennies and binders" were not considered efficient methods of reduction.) Alternate cases were strapped and the others, who were not treated in any way, served as controls.

Only true umbilical hernias were included in the trial. Cases of supra-umbilical or linea alba hernias or babies with cutis navel were excluded. Mongols, cretins, and babies with general muscular hypotonia were also excluded. With some of the smallest hernias it was sometimes difficult to be sure whether a hernia was present or whether there was merely a cutis navel. Hernia was diagnosed only if the protrusion at the umbilicus could be reduced easily by digital pressure and a defect in the linea alba was palpated.

The size of each hernia was measured as accurately as possible from the skin of the abdominal wall to the highest point of protrusion. Protrusions of $\frac{1}{4}$ in. (6 mm.) or less were described as "small" and those of more than $\frac{1}{4}$ in. as "big." The smallest diameter of the oval defect in the linea alba was also measured by comparing its size by palpation with the size of holes of known diameter bored in a wooden gauge.

The method of strapping was that described by Gross (1953), using two pieces of 2-in. (5 cm.) non-elastic plaster and threading a tongue cut in one through a hole cut in the other. The skin was first painted with tincture of benzoin to increase adhesion, and the plasters were applied so that there was a gap between them at the back. An

assistant reduced the hernia by pinching the skin into a vertical fold over the hernia and the plasters were then pulled tight. A strip of 3-in. (7.5-cm.) plaster was then applied on top of the 2-in. (5-cm.) plasters. All cases were strapped for four weeks, although the plasters were changed after two weeks, the reduction of the hernia being maintained while this was done. After four weeks the strapping was removed, but if the hernia was still an appreciable size the strapping was reapplied for a further two weeks and occasionally for another two weeks after that. Thus no case was strapped for more than eight weeks. If, however, only a minimal protrusion was seen when the strapping was removed after four weeks, no further strapping was applied, but the hernia was observed until it disappeared.

Cases used for the final analysis were those in which (1) the hernia had disappeared before 12 months of age—that is, the "successes"; and (2) the hernia had not disappeared by 12 months of age—the "failures."

Results

Of the 100 cases which qualified for the final analysis, 80 were successes and 20 failures; 51 babies had their hernias strapped and 49 served as controls. There were 66 males (34 strapped and 32 controls) and 34 females (17 in each group).

Analysis of Cases Using Measurement of the Hernial Protrusion.—Table I shows the results. Unfortunately the "big" and "small" hernias are not evenly matched in the two groups, but the numbers are large enough to show

TABLE I.—Relationship of Results to Size of Hernial Protrusion (Big=More than $\frac{1}{4}$ in. (6 mm.); Small= $\frac{1}{4}$ in. (6 mm.) or Less)

	Strapped				Control			
	Big		Small		Big		Small	
	No.	%	No.	%	No.	%	No.	%
Total	35		16		21		28	
Resolved by 6 months ..	22	67*	14	87	2	9	21	75
" " 9 " " ..	26	79*	16	100	8	38	24	85
" " 12 " " ..	28	80	16	100	9	43	27	96
Still present at 12 months	7	20	0	0	12	57	1	4

* Since two babies with big protrusions were still under treatment at 9 months, these percentages of hernias resolved at 6 and 9 months refer to 33 babies who had completed their course of strapping by these ages.

that, whereas the difference in the rate of disappearance of the small hernias in the strapped and control groups was slight, 87% and 75% respectively having resolved by 6 months and 100% and 96% by 12 months of age, the big hernias in the strapped group had a much higher success rate than the controls. At 6 months of age 67% of the strapped group had resolved, whereas only 9% of the control group had done so. At 12 months the figures were 80% and 43% respectively. These figures are statistically highly significant.

Analysis of Cases Using Measurement of the Umbilical Defect.—Table II shows the results in the two groups when analysed in relation to the diameter of the defect. Here the numbers are evenly matched in the strapped and control groups, and they show that the hernias with the small defects tended to resolve slightly quicker than those with

TABLE II.—Relationship of Results to Diameter of Umbilical Defect (Big=More than $\frac{1}{4}$ in. (6 mm.); Small= $\frac{1}{4}$ in. (6 mm.) or Less)

	Strapped				Control			
	Big		Small		Big		Small	
	No.	%	No.	%	No.	%	No.	%
Total	13		38		12		37	
Resolved by 6 months ..	5	42*	31	84*	1	8	22	59
" " 9 " " ..	8	67*	34	92*	4	33	28	76
" " 12 " " ..	8	62	36	95	5	41	31	84
Still present at 12 months	5	38	2	5	7	59	6	16

* Since two babies, one with a large defect and the other with a small defect, were still under treatment at 9 months these percentages refer to 12 babies with big defects and 37 with small defects who had completed their course of strapping by these ages.

big defects; the latter, however, resolved much more rapidly in the strapped group than in the control. The figures of resolution at 6 months of age, however, where the differences appear to be greatest, are not quite significant statistically. Table III shows the correlation between the size of the protrusion and the size of the defect. It is seen that three-fifths of the big protrusions came through

TABLE III.—Correlation Between Size of Protrusion and Size of Defect

Size of Defect	Size of Protrusion	
	Big (> $\frac{1}{4}$ in.)	Small ($\frac{1}{4}$ in. or Less)
Big (> $\frac{1}{4}$ in.) ..	22	3
Small ($\frac{1}{4}$ in. or less) ..	34	41

small defects and all but three of the small protrusions came through small defects. If the results are analysed so that the big protrusions with big defects are compared with the small protrusions with small defects, the results are very similar to those of Table II.

Age of Babies when Hernias were First Strapped.—Table IV shows the ages of the babies when strapping was first applied, and it is seen that most of the hernias were

TABLE IV.—Relationship of Age at Which Strapping was First Applied to Age of Resolution

Age in Months:		< 1	1-2	3-6	> 6
Total No.:		1	40	8	2
No. resolved by 6 months	..	0	32	4	—
" " " 9 "	..	0	36	6	0
" " " 12 "	..	0	37	7	2
No. still present at 12 months	..	1	3	1	

strapped when they were 1 to 2 months old. Neither of the two babies first strapped when over 6 months of age had resolved by 12 months, and when followed up after 12 months neither had resolved at 14 and 28 months respectively.

"Failures."—There were 20 failures in the two groups. One big hernia in the control group had resolved when seen at 14 months of age. The remaining 19 hernias had not resolved at the time of writing, and Table V shows the

TABLE V.—Ages of the "Failures" When Last Seen

Age in months ..	12-17	18-23	24-29	30-36
No. of cases ..	8	3	7	1

ages of the babies when they were last seen. Of the seven failures in the strapped group, two, as already mentioned, were strapped when over 6 months of age. One other case had a supra-umbilical hernia in addition to the umbilical hernia, and a thin band of fibrous tissue separated the two defects; the umbilical hernia, which had previously been big, became much smaller after it had been strapped for four weeks, but it had not quite gone when the baby was 12 months old, the supra-umbilical hernia showing no alteration in size. One case developed pertussis and another chronic bronchitis after the hernias had almost resolved with strapping, but the severe cough in both cases caused recurrence and further strapping was without effect. In two other cases the maximal protrusion was through the upper edge of the umbilical scar, and the hernias were probably what Browne (1952) has called "semi-umbilical." According to him these have a poor prognosis so far as spontaneous regression is concerned. One other similar baby in the strapped group, however, had resolved by 9 months of age. Three of the failures in the control group also had severe coughs, but the remainder were uncomplicated.

Complications of Strapping.—On the whole the babies in the strapped group tolerated the strapping well. Occasionally a mother would complain that her baby seemed to have discomfort when the strapping was first applied, and in two cases strapping had to be abandoned

because of excessive discomfort or soreness of the skin. These cases were, of course, excluded from the trial. Of the 51 babies who had strapping applied for four weeks or more, 13 suffered from mild excoriation or skin sepsis.

Discussion

The results of this investigation confirm the belief that umbilical hernias in infants have a great tendency to disappear spontaneously during the first few months of life, but they indicate that the natural cure rate depends upon the size of the hernial protrusion. Table I shows that by the age of 12 months nearly all (96%) untreated small hernias had disappeared, whereas less than half (43%) of the big hernias had resolved by the same age. In Woods's (1953) series of umbilical hernias 93% underwent spontaneous resolution in the first year of life, and she thought that severity did not influence the prognosis.

The results also indicate that adhesive strapping greatly increased the cure rate of the big hernias, but had little or no effect on the small ones. The percentage of successes in the strapped group might have been higher if two of the babies had not developed a severe cough. Woods (1953) pointed out that an umbilical hernia may first appear during pertussis or recur after apparent cure. It will be seen that there was no baby with the usual type of umbilical hernia who did not develop a cough, and whose hernia was strapped before 6 months of age, that was not cured by 12 months. Of the 13 failures in the control group, 3 developed a cough and 10 were uncomplicated.

The results of this clinical trial therefore demonstrate that: (1) If an umbilical hernia in a baby protrudes more than $\frac{1}{4}$ in. (6 mm.) and is efficiently reduced by adhesive strapping for at least four weeks, there is a much greater chance that the hernia will have resolved by 6 or 12 months than if no treatment is given. (2) Strapping after 6 months of age is probably useless. (3) No advantage is to be gained by strapping a hernia which protrudes only $\frac{1}{4}$ in. (6 mm.) or less, and possible skin irritation makes it inadvisable to do so.

The sex ratio of two males to one female in this series of 100 cases of umbilical hernia is unusual, and no similar sex ratio has been found in other series reported in the literature. For instance, Barrington-Ward (1947) wrote that umbilical hernia "is usually found in the female." Gross (1953) recorded a ratio of two females to one male, while Paterson and Gray (1927), Carter (1932), and Crump (1952) recorded an equal sex incidence.

Summary

A clinical trial was conducted to determine the efficacy of adhesive strapping for umbilical hernias in infants.

It was found that, while nearly all untreated umbilical hernias had resolved by 12 months of age if the protrusion was small, if the protrusion was more than $\frac{1}{4}$ in. (6 mm.) in size strapping greatly increased the cure rate. Strapping of big hernias before the baby is 6 months old is advocated.

In this series of 100 cases the proportion of males to females was two to one.

I am indebted to Dr. T. Colver, Professor R. S. Illingworth, and Mr. R. B. Zachary for kindly referring babies to me and for much helpful advice in the preparation of this paper. I am also grateful to Dr. J. Pemberton, of the Department of Social and Industrial Medicine of the University of Sheffield, for his help in testing the significance of the results. A number of family doctors in Sheffield referred cases to me, and to these I should also like to express my thanks.

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Medical Memorandum

Rupture of the Rectovaginal Septum at Parturition

Isolated rupture, at parturition, of the rectovaginal septum without involvement of the perineum is a very rare obstetrical accident. In this condition the sphincter mechanism remains intact in contrast to the more common injury to the septum which is due to extension into it of a third-degree perineal laceration.

McNulty (1952), in a series of 75 cases of third-degree laceration occurring in a total of 14,080 patients, makes no reference to rupture of the septum; neither does Hofmeister (1952) in his paper on repair of rectovaginal injury occurring at parturition, or Dodek (1954) when writing about similar accidents. Kerr and Moir (1949) mention an instance of rupture of the rectovaginal septum in a patient with a breech presentation at the Glasgow Royal Maternity Hospital. Eight years ago I saw an identical case at the Royal Maternity Hospital, Belfast, when one foot presented through the vagina and the other through the anus. A similar accident is described by Lesh (1952) as occurring with the first of twins. The only record in English that I can find of rupture of the rectovaginal septum occurring in a vertex presentation is that of Melody (1953), although French and German writers have described such incidents. Melody (1953) describes a case occurring in a woman following delivery of her second child by outlet forceps and medial episiotomy. The entire delivery, he states, was easily effected and there was no extension of the episiotomy. On inspection of the posterior vaginal wall, however, a complete rupture of the rectovaginal septum was discovered which extended for a distance of 10 cm. without involvement of the episiotomy or of the anal sphincter.

CASE REPORT

The patient was a primigravida aged 36 who had had a completely normal antenatal period. Labour began at the 38th week. The os became fully dilated after 14 hours. Advance was slow in the second stage. This had been attributed to lack of co-ordination due to the patient having received "omnupon," $\frac{1}{2}$ gr. (22 mg.), and scopolamine, 1/30 gr. (2 mg.), in the four hours preceding delivery. When the head had been on the perineum for half an hour it was decided to deliver with forceps. During the preliminary vaginal examination a peculiar tight band was felt posteriorly in front of the head, near the introitus, but this caused only a momentary hesitation and it was decided the impression was created by a tight fourchette. After medio-lateral episiotomy a live male infant weighing 7 lb. 1 oz. (3.2 kg.) was delivered, using only moderate traction. There was no extension of the episiotomy. It had been intended to repair the incision with subcuticular figure-of-8 catgut sutures, starting posteriorly. It was not until the second of these was being inserted that anything unusual was noted.

An abnormal white appearance in the depths of the wound led to further exploration, which showed that the rectovaginal septum had split for a distance of 4 in. (10 cm.) in the midline posteriorly. The apex of the tear was in the posterior fornix and its distal portion extended into the episiotomy. The white appearance was due to the rectal epithelium. The rectal mucosa and muscularis were closed with a continuous row of intestinal chromic catgut. Another continuous row of the same material approximated the perirectal fascia as a separate layer. In the lower part of the wound the perineal body was reconstituted with interrupted catgut. The vaginal mucosa was then closed with interrupted sutures. This was simple at the apex of the tear, but where the septal split met the episiotomy the vaginal epithelium was badly lacerated and its vitality must have been grossly impaired by the necessity for the introduction of many stitches in different directions. The only comforting factor was the presence of a firm mass of

perineal tissue between the patchy, saggulated vaginal epithelium and the rectal mucosa at this level. The perineal skin was closed with three nylon sutures.

Obstipation was obtained by means of a low-residue diet for five days. An attempt to sterilize the bowel was made by giving streptomycin by mouth for the first two days as well as phthalylsulphathiazole, 10 g. daily for the first week. Penicillin and streptomycin were also administered parenterally. The bowels moved on the fifth day, following which all therapy was stopped and a normal diet resumed. The patient remained afebrile in hospital and was discharged, doing well, on the 13th day along with her baby, which then weighed 7 lb. 3 oz. (3.26 kg.) and was being artificially fed.

On the 20th day she was seen again because of pain in her perineum. She had developed a small abscess in the anterior part of the episiotomy wound, which at the time of examination had started to discharge with consequent lessening of pain. The discomfort ceased quickly and the perineum healed rapidly following the discharge of a small piece of catgut.

A post-partum examination was made at the sixth week. No evidence of the tear could be seen. The calibre of both rectum and vagina felt normal. The episiotomy was well healed, with no discomfort. Involution was satisfactory. Bowel action had always been normal.

COMMENT

Melody (1953) attributed the accident in his case to loss of mobility of the vaginal tube upon the rectum, due to scarring and fixation following Whitehead's haemorrhoidectomy. Other cases have been attributed to vaginal stenosis following circumcision and to rupture of a retro-uterine haematoma.

In this instance, however, there has been no previous involvement of the rectovaginal septum in trauma or inflammation of any sort, and no reason can be advocated for the unusual accident. The patient afterwards volunteered the information that because she was "so small inside" she always had some difficulty with coitus. In retrospect it is obvious that what had been thought to be fourchette was really a fold of the tight rectovaginal septum stretched to the point of rupture. If its significance had been realized, delivery probably would have been effected by caesarean section.

The main problems which the case poses are (a) the method of repair of the actual injury, and (b) the method of delivery in future pregnancies. The second problem is the more easily answered: I feel that all future deliveries should be by caesarean section. With regard to the principles of the repair of such a tear, opinions differ. I cannot see the necessity of sacrificing the sphincter mechanism by converting the wound into a typical third-degree laceration. The advantages are better access at the time of operation and a reduction of sphincteric tone during convalescence. The latter, however, can be readily obtained by other methods. Any anatomical advantage gained by producing a third-degree tear is offset by the increased trauma that has been caused and by the marked increase in bleeding which will occur. Since the introduction of powerful antibiotic and chemotherapeutic agents, the question of colostomy should not, in my opinion, arise—yet such was mentioned by several colleagues in discussion of the case. The similar injuries described by Kerr and Moir (1949) and Melody (1953) all healed satisfactorily without colostomy and without conversion into a third-degree laceration.

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Reviews

STORY OF A STRUGGLE

More from the Primeval Forest. By Albert Schweitzer. (Pp. 128. 6s. 6d.) London: Adam and Charles Black. 1956.

The story of a struggle seldom fails to fascinate, and here there is struggle and difficulty enough to make a tale fascinating, together with all the thrill of ultimate achievement. Through his work in many fields Dr. Schweitzer has become something of a legend already during his lifetime; by many he has been idolized in a way which renders objective assessment of his work difficult, and it can be no disparagement to make up this book are similar to those which have been overcome by many hundreds of medical missionaries. Rather does the insight which he gives into their work make their achievement the more memorable.

The world has never failed to be amazed that Dr. Schweitzer should have chosen to use his talents in the "primeval forest." This book goes some way towards enabling one to understand his choice, for it reveals the intense interest he has in human nature, the satisfaction he obtained in building his hospital and superintending its work, and the feeling he has that the work is supremely worth while. The narrative consists of an account of his second period at the hospital at Lambaréne which he established in 1913 and left in 1917. Returning in 1924, he found it in a state of decay and rebuilt it, and then, finding the premises inadequate for the work as it developed, he decided 18 months later to construct an entirely new one. The labour involved was great and there were many difficulties, but the book ends with the main buildings complete and Dr. Schweitzer embarking for leave in Europe feeling that it is "incomprehensible that I am leaving the natives that I am so fond of them one becomes in spite of all for months. How fond of them one becomes in spite of all the trouble they give one." There are many anecdotes giving insight into the thoughts and feelings of the people with whom Dr. Schweitzer dealt. On one occasion, while himself piling timber, he asked an African visiting the hospital to help him. "I am an intellectual and don't drag wood about," came the reply.

Unfortunately the pleasure in reading the book is marred by the appalling English into which it is translated. The Germanic construction of sentences usually remains, the present tense is used almost throughout, and there are several simple errors; thus the town Buea appears as Buca, and "recuperate" as "recruit." The tale, however, lives; it has considerable vitality and will interest all who have practised medicine in the Tropics.

A. W. WOODRUFF.

OBSTETRICAL ANAESTHESIA

Anesthesia for Obstetrics: Labor—Delivery—Infant Care. By Robert A. Hingson and Louis M. Hellman. (Pp. 344+ xvi; illustrated. £5.) Philadelphia, Montreal: J. B. Lippincott Company. London: Pitman Medical Publishing Co. Ltd. 1956.

The number of books on this subject which have appeared during the last year or two must reflect a considerable surge of interest on the part of both anaesthetists and obstetricians. This is to be welcomed, and must be but one of the results of the publicity which has been given to recently available information on the frequency with which death or near death occurs in these circumstances. It is now realized that anaesthesia is probably the most important factor involved in death during operative obstetrics. From the point of view of efficacy, too, the current methods of analgesia and anaesthesia still leave a lot to be desired. None is both wholly safe and wholly effective.

The present book is an extension of one, the third edition of which appeared eight years ago, written by Drs. Lull and Hingson. Dr. Hingson is now joined by another obstetrical colleague, Dr. Hellman, and between them they have produced a comprehensive, vigorous, provocative, and informative monograph. Anaesthetists in particular will recognize Dr. Hingson's vivid and attractive personality on every page. While the authors of course stress those methods of which they have had special experience, they do not, like some other American writers, ignore or dismiss too briefly methods, such as "trilene and air," more popular in Britain. A full description will be found of Dr. Hingson's own portable, miniature anaesthetic machine for administering non-explosive mixtures of cyclopropane, which is likely to be useful not only in obstetrics but in other fields as well. Particular views are naturally put forward on many subjects, but they are always admirably supported by evidence—usually statistical. The section at the end deals with infant pathology and morbidity, as well as with maternal and infant resuscitation. Details are given, too, of the organization of an anaesthetic service for a busy obstetrical department.

This book will not please everybody, for it presents its often unorthodox material boldly, but it is certain to stimulate every reader whatever his views. The illustrations, index, and general production of the book are all excellent. Drs. Hingson and Hellman have made a major contribution to this still comparatively undocumented field of anaesthetics.

W. W. MUSHIN.

RADIOLOGY OF THE DIGESTIVE TRACT IN INFANTS

Radiology of the Alimentary Tract in Infancy. By Roy Astley, M.B., M.R.C.S., D.M.R. (Pp. 287+viii; illustrated. 50s.) London: Edward Arnold (Publishers) Ltd. 1956.

Paediatric radiology has made great strides in recent years, and in no particular field has it proved more useful than in the congenital anomalies presenting as surgical problems in the newborn. Dr. Astley, in writing of the radiology of the alimentary tract in infancy, has helped greatly in clarifying the conditions, and, although the book is intended primarily for radiologists, paediatricians will find much of value. The book follows a caudad course from the oesophagus to the rectum, and there is a final chapter on miscellaneous conditions involving liver, spleen, pancreas, mesentery, omentum, and retroperitoneal and pelvic structures. Many of the conditions described are rarities, but nevertheless merit inclusion; others are commonplace but still often too little understood. The sections on the oesophagus and diaphragm are particularly good. Common sense pervades the text, and it is clear that radiology is considered throughout as an aid to diagnosis rather than a convenient method of by-passing full clinical examination and investigation. Its limitations are fairly stated. Many interesting findings are reported, including cases of rumination which were associated with gastro-oesophageal incompetence and partial thoracic stomach. There are excellent references at the end of each section, and these are followed by illustrative case histories and practical comments. The book is well produced and the illustrations and their accompanying captions are clear and concise. The author and publishers are to be congratulated on their contribution to paediatric literature.

WILFRID GAISFORD.

The second edition of *Techniques and Procedures of Anaesthesia*, by John Adriani (Blackwell Scientific Publications, Oxford, price 66s.), has brought up to date this very popular technical manual. The compressed and tabulated material is naturally based on the American practice of anaesthesiology. It will nevertheless serve as a means of ready reference in this country, particularly to junior anaesthetists. It is essentially a book on how and not on when and why. Within these limits this is a first-rate book.

BRITISH MEDICAL JOURNAL

LONDON

SATURDAY DECEMBER 1 1956

A CRISIS OF CONFIDENCE

The legal advisers to the Minister of Health disagree with the legal opinion of Sir James Millard Tucker on the nature of the Government's obligation to carry out the recommendations of the two Spens Committees. The argument for the profession was carefully and at length set out in a document of 6,500 words published in the *Supplement* of July 28. The Government's reply is a letter of 94 words from Sir John Hawton (*Supplement*, p. 201). There are times when brevity is a merit. There are also times when it is mere discourtesy, and this is one of them. The Ministers give the profession the lawyer's advice to take the matter to the courts. The Ministers evidently stick to the completely untenable interpretation of the Spens recommendations that they applied only to the time of entry into the N.H.S., to the view, in other words, that the readjustment to the post-war value of money related only to the post-war year of 1948. The profession will have only one interpretation of the present Government's attitude and action—that it has broken faith with it. Mr. Turton, it is true, is doing little more than follow the line laid down by his predecessors, starting with Mr. Bevan, in trying to wriggle out of the recommendations made in the two Spens reports. It is now crystal clear that the Government's original acceptance of these was insincere, and until now the profession has for nearly nine years been reluctant to believe that was the case. But the fact is that it was, and has been so all along the line of a series of Ministers of Health who have done little else but try to make political capital out of the medical benefits they think they have bestowed on the country. We have had amply demonstrated to us that medicine and politics do not mix, something the profession has always instinctively known but has been rather reluctant to admit without trial. Maybe the trial was necessary to bring home the painful truth that in medical politics the professional

politician and his expert administrators know a few more tricks of the trade than those medical men who devote themselves unselfishly in their spare time to serving the profession in this intricate field. That the N.H.S. has operated without any major breakdown is due solely to the fact that the long tradition of the medical profession has ensured that the patient would not suffer. The present crisis is something far deeper than a mere question of payment for work done in accordance with Governmental promise. It is a crisis of confidence between Medicine and the State. It brings to the fore the question of the soundness of the National Health Service in its present form. It is this, more, perhaps, than the remuneration of doctors, that demands investigation by the profession from the base upwards.

What is to be done? The British Medical Association is faced with a grave task, to tackle which will require all its long experience and expertness in this field. The B.M.A. is no more free from faults than any other great organization founded on the principles and practices of a free democracy, which include freedom to think, to speak, to assemble, to criticize; and freedom to disagree. But the Association is the only professional organization that can and does represent each and every branch of medicine. The medical profession has established the Association to do certain jobs, and has seen that it is equipped to do them. Of course it needs the assistance of other groups of medical men, whether organized in societies, corporations, or colleges; it needs their help, their wisdom, the variety of their outlook and experience. But in what may turn out to be a long struggle to put right those things that are so patently wrong in the medical services of this country—and more particularly in the relationship between Medicine and the State—there should be one spearhead of attack if the attack is to be driven home and effective. Unity does not mean singing in dull unison, but it does mean singing in harmony. There is urgent need for still closer consultation between those representing consultants and those representing general practitioners with the Association that represents them both, so that policies may be co-ordinated and action be made strong and organized by the body set up by the profession to maintain its honour and interests.

Those entrusted by the profession with the negotiations over pay that have been going on since February this year met on Wednesday this week. At the time of going to press we do not know what immediate steps they will recommend in face of the

present impasse. But their mandate is unambiguous—to insist upon the carrying out of the Spens recommendations. As the Government persists in its obstinate refusal to do this, then the Association will have to decide upon what should be done forthwith as a short-term measure; and then, we suggest, upon the long-term measures that may well embrace much more than the question of how much doctors should be paid for their work. Whatever is decided, the public may be assured—if such assurance is really necessary—that the sick and the suffering will be cared for as they always have been. Doctors all over the country will be infuriated by the cavalier treatment meted out to them, will be disgusted by this present flagrant breach of faith, even though not surprised by it. But the solution of the immediate and cognate problems will call for cool heads, calm reasoning, determination, and unity of purpose. These, we may be confident, will not be lacking under the leadership of the Association.

POISONING BY COAL GAS

A striking increase in the number of deaths due to coal-gas poisoning has been recorded during the last 25 years in Great Britain. In 1931, for example, there were 175 deaths, while in 1955 there were 891, and the increase has been at a fairly steady rate throughout the intervening years. Two years ago an article in this *Journal* by Dr. Keith Simpson,¹ the forensic pathologist, drew attention to what he called "a disquieting toll of life that has for many years been accepted as a natural risk of urban existence." The need for further investigation of these deaths was recognized, and in March, 1955, the Council of the B.M.A. empowered the Science Committee² to set up a subcommittee "to inquire into the problem of accidental death and ill-health from coal-gas poisoning, and to make recommendations." The subcommittee's report, recently approved by the Council, is summarized in the *Supplement* this week.

The figures set out by the subcommittee show that in Great Britain the number of deaths in 1955 was about 5 times the number in 1931, and the increase fell most heavily on older people, for deaths of people aged under 65 increased 2½ times, whereas deaths of people aged 65 and over increased 7½ times. The meaning of these figures is somewhat obscured, however, by changes in the population and by the increase

in the supply of gas. The number of people aged 65 and over increased about 1½ times, rising from about 7½% of the population to 11½%. At the same time the amount of gas sold increased by about 86%. While the relative increase in numbers of old people, who are naturally more liable than the young and active to be the victims of coal-gas poisoning, and the larger supply of gas would cause a greater exposure to risk of death from this cause, the actual numbers of deaths seem to be much greater than would be expected. For instance, the number of deaths per 10⁶ therms sold was 126 in 1931 and 345 in 1955, with a fairly steady increase in between. Thus a part of the increase remains unexplained, and it is all the more puzzling in view of the efforts made by the gas boards to ensure that faulty apparatus is replaced as soon as it is detected. Some data on mechanical defects classified by the Ministry of Fuel and Power for the two quinquennia 1934–8 and 1946–50, and tabulated by the subcommittee, intensify rather than solve the mystery. They show that between these two periods external escapes of gas causing death increased by 74.5%, or by about the same amount as the supply of gas increased. These are accidents for which the supplier rather than the consumer is responsible. By contrast, much the largest increase in causes of death was taps being left open (lighting and cooking burners 311%, cooking ovens 187%, fires 172%). These are accidents for which the consumer is responsible. In between are various causes for which both parties share some responsibility in varying degree, most notably deaths associated with defective internal pipes, meters, and fittings, which increased by 191%. Though the toxicity of coal gas varies slightly from time to time, it cannot account for these changes in the numbers of deaths. Nor does a likely explanation seem to lie in any increase in what have been called the four D's of carbon monoxide poisoning—the decrepit, the diseased, the drugged, and the drunk.³ Possibly increased consumption of barbiturates may have played a part now that better standards of living combine with high taxation to make drunkenness so much rarer than formerly. Further study might be worth undertaking by necropsy in a series of cases to find out what pathological conditions commonly contribute to the carelessness that underlies so many of these accidents. Simpson¹ has recorded some pertinent data.

In a thorough review of preventive measures, most of which are of necessity more the concern of engineers than medical men, the subcommittee draws attention to the local authorities' obligation to look after the health and welfare of old people. "There

¹ Simpson, K., *British Medical Journal*, 1954, 2, 774.

² *Ibid.*, 1955, 2, 370.

³ Fiddes, F. S., *ibid.*, 1956, 2, 697.

is no doubt," says the report, "that any changes required to make gas appliances safer and more handy for these people would be a justifiable expense." Health visitors can be encouraged to keep an eye on the hazards of gas appliances in the houses they visit, and the report specially emphasizes, too, the need for "close co-operation between the gas authorities and the many statutory and voluntary organizations which at present are concerned with the welfare of old people."

TEMPORARY THROMBOTIC STATE

As mortality and morbidity from thrombosis continue to increase, the problem of the temporary thrombotic state gains ever greater importance, especially since it has been shown that the fatal thrombus is seldom the only evidence of recent intravascular thrombosis in the body. Man's survival depends on the ability of his blood to remain in a fluid state within vessels. Once blood is removed from the blood vessels it will clot if left in its natural state. Two problems require analysing. First, how is the blood kept from clotting in the blood vessels, and, secondly, how can we recognize an incipient breakdown in this mechanism?

Several factors play a part in the prevention of intravascular coagulation. The most important of these is the presence of a healthy and intact vascular endothelium. The endothelium is probably not a passive lining but has a vital function in preventing coagulation; it may actively stimulate coagulation when damaged.¹ No less important than this factor is the maintenance of a normal circulation rate. Stasis is a recognized and potent stimulus to intravascular thrombosis. J. N. Morris and his colleagues^{2,3} have recently analysed the relationship of occupation to coronary thrombosis and shown that when physical activity was high and therefore stasis was rare the incidence of coronary thrombosis was significantly less. It may well be that the sedentary state or poor posture, with their consequent blood stasis, may be more important than has been hitherto recognized. P. Nolf⁴ suggested that in the normal circulation fibrin is continually forming on the walls of the blood vessels and that a fibrinolytic mechanism then dissolves this deposit. It is worth remembering that fibrin once formed is a most potent antithrombin.⁵ Circulating anticoagulants such as antithrombin,⁶ heparin, and antithromboplastin⁷ are concerned in preventing such a mechanism. The defibrination syndrome of pregnancy shows that such a mechanism as Nolf suggested can in fact occur without the vessels clotting completely.⁸ This view has also received support in recent analyses of the pathogenesis of atherosclerosis and in electron-microscopic studies of atheroma and normal intima.^{9,10}

Interest has recently turned to agents which may increase the coagulability of the blood. The chylomicrons obtained from rat chyle and its active fraction phosphatidyl ethanolamine have been found to shorten the

coagulation time of plasma.^{11,12} This work is of great importance in considering the relation between fat intake and increased tendency to thrombosis.¹³ The finding of abnormal lipoprotein ratios in cases of coronary thrombosis suggests that fat metabolism and the thrombotic state are closely related,¹⁴ but there is no experimental evidence that an increased intake of fat or phospholipids can produce thrombosis *in vivo*. Recent work on serum-induced thrombosis in animals has suggested that factor VII (convertin, S.P.C.A.), or some similar but at present undetermined protein fraction, when present in increased amounts, may precipitate intravascular thrombosis.^{15,16} An increase in the level of factor VII is associated with states that are known to have a high incidence of thrombotic complications.¹⁷ Infection, neoplasms, especially visceral carcinoma,¹⁸ parturition, operations, and trauma are all well recognized as states associated with increased tendency to thrombosis. In animals it has been found that in hypotension the blood becomes hypercoagulable, and coagulation may occur.¹⁹ Platelets have been shown to have an increased adhesiveness in certain states, though it is doubtful if this is due to any abnormality of the platelets themselves, but rather to a property conferred on them by factors in the blood.²⁰ This observation may, however, provide evidence of a tendency to thrombosis.

At present no coagulation test is available which reliably diagnoses the incipient or established thrombotic state. L. Poller²¹ has shown that where clotting times have been estimated in a heparin-sensitized system they are reduced after surgical operations. Further elaboration or modification of known clotting tests such as this may provide the answer, but caution is necessary before they are adopted as routine techniques. Unconscious variations in the technique of venepuncture can shorten *in vitro* clotting times, and this makes analysis of any series a difficult procedure. Many factors complicate this problem. A delicate balance probably exists between the blood trying to clot on one side and various anticoagulant mechanisms on the other. Only one factor need be either more or less active for thrombosis to occur.

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² Morris, J. N., Heady, J. A., and Barley, R. G., *British Medical Journal*, 1952, 1, 503.

³ Raffle, P. A. B., Roberts, C. G., and Parks, J. W., *Lancet*, 1953, 2, 1053.

⁴ Nolf, P., *Arch. int. Physiol.*, 1908, 6, 306.

⁵ Biggs, R., and Macfarlane, R. G., *Human Blood Coagulation and Its Disorders*, 1953, Oxford.

⁶ Klein, P. D., and Seegers, W. H., *Blood*, 1950, 5, 742.

⁷ Tocantins, L. M., and Carroll, R. T., *Blood Clotting and Allied Problems*, Second Conference of Jos. Macy Found., N. Y., 1949, p. 11.

⁸ Schneider, C. L., *Amer. J. Obstet. Gynec.*, 1955, 69, 758.

⁹ Duguid, J. B., *Brit. med. Bull.*, 1955, 11, 36.

¹⁰ Levene, C. I., *Lancet*, 1955, 2, 1216.

¹¹ Poole, J. C. F., and Robinson, D. S., *Quart. J. exp. Physiol.*, 1956, 41, 31.

¹² Robinson, D. S., and Poole, J. C. F., *ibid.*, 1956, 41, 36.

¹³ Fullerton, H. W., Davie, W. J. A., and Anastasopoulos, G., *British Medical Journal*, 1953, 2, 250.

¹⁴ Oliver, M. F., and Boyd, G. S., *Brit. Heart J.*, 1953, 15, 387.

¹⁵ Wessler, S., *Fed. Proc.*, 1953, 12, 152.

¹⁶ ———, *J. clin. Invest.*, 1955, 34, 647.

¹⁷ Alexander, B., Meyers, L., Goldstein, R., Gurewich, W., and Grinspoon, L., *ibid.*, 1954, 33, 914.

¹⁸ Woolfing, K. R., and Shick, R. M., *Proc. Mayo Clin.*, 1956, 31, 227.

¹⁹ Crowell, J. W., and Read, W. L., *Amer. J. Physiol.*, 1955, 183, 565.

²⁰ Wright, H. P., *J. Path. Bact.*, 1942, 54, 461.

²¹ Poller, L., *Clin. Sci.*, 1956, 16, 55.

GENERAL-PURPOSE OR SPECIALIZED SOCIAL WORKERS?

The World Health Organization renders a singular service to its members by carrying out comparative studies of systems of health care operative in various countries, mainly with the object of demonstrating good and interesting features which might be more widely applied, especially by those whose institutions are in the formative stage. In 1950 W.H.O. and the Rockefeller Foundation, through their European offices, sponsored a study which aimed at defining "the type or types of health and social workers best suited to meet the needs of families with the greatest measure of efficiency and economy." For various reasons it was decided to make a comparative survey of the personnel and activities of the health and social services of England and France. The two countries have much in common in their social and economic development, and yet there is a remarkable contrast in the solutions found by each to the problem of meeting the health and welfare needs of its people. In broad terms, the French social services depend largely upon the general-purpose, or "polyvalent," social workers, while the English make use of a great variety of specialized workers. The report¹ just published has been prepared jointly by Monsieur P. Laroque and Sir Allen Daley. In trying to make effective comparisons between the two countries they met many difficulties. Nevertheless, the survey is intrinsically valuable as a descriptive account, by competent observers on the spot, of contrasting and in some ways complementary systems of health and social work.

The findings of the survey range widely: they include a brief, well-written account of the medical, social, and welfare services in the two countries, and the appropriate legislation; and the authors make a study, based on field work, of the general needs of families in relation to the duties of social workers. A comparison of the ways in which the social workers are brought into action raises interesting points. In England about a quarter of the cases are reached through routine notification and another quarter at the request of the family concerned. The social worker herself takes the initiative in 22% and the family doctor in 14%. Transfers from other social workers account for nearly all the rest. The data from France are not exactly comparable, but routine notifications account for more than half the interventions of the social worker. It is unusual for the *assistante sociale* to be called in by the doctor in attendance. In general, the French social worker is more isolated than the English, but she has fewer duties of a medical nature to perform, except, perhaps, in giving injections. In both countries maternity and infant welfare is the predominant reason for service. In the second place come problems about financial resources, housing, and health. Purely psychological problems occupy a secondary place, although of course they are likely to be discussed on routine visits.

One of the most important questions considered in this report may be summed up in the words "polyvalence or specialization." This is indeed the central theme of the study, but the conclusions are equivocal.

In fact, the difference between the two countries is not so big as had been believed; there are a great many specialized social workers in both countries, and the investigation has not shown any essential differences between the technical methods used by the two types. The report concludes that the action of the specialized *assistante sociale* operates earlier, takes less time, and gets to the root of the problem. The resources at her disposal are greater, but her action is generally remedial and is more effective than that of the general-purpose *assistante*. On the other hand, so far as preventive action is concerned, the specialized worker is likely to be less effective, because she is called in only after trouble has arisen: she cannot nip it in the bud. The general-purpose social worker, however, cannot do all that the specialist can, because her training does not give her the technical knowledge necessary to handle remedial work of any complexity. Yet she is better able to see the family as a whole.

As one might expect, the report tried to make some assessment of the relative efficiency of the French and English social-service systems, but no valid conclusions could be drawn. "In France, as in England, the action of social workers has contributed to a steady and marked improvement in the material and moral condition of the people, and it is to-day an essential part of the health and welfare system, even though it is not possible to assess the relative efficiency of the methods applied in either country." To some readers it may seem disappointing that the report is so inconclusive. Nevertheless, it is rich in factual information, and as a descriptive analysis it is a model of clear writing. The fact that the authors, who must have had to deal with a great mass of basic material, have resisted the temptation to put forward half-digested conclusions makes the report all the more useful as a work of reference.

PRESSURE SUITS IN MEDICINE

Pilots of highly manoeuvrable aircraft are sometimes exposed to a linear centrifugal force acting in the long axis of the body. This force is termed "positive G," because it is measured as multiples of the normal terrestrial gravitational force. Its principal effect is that, at a certain level of intensity, which varies slightly between different individuals, the blood becomes located in the vascular bed of the splanchnic area and lower limbs, with ultimate cessation of the circulation. This undesirable effect can be reduced by the application of controlled external pressure designed to restrict the capacity of the caudal peripheral vascular bed, and it has been for long successfully studied by aviation medical research departments in the armed Forces.

The induced hypotensive state, whether caused by drugs, spinal anaesthesia, or sympathectomy, becomes comparable when the patient is erect and subject to an appreciable gravitational force. This might happen if it became necessary during the course of a surgical operation to change the position of a patient in whom a hypotensive state had been created. P. A. Restall and F. H. Smirk¹ showed that the effects of a deliber-

¹ Restall, P. A., and Smirk, F. H., *Brit. Heart J.*, 1952, 14, 1.

² Gardner, W. J., and Dohn, D. F., *J. Amer. med. Ass.*, 1956, 162, 274.

¹ *Health and Social Workers in England and France*, 1956, Geneva.

ately induced hypotensive state could be controlled provided the external pressure was applied to the body up to the heart level, and provided the external pressure was not so great as to interfere with the venous return. W. J. Gardner and D. F. Dohn² have now described the use of a "pressure suit," mainly to combat fall in blood pressure during surgical procedures. "It consists," they report, "merely of two sheets of vinyl plastic sealed at the edges to form a large inflatable bladder. This is placed beneath the patient, the edges are folded over so as to enclose him from the rib margin to the ankles, and it is drawn snug by lacing. A manometer is attached to a tube leading from the upper part of the bladder; to a second tube leading from the lower end, a tank of gas is attached from which the bladder may be inflated in a matter of seconds."

Whether such a device will find a wide application in surgery is problematical. Induced hypotension as a routine aid to surgery is not favoured in Britain by the majority of anaesthetists and is now reserved for operations, particularly intracranial and plastic, at which bleeding may be expected to cause difficulty to the surgeon or danger to the patient and when efficient control by orthodox methods is uncertain. Probably most anaesthetists would prefer to retain pharmacological control of the hypotensive state rather than mechanical through an apparatus which must be somewhat cumbersome if it is to be efficient. Many surgeons might endorse this view, for they already find their access to the patient's body becoming increasingly restricted by the presence of apparatus. However, a light pressurized suit might be particularly useful during the post-operative period, when hypotension is present, until the blood pressure reaches a stable level. It could remove some of the need for special nursing of these cases, permit activity to be less restricted, and avert the severe headache that is sometimes an unpleasant sequel.

REHABILITATION IN THE R.A.F.

The Royal Air Force is this year celebrating the completion of its first fifteen years of organized rehabilitation. The first comprehensive scheme ever to be introduced on a national scale, it was born during the grim summer of 1940 as a result of the initiative of Sir Reginald Watson-Jones, supported by the then Director-General Sir Harold Whittingham, Mr. H. Osmond-Clarke, Dr. H. E. Moore, and Group Captain C. J. S. O'Malley as the leading participants. The stimulus was the desperate need for air crew in those days, and a residential centre where intensive full-time treatment could be given was opened at the Palace Hotel, Torquay, with accommodation for sixty patients. When the centre received a direct hit from a bomb, which killed some of the patients, other centres had been opened elsewhere, so that by the end of the war ten existed, by no means limited to the treatment of air crew. Through these 62,210 in-patients passed during the five years 1941-5; 77% of them were returned to full duty and only 4.8% required invaliding. Fortunately the impetus did not die with the end of the war, and there are to-day three centres active with a total of 600 beds.

The scope has been extended beyond purely orthopaedic and traumatic problems, for nearly 10% of the cases are medical, general surgical, or psychiatric. The bulk of the medical cases comprise patients recovering from pneumonia and bronchitis or suffering from bronchiectasis, and graded rehabilitation may be helpful also in building up the exercise tolerance of patients recovering from rheumatic fever. Return to full activity can be hastened after operations such as appendicectomy or herniorrhaphy. Patients with depressive or anxiety states and post-concussional syndromes have also been through these centres, with encouraging response. The principle of the residential centre, based on the dictum of "segregation and unification of control" enunciated by Sir Robert Jones, has been maintained so that full-time treatment can be given. The patient can thus receive the optimum of four to five hours' treatment daily. During his stay the whole range of physical treatment can be applied as well as training in a trade and social resettlement. These centres permit the safe transfer of patients from hospital at the earliest possible moment, thus keeping hospital waiting-lists to a minimum and returning patients to work most rapidly. By this means some 70% of all patients are to-day being returned to full duty and only 5% are being invalided—figures comparable to those obtained during the war. Even the patients in this 5%, which includes severe cases of poliomyelitis, multiple fractures, and chronic neurological and arthritic disorders, have an excellent chance of achieving the best possible social resettlement, because discharge from the Service can be dovetailed into the return to civilian occupations. Indeed, eight out of ten of those invalided are at work, 84% of them in the jobs decided on at the resettlement clinic before discharge.

Finally, in addition to the humanitarian and economic aspects of such an organization, the opportunities for research are much enhanced by the concentration of special clinical material. Thus all traumatic lesions of peripheral nerves and tendons occurring in the R.A.F. anywhere in the world rapidly find their way to one centre, giving great opportunities for the development and improvement of special surgical skills and techniques. Expensive research apparatus, such as is required for electromyography, can thus be developed most economically and efficiently. Unique clinical opportunities, not otherwise available, have enabled investigators to undertake studies of no fewer than 55 cases of osteochondritis dissecans,¹ some 1,500 athletic injuries,² the results of different forms of physical treatment in knee injuries,³ and over 1,500 menisectomies.⁴ This organization has advanced a long way from the Manchester Ship Canal fracture service of Sir Robert Jones in 1888 and the convalescent camp in Salonika formed by Sir Thomas Fairbank in 1915, and the R.A.F. is to be congratulated on continuing with such energy and skill into peacetime the rehabilitation service it founded in the second world war. The National Health Service has benefited much from it.

¹ Lewis, N. R., and White, P. K. B., *Ann. phys. Med.*, 1956, 3, 13.
² Wynn Parry, C. B., *Proc. roy. Soc. Med.*, 1956, 49, 445.
³ — and Millard, J. B., *Ann. phys. Med.*, 1953, 1, 156.
⁴ — Nichols, P. J. R., and Lewis, M. R., *in press*.

BRITISH SOCIETY FOR IMMUNOLOGY INAUGURAL MEETING

[FROM A SPECIAL CORRESPONDENT]

Immunologists in Britain, unlike their counterparts in America and France, have long lacked a representative body. One consequence of this shortcoming has been the unavoidable inclusion of their contributions, both verbal and written, in the *Proceedings* of other societies. While this has undoubtedly avoided some of the very real dangers of overspecialization, it has resulted in a dangerous lack of cross-fertilization between the far-spaced frontiers of a large field. Thanks to the hard work of Dr. R. R. A. Coombs, Professor J. R. Marrack, Professor G. Payling Wright, and others the British Society for Immunology came into being at precisely 10 a.m. on November 9 in the lecture theatre of the Wellcome Foundation in Euston Road. The society was particularly fortunate in having Sir HENRY DALE, O.M., F.R.S., to open its proceedings. More than 250 people attended the two-day scientific meeting, at which 22 papers were presented.

Sites of Antibody Reactions

The first session, under the chairmanship of Brigadier J. S. K. BOYD, F.R.S., was mainly devoted to studies in which Coon's fluorescent antibody technique had been applied. The method depends upon the conjugation of antibodies with fluorescein, which are then allowed to react with the antigen under appropriate circumstances—e.g., in frozen histological sections. Sites of union of the "marked" antibody with antigen are then revealed by their fluorescence under the ultra-violet microscope. The application of this method to histological sections by Drs. D. G. SCOTT and A. G. S. HILL had indicated that the basement membrane of the kidney glomerulus contains at least two antigens, one of which was apparently shared by reticular tissue throughout the body and the other shared by more restricted tissues. Dr. B. CRICKSHANK and his colleagues described their attempts to apply the method to reveal the sites of formation of pituitary hormones in man. The antibodies were prepared in rabbits against purified hormones of human origin isolated from fresh pituitaries and from urine. The use of Coon's method to study the union of antibodies with red-cell antigens was dealt with by Dr. R. ALEXANDER. All speakers were agreed that the interpretation of their results presented considerable problems, because the specificity of uptake of the conjugated or fluorescein-labelled antibodies was difficult to appraise with confidence. Dr. G. H. BEALE concluded this series of papers by describing his investigation of the use of fluorescein-labelled rabbit antibodies to study the gene-controlled ciliary antigens in *Paramecium*, which undergo transformation with environmental conditions.

Immunity to Parasitic Worms

The two final papers of the session were concerned with the immunological responses of mammals to metazoan parasites. Dr. E. J. L. SOULSBY had investigated immunity to *Ascaris lumbricoides*—a parasite of the pig—when it is introduced into guinea-pigs. A substantial immunity, which had a protective influence—as evidenced by fewer larvae, less lung damage, and degeneration of embryonated eggs—developed following the oral administration of embryonated eggs. When larvae of the organism were exposed *in vitro* to sera from immunized animals precipitates formed around them.

Studies on parasitic bronchitis in cattle, caused by nematode worms (*Dictyocaulus viviparus*) picked up from the pasture, were described by Dr. G. M. URQUHART and his associates. Animals which survived this disease acquired

a protective immunity which could be passively transferred with their serum. One of the problems to be resolved was that antibodies did not appear until after the infection had been eliminated. Some measure of protection was achieved by injection of either dried lungworms with Freund's adjuvant, or of heavily x-irradiated larvae, before challenge with living *Dictyocaulus*.

Complement, Properdin, and Immunoconglutinin

The second session was a comprehensive symposium on complement. This was ably introduced by Professor J. R. MARRACK, the chairman. Many of us have rather naively come to regard complement as being almost synonymous with freshly prepared guinea-pig serum. Certainly it was reassuring that Professor Marrack said that by definition complement is a haemolytic substance which causes lysis of red cells which have reacted with antibodies. But unfortunately the story is not simple: complement has at least four components, all of which are necessary for haemolysis. The opening speaker, Dr. R. JOHNS, stressed how little is known about the uptake of complement in the course of the formation of antigen-antibody precipitates. Active haemolytic complement could not be recovered from antigen-antibody complexes after dissociation. We really do not know, in fact, whether complement is "fixed" at all. Dr. A. C. WARDLAW dealt with the action of properdin and complement on bacteria. Properdin, a normal constituent of serum, recently discovered by Professor Pillemer, of Western Reserve University (Ohio), combines with and inactivates certain bacteria in the presence of complement and magnesium ions. Various lines of evidence suggested that properdin may act enzymatically and not be used up in killing micro-organisms. For example, a small constant amount appeared to be equally effective in inactivating small numbers or very large numbers of bacteria.

Dr. R. R. A. COOMBS and Dr. J. MARKS put forward the view that when the components of complement in man become fixed on sensitized cells *in vivo* they undergo configurative changes which make the complement auto-antigenic. A new substance, immunoconglutinin, is then formed in response to it and may be regarded as an auto-antibody. Although a high natural level of conglutinin is found regularly in ruminants, in man it appears in the serum only as a consequence of certain infections. Dr. J. V. DACIE emphasized that complement was essential for the sensitization of red cells by cold agglutinins. In the absence of complement cold agglutinins are eluted and no agglutination can then be obtained with antiglobulin sera.

In addition to the complex series of "ingredients" of complement present in blood plasma, there is also another rather complicated system of proteins which is responsible for the clotting of blood. After a comprehensive review of the present state of knowledge about these two complexes, Dr. A. SHARPE concluded that, although the matter is not completely resolved, the two systems are probably separate. The symposium was concluded by Dr. C. E. KELLETT's account of his clinical studies on the low level of complement in the blood during the course of various diseases. Recovery was generally associated with return of complement to a normal level, but there were exceptions which at present defied explanation.

Diffusion Studies of Complex Antigens

In the third session, although a wide variety of studies were presented, a common factor to all was the employment of agar diffusion techniques (variants of Ouchterlony's method). The principle of these methods is simple: antigen and antibody solutions are placed in separate wells cut in a flat agar plate. After a time lines of precipitation form where antigen and antibody make contact through diffusion. The advantage of the method is that it enables investigators to resolve complex antigens into their components.

Dr. R. R. PORTER had studied the specific reactions of "fragments" of bovine serum albumin after digestion with chymotrypsin and quite drastic purification procedures. He produced evidence that a fraction with a molecular weight about one-fifth of that of the original antigen combined with antibody. The immunological properties of fractions derived from grass pollen antigens formed the subject matter of Mrs. R. ALGUSTIN'S paper. These fractions differed in their precipitation properties *in vitro* as well as in their capacity to induce skin sensitization. During the discussion following this paper those present were pleasantly surprised to discover that among them was Dr. PRAUSNITZ-GILES, a youthful octogenarian, whose name is familiar to all from the Prausnitz-Küstner reaction.

By perfusing isolated lungs from immunized rabbits *in vitro* with ¹⁴C-labelled amino-acids Drs. J. H. HUMPHREY and B. ASKONAS had obtained evidence of continued formation of antibody and, of course, that antibody is produced in the lungs. Dr. P. G. H. GELL gave an account of elegant and highly specific agar diffusion methods for the semi-quantitative detection of certain types of serum globulins. Drs. B. CINADER and J. H. PEARCE had employed agar diffusion methods to study the antigenic composition of bovine ribonuclease. They measured the enzymatic activity of the antigen after its combination with antibodies in various concentrations.

Immunological Tolerance

Three of the four contributions at the final session dealt with immunological tolerance—a specific central *inhibition* of immunological response which follows exposure of individuals to antigens either during foetal life or soon after birth.

Dr. I. DUNSFORD described two individuals who were apparent exceptions to the rule that human beings lack iso-antibodies to antigens present in their own red cells. The first case was that of the human red-cell chimera,* Mrs. McK., who during pregnancy had developed A₁ antibodies which, however, failed to react with the A₁ cells of fraternal origin present in her own blood. The second was a woman, possibly a chimera, who was certainly not a twin at birth, but whose anomalous red-cell antigen picture might conceivably be explained in terms of an exchange of cells with a dizygous twin which had been resorbed in foetal life. Drs. R. E. BILLINGHAM and L. BRENT described a method for inducing tolerance of skin homografts in mice by intravenous inoculation of the animals at birth with spleen cells. Evidence was presented that, besides conferring tolerance, the inoculated cells might react against their hosts, inflicting damage on their lymphoid tissues. Dr. D. W. WEISS and the late Dr. A. Q. WELLS, whose untimely death was a source of sadness to all, had succeeded in making guinea-pigs partially tolerant of tuberculin by inoculation of the antigen in foetal life. This was evidenced by a reduced skin reaction in a tuberculin test. Following their prenatal injection with living B.C.G., however, evidence of sensitization at birth was obtained.

Dr. P. L. MOLLISON described the effect of the antigenic constitution of incompatible red cells on the mode and tempo of their elimination in man. Small quantities of radio-labelled red cells were injected and their fate followed in the body with a scintillation counter. His findings showed that most of the cells are removed by the spleen within a very short space of time, but a small residue of them was long-lasting in the circulation.

Throughout the meeting the standard of the papers was very high: this, combined with commendable self-discipline of the speakers in keeping to their allotted times, was amply rewarded by the excellent discussions which the society intends to foster at its future meetings.

*When tissues or cells from one individual become permanently established in the body of another, unrelated, individual the composite organism is described as a chimera.

HARVEY TERCENTENARY CONGRESS

CELEBRATIONS IN LONDON AND FOLKESTONE

June 3-8, 1957

To commemorate the tercentenary of William Harvey's death in 1657 an international congress will be held next June in London and Folkestone. The congress will comprise scientific sessions at the Royal College of Surgeons on the general theme, "A Review of the Present Knowledge of the Circulation," and a one-day conference at Folkestone, Harvey's birthplace, where the more personal and biographical aspects of Harvey's life will be reviewed. The programme of subjects and distinguished speakers is given below. The idea of the congress came from the Harveian Society of London, and the society is duly represented on the organizing committee. The president of the congress is to be Mr. A. DICKSON WRIGHT, president-elect of the Harveian Society of London. Mr. W. E. TUCKER is the honorary treasurer, and Dr. D. GERAINT JAMES honorary secretary. The congress committee reflects the wide support from other learned bodies and includes representatives of the Royal Society, the Royal College of Physicians of London, the Medical Research Council, the Cardiac Society, the Physiological Society, the Thoracic Society, and the Society of Thoracic Surgeons. Sir RUSSELL BRAIN, P.R.C.P., will deliver the concluding address of the London meeting, and Sir GEOFFREY KEYNES will be chairman of the Folkestone commemoration. The social programme includes a banquet at the Dorchester Hotel and receptions at London University and Gray's Inn.

The registration fee for both the scientific sessions and the social functions is £10; or £1 daily for attendance at the scientific sessions only. Further details and registration forms may be obtained from the congress secretary, 11, Chandos Street, Cavendish Square, London, W.1.

Scientific Programme

Monday, June 3: 9.30 a.m., Opening of the Congress. The president, Mr. A. DICKSON WRIGHT, in the chair. "Knowledge of the Circulation from the Seventeenth to Twentieth Centuries." *Contributors*: Professor K. J. FRANKLIN, F.R.S. (Medical College, St. Bartholomew's Hospital, London); Dr. F. A. WILLIUS (Mayo Clinic); Dr. J. FULTON (Yale University); Professor Sir CHARLES DODDS, F.R.S. (Middlesex Hospital, London). **2 p.m.**, Professor G. W. PICKERING (Oxford) in the chair. "The Role of the Heart in the Circulation." *Contributors*: Dr. L. KATZ (Chicago); Dr. P. WOOD (National Heart Hospital, London); Professor K. MATTHES (Heidelberg); Dr. SILVIO WEIDMANN (Berne).

Tuesday, June 4: 9.30 a.m., *Chairman*: Sir CLEMENT PRICE THOMAS (Westminster Hospital, London). "The Results of Cardiac Surgery." Sir RUSSELL BROCK (Guy's Hospital, London); Professor G. D'ALLAINES (Paris); Professor C. CRAFOORD (Stockholm); Dr. MAURICE CAMPBELL (Guy's Hospital, London). **2 p.m.**, *Chairman*: Dr. C. S. BECK (Cleveland). "The Coronary Circulation." Dr. D. E. GREGG (Washington).

Wednesday, June 5: 9.30 a.m., *Chairman*: Professor J. McMICAL (Postgraduate Medical School, London). "The Pulmonary Circulation." Dr. A. CURNAND (New York); Professor C. V. HARRISON (Postgraduate Medical School, London); Dr. S. RADNER (Lund, Sweden). **2 p.m.**, "The Foetal Circulation." Dr. G. S. DAWES (Nuffield Institute for Medical Research, Oxford).

Thursday, June 6: 9.30 a.m., *Chairman*: Dr. MACDONALD CRITCHLEY (King's College Hospital, London). "The Cerebral Circulation." Dr. S. KETY (National Institute of Health, Bethesda); Professor TH. ALAJOUANINE (Paris); Dr. E. H. BOTTERELL (Toronto). **2 p.m.**, *Chairman*: Professor Sir JAMES LEARMONTH (Edinburgh). "The Splanchnic Circulation." Dr. S. E. BRADLEY (New York); Dr. S.

DEC. 1, 1956

HARVEY TERCENTENARY CONGRESS

BRITISH
MEDICAL JOURNAL

1297

SHERLOCK (Postgraduate Medical School, London); Professor R. MILNES WALKER (Bristol).

Friday, June 7: 9.30 a.m., *Chairman*: Professor A. KEKWICK (Middlesex Hospital, London). "The Peripheral Circulation." "Circulation Through the Limbs," Professor H. BARCROFT (St. Thomas's Hospital, London); "Vascular Innervation," Professor W. D. M. PATON, F.R.S. (Royal College of Surgeons, London); "Pathology of Vessels," Professor J. H. DIBLE (Postgraduate Medical School, London); "Surgery of Occlusive Arterial Disease," Professor C. G. ROB (St. Mary's Hospital, London). **2 p.m.**, Concluding address by Sir RUSSELL BRAIN, P.R.C.P.

Folkestone Commemoration

Saturday, June 8: 10.30 a.m., Sir GEOFFREY KEYNES in the chair. "Harvey's Birthplace," Professor T. HARE (London); "Harvey at Padua," Professor A. P. CAWADIAS (London); "Harvey the Scientist," Dr. W. R. BETT; "Harvey and French Medicine," Dr. L. CHAUVOIS (Paris). **Afternoon**.—Visit to Canterbury Cathedral. **Evening**.—Civic Reception.

MEDICAL WOMEN'S INTERNATIONAL ASSOCIATION

[FROM A SPECIAL CORRESPONDENT]

The Medical Women's International Association has recently held an extraordinary general assembly at the Burgenstock, Switzerland, attended by nearly 200 delegates from 23 countries. There was also an observer from Japan, where there is a large and flourishing association of medical women. Although the meeting was short, lasting only from September 20 to 23, and called mainly for administrative purposes, one day was devoted to scientific discussions. The theme chosen was "The Problems of the Married Woman Working Outside the Home, and their Effects on the Physical and Mental Well-being of the Family Group." The assembly was presided over by its Italian president, Dr. M. YOLANDA TOSONI DALAI, of Milan, and the chairmanship of the scientific sessions was in the hands of Professor A. CHARLOTTE RUYS, of Amsterdam.

Working Wives and Their Families

Owing to the nature of the subject, one on which women doctors tend to have strong views, it was decided to employ the method of group discussion for the treatment of the theme. Four speakers had been chosen beforehand, Dr. SUZANNE SERIN, of France, a psychiatrist with a great deal of experience of work with juvenile delinquents; Dr. MARIE MEIERHOFER, of Switzerland, one of the co-founders of the Pestalozzi village; Dr. INGE JESPERSEN, a young Danish doctor who has recently undertaken specific research into the subject for a state organization in Denmark; and Dr. DORIS ODUM, president of the European League for Mental Health. After the papers, the delegates divided into a number of groups in order to discuss the subject. Each group had been left free to determine the language to be used in its discussions, and this inevitably led to a certain linguistic or regional grouping, not without advantage when so many different continents were represented. The Far Eastern group, for instance, reported that it had no real experience of such problems, but appeared to be looking forward to the day when it would have.

The views of the speakers were on the whole very similar, although the Swiss report sounded a rather negative note. The Danish paper stressed the very high degree of social legislation in the Scandinavian countries to protect the married woman at work; but, although reporting that investigations had failed to prove any unfavourable results from such work, stated that the shortage of domestic help,

the inadequate provision of crèches and nursery schools, and the discriminatory taxation of married woman had all created serious problems. The British paper dealt more with the practical aspects of the problem, and with marital and social attitudes, and stressed the fact that the emotional relationships between husband and wife, and mother and children, were the really determining factors in the case. Here again, although some increase in nervous and emotional instability was reported, the speaker could find no overall unfavourable factors to militate against work outside the home.

The Swiss report looked more on the darker side, stating that the tendency in Switzerland was to do everything to encourage the married woman to stay at home, such as by increasing the income of the husband and by various grants and tax reliefs. The view of the speaker was that the result of the married woman working outside the home was a serious strain that impaired both the well-being of the family group and of the woman herself. When this point of view was later challenged by some of the groups and even by Swiss colleagues, the speaker remarked pointedly that, although everyone was unanimous in urging practical measures to help the married woman who went out to work, such as more domestic help, more trained assistants to take charge of the children, shorter working hours, and so on, such things were difficult in practice, and married women were often doing full-time work both inside and outside the home, with an amount of overstrain which could only be injurious to their well-being.

The French report stated that, though women's employment in France had shifted considerably from agricultural to professional, clerical, and factory work, the actual proportion of women at work had remained constant for over half a century. The speaker, from her experience of the children's and adolescents' courts of the Seine department, was able definitely to refute the charge that the emotional difficulties of children and adolescents which resulted in delinquency or prostitution were more frequent in homes where the mother went out to work. The French report ended with a serious warning that women should not seek too many concessions in their work, lest they should prejudice many openings for women's employment.

Professor Ruys pointed out in her summing up that economic pressure in the Western Hemisphere was largely responsible for the increase in the employment of women in many countries. There was a tendency for women to marry earlier, owing to the increasing proportion of males in the population, and girls were staying longer at school. Thus the percentage of married women in employment was inevitably higher. The incentives, however, were not purely economic, as many women found it essential to their own development to continue with their occupations or professions after marriage. The problem was common to very many countries, and was part of an evolutionary process which, like all others, was bound to claim its victims. It was the task of medicine to try to minimize any harmful effects of such developments.

The Scientific Film Association gives details of 145 films on atomic energy and related subjects in the October issue of *Scientific Film Review*. This is said to be the first comprehensive list of such films, and the subject index covers the following categories: application and handling of radioactive isotopes in agriculture, biology, chemistry, general surveys, industry, metallurgy, and meteorology; atomic bomb and civil defence; equipment and apparatus; general surveys; moral, political, and religious problems; natural resources; nuclear reactors; occupational safety; progress reports; research centres and atomic energy plants; theoretical aspects. Single copies of this issue of the *Review* (Volume 2, No. 4, October, 1956) are available at 3s. 6d. from the association at 164, Shaftesbury Avenue, London, W.C.2.

Correspondence

Because of heavy pressure on our space, correspondents are asked to keep their letters short.

Pharmaceutical Advertisements

SIR,—Preparations issued by certain pharmaceutical firms and the circulars advertising them have recently been the subject of animadversions in the medical press. Particular criticisms have been directed against advertisements for preparations of triiodothyronine and against the issue of capsules containing multiple anti-anaemic drugs. It is right and proper that the medical profession should take a critical interest in the suitability of pharmaceutical preparations—particularly when they contain potent remedies—and in the accuracy of the claims made for them in the circulars which reach doctors in such numbers. The splendour of the therapeutic advance in the last fifty years has been due in no small measure to the research, ingenuity, and initiative of the great pharmaceutical firms. The close co-operation of the medical profession with the pharmaceutical industry—particularly in the clinical trial of new drugs—and the confidence of the profession in the industry's integrity and altruism are of the greatest importance. Nothing is more calculated to upset that co-operation and confidence than the issue of undesirable pharmaceutical preparations and advertisements which include extravagant and unjustifiable claims.

A further attempt to popularize "blunderbuss" therapy is evidenced by the recent advertisement of a tablet for the treatment of asthma containing prednisone 1.5 mg., ephedrine hydrochloride 15 mg., theophylline 120 mg., and phenobarbitone 10 mg. Since cortisone became available for general prescription in this country it has on the whole been used with much propriety and discretion and has not been incorporated into oral polypharmaceutical preparations. This example should be followed in the administration of prednisone. Potent drugs of this nature should be prescribed alone. Any increase or decrease in their dose does not then involve an automatic—and possibly undesirable—change in the quantity of the other drugs contained in a polypharmaceutical tablet. The makers claim for this tablet that "a marked synergism exists among the constituents." The term "synergy" has a definite pharmacological connotation, and there is no scientific evidence whatever to suggest that synergism exists between the drugs included in the preparation. The makers claim further that "side-effects are negligible" and that there are "no contraindications." Doubtless in the doses recommended (up to six tablets daily—i.e., 9 mg. daily of prednisone) side-effects are unlikely to be pronounced, but there is no mention in the circular of the possible duration of treatment. It has been reported that prolonged administration of 10 mg. of prednisone daily has produced psychoses, and no one yet knows how much suppression of the patient's adrenal cortex may be produced by lengthy treatment, even if the dose employed is a small one. Further, bronchial infection, a potent factor in many cases of asthma, is likely to be exacerbated rather than relieved by such treatment, but the makers claim that the tablets are suitable for all cases of asthma "whatever the aetiology." Lastly, it is noteworthy that the price of the tablets is not mentioned in the circular.

The value of cortisone and prednisone in the treatment of certain cases of intractable status asthmaticus has been established. Their role in the long-term management of the asthmatic state is much more controversial, but at any rate they should not be incorporated in "blunderbuss" tablets for the treatment of "asthma of all aetiologies."—I am, etc.,

Edinburgh, 3.

D. M. DUNLOP.

SIR,—Dr. J. D. W. Whitney (*Journal*, November 10, p. 1116) raises a point of real importance in the business-like conduct of general practice as it is to-day. I have tried every method that I could conceive to keep a tabulated and up-to-date file of all new pharmaceutical products as their advertisements and literature reached my desk. Alas, whatever the method, I found myself in a very short space of time with an untidy and unmanageable mess of advertisements of every possible size and shape, and in desperation the whole lot were consigned to the waste-paper basket. *Faute de mieux*, I now only keep those books as issued by the larger houses, and which are kept up to date by an annual revised edition.

I feel that a loose-leaf file (as Dr. Whitney suggests) would be filled to capacity in next to no time, whatever its size. If the big pharmaceutical houses did but realize the appalling waste of printing and postages that to-day befall their efforts, surely they would get together and agree on a standard size and quality of card, and a standard size of type and layout, at least for the top line or two. It would also be necessary to start such a filing system off "on the right foot" by deciding at the outset upon the method of classification—is it to be under the manufacturers' name, or the proprietary name of the drug, or the particular condition or syndrome or symptom for which it is offered, or some other basis? But the present state of utterly wasteful advertising is long overdue for control and co-ordination by the houses from whence it emanates.—I am, etc.,

Arnold, Notts.

K. SHALLCROSS DICKINSON.

SIR,—Dr. J. D. W. Whitney's suggestion (*Journal*, November 10, p. 1116) for a card-index of pharmaceutical products would appear to be admirably met by the *Index of New Products* published by the Pharmaceutical Society of Great Britain. This index began in 1949 and costs £2 2s. per annum. Manufacturers supply the Pharmaceutical Society with the required details of their products. The Society, which is also the publisher of the *British Pharmaceutical Codex* and the *Extra Pharmacopoeia* (Martindale), edits these details and issues a new card for each new product, with revision cards from time to time. The result is an up-to-date index of scientific integrity, comprehensive in its detail and free from commercial bias.—I am, etc.,

Liverpool.

N. A. HERDMAN,
Home Sales Manager,
The Distillers Company (Biochemicals) Ltd.

Pitfalls in Medicine

SIR,—Many of us will have read with enjoyment and the greatest interest Dr. A. H. Douthwaite's Croonian Lectures (*Journal*, October 20 and 27, pp. 895 and 958). There is, however, one pitfall unfortunately only too common to which he does not refer but which is amply illustrated in the lecture, and that is the misinterpretation and misuse of radiological investigation. This is particularly evidenced by the suggestion that some radiologists believe it pointless to carry a barium-meal examination beyond the ileo-caecal region. I can assure Dr. Douthwaite that even in the backwoods such a view has not been held for many years (if ever), and even in the sylvan glades of the metropolis there can only be a few eccentrics who do not agree that the colon is not completely investigated unless a barium meal has been followed through to the anus.

It ought now to be generally recognized that much of the unreliability of radiological examinations stems from ignorance of the principles and methods involved, and, indeed, in the sixty years since Roentgen put this diagnostic weapon in our hands it is still seldom used efficiently. That this is so is a consequence of medical education. It is a fact that medical men, during their medical education, spend many weary hours making microscopic slides and learning about pathological changes in tissue, yet they would not make a pathological diagnosis without consulting the pathologist. Yet these same practitioners, on the strength of half a dozen sketchy lectures on radiology and fortified by the experience of wielding a box-camera in their youth, will think nothing

DEC. 1, 1956

CORRESPONDENCE

German Measles and Abortion

SIR,—In an inaugural address at King's College Hospital Medical School Lord Justice Denning is reported to have expressed the opinion that "Law and medicine went hand in hand when the Oath stipulated that the doctor should in no way misuse his art or skill. The law in regard to abortion would, his lordship was sure, permit the practice in regard to German measles. The law in England, he hoped, was in complete accord with common sense in this matter" (*Journal*, October 6, p. 821).

With reference to the position of medicine in regard to abortion and German measles, the attention of your readers is drawn to the summing-up of the medical viewpoint which appeared in a leading article in the *British Medical Journal*, September 8, 1951. In this article the following was stated, *inter alia*, "Maternal rubella in the early months of pregnancy is apparently thought by some to necessitate termination of the pregnancy . . . the medical evidence can hardly be taken to justify such a course. . . . If rubella does occur, then it is important that the anxieties, if present, of the parents should be relieved as much as possible by letting them know that they are quite likely to have a normal baby, and that, if the baby is affected, it will not necessarily be seriously."

In view of the fact that conflicting views have been expressed, it is suggested that a further leading article summarizing the present-day position would be of value in guiding medical and legal opinion.—I am, etc.,

Claremont, C.P.,
S. Africa.

R. LANCE IMPEY.

Bleeding from the Cord

SIR,—As a result of one or two personal scares caused by the occurrence of bleeding from the umbilical cords of babies delivered some hours before, I was prompted to inquire how often this happened, and to try and discover why it should be possible after seemingly adequate precautions had been taken. At the Birmingham Maternity Hospital it was the practice to divide the cord between clamps and later to tie the cord twice with tape before the proximal clamp was removed. In spite of this, investigation showed that in the course of nine months some degree of bleeding from the cord occurred in 32 babies; in eight of these the bleeding was sufficient to cause some alarm, while on one occasion transfusion was considered necessary. The bleeding nearly always occurred about two to four hours after delivery. Inquiries sent to departments in other parts of the country showed that, although the incidence elsewhere was probably less than in Birmingham, there had been occasions where the baby had actually died as a result of this haemorrhage.

How, one might ask, could such a simple procedure for controlling bleeding fail to be invariably successful? The clues to the detection of the cause were that bleeding usually occurs where there has been marked shrinkage of the cord, and when the cord is inspected the ligatures are now found to be loose and inadequate. Professor Jeffcoate kindly inquired of cases occurring in his departments, and found only very few cases of minor haemorrhage over a number of years. This he suggested might be due to the fact that the cord was not tied until the baby was bathed, usually one to two hours after it was born, so that shrinkage had largely occurred before the ligatures were applied. A little detective work in our own hospital showed that the cord was being tied soon after the baby was born. The remedy we are suggesting is as follows: (1) The cord is first divided between clamps and one ligature of tape is applied between the proximal clamp and umbilicus (tape is preferred for this ligature, as the finer ligature material may actually cut through vessels in the cord and cause bleeding). (2) When the baby is bathed about two hours later the tape is removed and a ligature of plaited thread is tied over the site occupied by the clamp. In this way there should be little doubt that there will be sufficient compression of the cord by the second ligature to prevent bleeding.

of making a firm diagnosis on an x-ray film. How often has one not observed, with rueful indulgence, medical practitioners, both general and specialist, holding x-ray films upside down, somewhere between the sink and the window, and coming to some unwarranted conclusion therefrom.

Even in these enlightened times, requests for x-ray examinations are only too frequently pushed into the department as soon as it opens, with the clinical details, if any, filled in by the ward sister and the house officer's initials (often forged) scrawled underneath—the whole accompanied by a verbal message to say please could it be done as soon as possible, so that the films are ready when Dr. Snooks does his rounds in two hours' time. Then again we have the special specialist who likes to read his own films and interpret them in the light of his own specialty and regardless of the old axiom that a patient is a person and not a case in a special clinic, and thereby missing some important evidence that lies outside his own ambit. His report is often regarded as a radiological report, and radiology falls into disrepute as a result.

No, Sir, the field of knowledge in medicine is now so extensive that no man can encompass it in its entirety, and, popular or unpopular, adequate results can only be attained by consultation and exchange of views between colleagues. Anything less than this is a disservice to medicine and an injustice to our patients, but until this liberal view is recognized and acted upon we radiologists must continue in our gloomy dens unhonoured, unvisited, and, we hope, unsued.—I am, etc.,

Newton Abbot, Devon.

A. ROBINSON THOMAS.

SIR,—Dr. A. H. Douthwaite, in the second of two excellent Croonian Lectures (*Journal*, October 27, p. 958), described a case of carcinoma of the distal colon in a man of 60. The history was suggestive; a barium meal follow-through increased the suspicion; but a barium enema showed no evidence of the neoplasm which was found at operation a month later. Dr. Douthwaite uses this case to oppose the opinion of "some radiologists" that a barium enema gives more reliable information about the colon than does a barium meal. With reference to the radiological demonstration of colonic carcinoma I would suggest that an overwhelming majority of radiologists favour the enema.

It would be unfortunate if the publicity given to this failure of a barium enema to demonstrate carcinoma should influence doctors to place more reliance on a barium meal follow-through. For Dr. Douthwaite's case was exceptional. It is an extreme rarity for a carcinoma of the distal colon to be demonstrated with certainty by a barium meal, whereas with a barium enema it is a common occurrence. The argument that an irregularity in the bowel may be completely obliterated by the hydrostatic pressure of an enema cannot apply to the post-evacuation films, which usually show good mucosal detail, especially in the distal colon.

The usual barium meal follow-through goes on for 48 and 72 hours, and often longer. It is reliable for the demonstration of diverticula, but its value in the detection of colonic carcinoma is minimal. Most radiological departments are overworked, and can ill afford the time spent on an examination which seldom reveals as much of significance in the colon as does a properly performed barium enema.—I am, etc.,

Reading.

PAUL CAVE.

Itchy Measles

SIR,—An unusual feature of a local measles epidemic is the intense irritation complained of by a large majority of the patients. Several children have said that the rash has been far more itchy than the chickenpox they had this summer. I have had several requests for calamine lotion to allay the irritation, and this is something that I have not come across in other measles epidemics. Apart from this the cases appear quite classical, and I wonder if we are seeing some modification in virus behaviour here.—I am, etc.,

Oxhey, Herts.

ERIC J. TRIMMER.

It may be that few of your readers have had any cause for alarm on this account. I feel, however, that eternal vigilance is necessary to prevent the sudden catastrophe, and occasional investigation into methods of cord ligature may be a useful prophylaxis.—I am, etc.,

Birmingham, 15.

A. L. DEACON.

Cutaneous Anthrax

SIR,—At the suggestion of my good friends, Dr. G. C. Dockeray and Dr. H. Foy, I am putting on record the fact that during the past seven years at Magadi Hospital over 500 cases of cutaneous anthrax, mainly in Masai (a nomadic cattle-rearing tribe), have been treated with penicillin under my supervision.

Year	Masai	Other Africans
1950	64	8
1951	32	7
1952	35	5
1953	43	6
1954	58	9
1955	96	7
1956 (to date)	130	2
Total	458	44

There have been three deaths only, all in small children, one of whom died within a few minutes of arrival at the hospital. The mortality rate in treated cases is therefore less than 0.5%, so that the prognosis is very good indeed.

Most of the lesions were typical "malignant pustules." A few patients who attended early had itching sores, rather like scratched insect bites. Localized "oedematous impetigo" should lead one to suspect anthrax in an area where the disease is common. Diagnoses were confirmed by laboratory examination of exudates from the lesions in all but 28 cases. The anthrax-infected "itching sore" is a pitfall for the unwary, especially in afebrile children who may be sent away with merely a local application, as happened in one instance in my series. The child was admitted the following day with typical massive oedema around the sore, convulsions, and a temperature of 104° F. (40° C.). Fits are not uncommon in children suffering from this disease, possibly because of meningo-encephalitis associated with septicaemia.

Adults respond well to intramuscular procaine penicillin in oil in doses of 300,000 units daily until 24 hours after they become afebrile (usually in three or four days). Children require heavier dosage. I have given up to 2,400,000 units of "distaquaine" initially, but such a large dose is probably unnecessary. I still give 900,000 units of distaquaine immediately to a child if the temperature on admission is 104° F. (40° C.) or over. Butobarbitone sodium controls convulsions very well. I do not give any local treatment other than calamine lotion.—I am, etc.,

Magadi, Kenya.

T. H. WHITE.

Colonic Motility

SIR,—I was interested in your annotation on colon motility and the significance of the observations of research workers in this field over the years (*Journal*, October 13, p. 870). My experience is that interpretation is very difficult, and I advise against drawing hard and fast conclusions from the work of Davidson and his colleagues at Cornell¹ on Type IV waves. To me a potentially significant point was the absence of these waves in seven children with ulcerative colitis (of more than one year's duration), not the matter of whether they had diarrhoea or not. Between 1946 and 1949 I investigated colon motility in 21 cases of ulcerative colitis, five cases of colon neurosis, and one case of duodenal ulcer, one carcinoma of stomach, one hysteria, one megacolon, and one colostomy for cancer of rectum. In the last year I have made more studies in colitis, Crohn's disease, and in one hypertensive subject, and this work is continuing. The length of each record is from two to three hours, and in some it has been repeated.

It is true that some cases of ulcerative colitis show a flat record with an inactive colon, but this is not invariable. My records tend to show that it is more common in the chronic form of the disease than in the acute severer types. This could be explained by physiological rest. After inserting the balloon through a sigmoidoscope it is usual to see a quiet period for 20 to 30 minutes which I have thought may be due to inhibition. It must not be confused with a genuinely inactive bowel. Most ulcerative colitis subjects, however inert their bowel, can produce some activity if tender emotional subjects involving their own life situation are discussed. If they still do not respond, morphine 1/12 gr. (5.4 mg.) intravenously has a remarkable effect on increasing tone and restoring motility of the normal type, if a little more excitable. Stimuli which had previously failed, such as gastrocolic reflex, increased stretch, and especially emotion, now succeed. It is possible that future investigators may find this a useful manoeuvre.

I cannot draw any definite conclusions from my work, and I think the whole matter of what happens in the colon when an ulcerative colitis patient takes umbrage is still wide open, though I am inclined to think that vascular changes, haemorrhage, and oedema in the mucosa may be the major factor, but this would not exclude muscular activity (Lium's² original work) as of contributory importance.—I am, etc.,

Ipswich.

JOHN W. PAULLEY.

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Physiological Castration Syndrome in Breast Cancer

SIR,—The interesting paper by Professor G. J. Hadfield and Mr. J. A. G. Holt (*Journal*, October 27, p. 972), dealing with the effect of castration upon breast cancer, has prompted me to send a short note of a case of this kind that I have dealt with recently.

My patient was aged 34, with three children, and was seen 19 months ago with an enlarged, hard breast completely infiltrated with carcinoma. I removed the breast and numerous infected glands that were present along the axillary and subscapular vessels. The operation was followed by a thorough course of radiotherapy, administered at University College Hospital. The patient remained well for six months; then the skin around the mastectomy incision became uncomfortable and was found to be widely infiltrated with recurrent cancer. No further radiotherapy was possible at this time, but on the advice of Dr. Gwendoline Hilton I castrated the patient. The ovaries were enlarged to the size of big walnuts, and histological examination showed that both were extensively infiltrated with highly malignant spheroidal cancer cells. A crystal of testosterone was implanted at the same time. After the operation the condition of the skin over the chest soon improved, and it became clear that the growth was of hormone-dependent type. A further course of radiotherapy was given to the operation area just one year after the breast was removed. At present the patient appears very well. It seems that the activity of the growth is controlled and secondary deposits are in a stage of regression which has lasted over 13 months. In view of the age of the patient, the type of tumour, and the early and extensive recurrence, this seems to me most remarkable.—I am, etc.,

Chobham, Surrey.

L. G. HIGGINS.

History of Adrenal Virilism

SIR,—Professor F. T. G. Prunty (*Journal*, September 15, p. 615) mentioned Sampson (1697) as the first writer to describe the adreno-genital syndrome. According to H. Keil,¹ two cases were described more than 2,000 years earlier than this in a part of the Hippocratic writings which have never been translated into English. Keil's rendering is from the French of Littré:

"At Abdera [a married woman] had had children previously; but her husband having fled, her menses became suppressed for

a long time; afterwards pains and redness in the joints . . . the body assumed a masculine appearance, this woman became hairy all over, a beard appeared in her, the voice became rough . . . [she] died not long after." [A second patient in Thasos] "The only hope of restoring her womanly attributes lay in the return of her menses but . . . this woman soon died."

—I am, etc.,

East Melbourne, Australia.

MICHAEL KELLY.

REFERENCE

- Kell, H., *Bull. Hist. Med.*, 1949, 23, 201.

Future of Diagnostic Procedures

SIR,—The letter from Dr. J. Shackleton Bailey (*Journal*, November 10, p. 1119) makes some interesting comments. He does not mention the possible genetic hazard in the case of his patient, but it may be as relevant as the leukaemia hazard.

Dr. Bailey does throw out the suggestion that modified echo-sounding and radar apparatus might find medical use, and this may well be so in the future. A modified mine-detector, however, is already in clinical use for the localization of metallic foreign bodies, especially during the progress of an operation for removal. So far as I know, they are only commercially available from the Berman Laboratories of New York, and Samuel Berman¹ has described the instrument and its use. I only know of four Berman locators in use in this country (in London, Newcastle, and Cardiff), but there must be already a score of surgeons who find the removal of needles, etc., greatly simplified by their use. I understand that at least one British firm is contemplating the manufacture of an instrument of this type. Should it appear on the British market, many hospitals will want to have one. This, at any rate, is one practicable step towards the reduction of radiation exposure of the population through diagnostic radiology.—I am, etc.,

S. B. OSBORN,
Principal Physicist,
University College Hospital.

London, W.C.1.

REFERENCE

- Berman, S., in *Medical Physics*, 1950, edited by Otto Glasser, Vol. 2, p. 1102. Year Book Publishers.

SIR,—Dr. J. Shackleton Bailey's letter (*Journal*, November 10, p. 1119) indicates the desirability for a definite pronouncement by a responsible body on the possible dangers of diagnostic radiological procedures involving doses which are very small in relation to those known to cause local damage to the skin or other tissues. Recent publications have suggested that there is a slight risk of producing leukaemia or other malignant disease from very small doses of x rays.¹⁻³ Nevertheless, we do not consider that his patient should have been refused radiography "because of the risk of producing leukaemia." We believe these risks to be quite secondary in importance to the genetic effects of radiation. We regard the risk of inducing leukaemia and malignant disease, if substantiated, as one which will presumably become apparent and calculable in the foreseeable future and will constitute a hazard which can be evaluated by clinicians.

While we await further details of the survey on which Dr. Alice Stewart is engaged, it seems likely that the risk of obstetric radiography is very small when considered in relation to the overall stillbirth and neonatal death rates. The information given by radiology is such that at the present time the risk of inducing malignant disease should certainly be ignored. It seems desirable to review radiographic procedure, partly with the object of minimizing the extent to which the gonads of patients, departmental and nursing staff, etc., who have not yet passed the reproductive period are irradiated. Many of the recommendations of the International Committee on Radiological Protection are ignored in diagnostic x-ray departments. The genetic effect of radiation is cumulative and likely to cause recessive mutations which may be serious in years to come if a sufficiently large proportion of the population has been irradiated.^{4,5} Furthermore, these effects are irreversible and will remain a permanent burden to future generations.

Radiology is an invaluable diagnostic method which carries, for the most part, probably a minute risk, and it should be used when the examination is likely to furnish information either positive or negative which is of value in the elucidation or management of the condition from which the patient is suffering or to allay anxiety. It is, however, obvious that indiscriminate and over-enthusiastic radiography of children, young adults, and pregnant women is to be deplored—largely because of the long-term genetic effects on the population.

Until more is known about the risks of diagnostic radiology it is questionable if it is justifiable to conduct radiographic surveys of normal or asymptomatic subjects under middle age for furthering academic knowledge. We believe that there is a strong case for questioning all married women of the child-bearing age referred for radiography of the lower abdomen or pelvis as to the possibility of pregnancy. Whenever possible, radiography of the abdomen should be avoided during the first three months of pregnancy and carefully controlled subsequently. It also seems desirable, in order to avoid irradiating an unsuspected pregnancy, that radiography of the pelvic region should be confined to the post-menstrual fortnight in married women.⁶

We consider that some modifications of apparatus are desirable—e.g., a shaft of light emitted by the x-ray tube to indicate the size of the primary beam falling on the patient, and a stricter discipline is required of the radiological staff to limit the extent to which the patient is irradiated when a particular part is under examination (How often is a baby's abdomen irradiated when its chest is being radiographed?).—We are, etc.,

C. K. WARRICK.

F. T. FARMER.

Newcastle-upon-Tyne.

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Fetishism Treated by Aversion Therapy

SIR,—I would like to point to a rather gross error in Dr. M. J. Raymond's recent article "A Case of Fetishism Treated by Aversion Therapy" (*Journal*, October 13, p. 854).

Dr. Raymond states at the beginning of his article that he had been able to find only three apparently successful results in established cases of fetishism quoted in the literature. A purely superficial glance through the literature on this subject, however, reveals quite a number of reports of successful cures by analytical methods in cases of fetishism—and I have no doubt that a careful search would reveal many more. Abraham¹ mentions the successful analysis of a fetishist; Stekel² quotes several successful results; both Nunberg³ and Hunter⁴ report on cures; and T. Hornik's⁵ brilliant and successful analysis of a case of fetishism should be read by all people interested in this problem.

Dr. Raymond's article gives the impression that the cure of a case of fetishism is a rather haphazard procedure, depending on such factors as "co-operative wives" or "temporal lobectomy." It should be stressed, however, that the analytical approach is in no way haphazard. It has not only helped us to arrive at a comparatively profound understanding of the aetiology and symbolism of fetishism but has also evolved a technique of treatment that can usually be relied on to achieve a partial or complete "cure" (whatever this means when one is dealing with an illness that has often spread to the core of a patient's personality and character). The argument for the analytical treatment of fetishism is admittedly weakened by the fact that Dr. Raymond's case had already received a long dose of analysis.

Dr. Raymond has clearly put a lot of thought and ingenuity into his successful attempt at curing his fetishistic patient by aversion therapy. But I feel that this form of

treatment should be reserved, as it was in this case, for cases that are not amenable to analytical treatment. It would be unfortunate if aversion therapy came to be considered as a primary method of treatment for fetishism, for this would be to reject the positive contribution inherent in the analytical method, which attempts to probe to the roots of a symptom and, by understanding it, to treat it. Let aversion therapy be used as a last resort, by all means, but it should not replace an already established (and often successful) method of treatment.—I am, etc.,

London, N.W.8.

S. E. SMITH.

REFERENCES

- ¹ Abraham, K., *Selected Papers*, 1927, p. 136. London.
- ² Stekel, W., *Der Fetischismus Dargestellt für Aerzte und Kriminalologen*, 1923. Vienna.
- ³ Nunberg, H., *Int. J. Psycho-anal.*, 1954, 35, 5.
- ⁴ Hunter D., *ibid.*, 1954, 35, 302.
- ⁵ Hornik, T., *Psychologie*, 1955, 7, 441.

SIR,—The article by Dr. M. J. Raymond (*Journal*, October 13, p. 854) on a deconditioning process, even if only embryonic, offers solid grounds for hope that at last we may be able to deal more constructively with that obscure group of psychoneuroses known as the fetishes and perversions, and indeed many others who have been wrongly conditioned.

Doubtless the aversion technique needs improvement. Dr. Raymond tried apomorphine in his perambulator case, with the success reported, while I have on one occasion used antabuse with not so signal a success. I cannot help feeling that we need some drug—not at present discovered, so far as I am aware—which will create in the mind itself a psychological feeling of disgust and revulsion, rather than a physical action associated with nausea and vomiting. The great thing, I think, is to time the two things exactly, the disgust fantasy in the mind, and the sight, sound, or smell—i.e., the fetish or perversion sensation—and then to establish this by force of habit and repetition until cure is established.

Life as we live it in this world of flesh consists very largely, if not wholly, of images and conditioned reflexes, and if those who work in mental hospitals or with the mentally afflicted knew no other psychology but about these matters their understanding of the human mind would be facilitated. Fetishists and pervers are, of course, only a small body of a large group of people wrongly conditioned; none the less, they are an important group because of their antisocial tendencies. At the Tavistock Clinic, and elsewhere since, I have handled various fetichisms and perversions—locks of hair, high-heeled shoes, whips, leather, women's clothes, etc. (but never perambulators)—by the familiar methods of psychotherapy, suggestion, hypnosis, psycho-analysis, and re-education therapy, without, I fear, any lasting success. Recently I have had a young man with an inclination to strangle when he passed an elderly (not a young) woman on the stairs. My investigations into the psychopathology of such states almost invariably reveal a close association in childhood (and sex floods the system much earlier than we think) between two signals, the equivalent of Pavlov's signals, between a sexual sight, sound, or smell, perhaps of an unusual nature, and a tidal wave of sex in the individual himself at a time of undue sensitivity, and almost invariably in the case of the male—which is natural enough, because the male, in contrast to the woman, must, in the normal course of events, be activated by a symbol, a symbol of womanhood, so far as his normal sex life is concerned.

This faulty impression or image, so emotionally charged, becomes indelibly stamped on the psyche by force of habit or repetition, ultimately substituting for, in whole or part, the natural sex urge. And it is to this, the replacement, the patient now responds on every occasion, or whenever he is particularly sensitized through depressive factors, stress, and so forth. There can be but one hope—deconditioning—and it is indeed to Pavlov and his researches into the conditioned reflexes we have to look for the first illumination.—I am, etc.,

Exminster, Devon.

JOHN W. FISHER.

Strychnine Poisoning

SIR,—With reference to the medical memorandum by Dr. Cecily Statham on a case of strychnine poisoning (*Journal*, November 10, p. 1101), I would like to remind practitioners that mephenesin ("myanesin," "tolseram," etc.) is a powerful and specific antidote to strychnine. It may be given by intravenous injection if necessary, in doses of up to 30 mg. per kg. weight. There seems to be no reason why control of fits should not be maintained by continued slow intravenous drip of a suitably dilute solution, which would appear to offer a less hazardous and "staff-consuming" procedure than anaesthesia plus curarization plus controlled respiration for a whole day.

I would stress that I have not had the opportunity to try this technique, as the few cases of strychnine poisoning I have seen have been mild and easily controlled by intramuscular phenobarbitone sodium and mephenesin as an elixir taken orally, but it works in animals.—I am, etc.,

Cardiff.

J. D. P. GRAHAM.

Radioactive Key-light

SIR,—Recently I was sent a "luminous ignition key-light," and think that many other doctors will have received a similar article. Simple tests made locally showed the key-light to be radioactive, although it had come unscreened through the post.

Two expert opinions have been obtained upon the sample. The radioactive content, mainly derived from radium, was found to be of the order of 5.5 microcuries. This is less than the safe tolerance dose when the key-light is kept at a distance greater than 10 cm. The device might, however, do harm if kept in the pockets for a time, or handled by young children as a plaything. May I warn your readers of the probable danger were one of these articles to be accidentally swallowed by a child? If, therefore, the light is not used as instructed it is desirable to arrange for its safe disposal. I am also informed that if one is placed near a photographic film the emulsion is likely to become fogged.—I am, etc.,

Leamington Spa.

D. LIVINGSTONE.

The Motor Show

SIR,—Your correspondent (*Journal*, October 20, p. 938) has, I am sorry to see, written a rather inconsequential article on the recent Motor Show; he has mentioned hardly any of the practical points which might interest the prospective purchaser, particularly if a medical man.

The most noteworthy feature of this Motor Show was the deplorably bad design of most of the cars from the practical point of view as distinguished from pure mechanical efficiency, a fault which in some respects almost amounted to criminal negligence in design. A prospective purchaser must consider whether he wants a car for work, pleasure, travelling long distances, airing his girl friends, or merely for parking outside his front door. Half the cars at the Show were fit only for the latter purpose.

If you are a doctor, you must have a car that you can get in and out of thirty times a day without breaking either your legs or neck. Whoever you are, you must have a car that you can drive on a rainy day without facing the danger of concussion every time the car goes over a bump. If you are to drive for long periods you must have a seat that does not predispose to painful orthopaedic conditions. Now the basic fault with modern cars is that they are designed for the female driver. As a result a man can hardly get in and out of the machines. Roofs are all too low, so that in almost any car there is a danger of banging your head on the roof, while in some cases, including one semi-limousine costing over £2,000 and all the sports cars of whatever price, my head actually touched the roof when I was sitting comfortably. The only sports car that I could get into with the hood closed was the cheapest. The difficulty with the roof can be overcome by sitting well forward

in the seat with the back well rounded, but this is the very position which predisposes to prolapsed intervertebral disk and causes so much discomfort to countless motorists.

Having eventually squeezed yourself into a car, you find that the steering wheel is in the wrong place, and there is nothing that you can do about it, for the pre-war steering wheel of adjustable length and rake is a thing of the past. In some cases the pedals are so set that they cause a marked strain on the muscles of the lower leg. Finally, what amounts to the almost criminal is the crowding of the pedals. My own car is one of the cheapest models and yet one of the roomiest; its performance is indifferent, but I can sit upright in the seat without getting backache and yet have 4 in. (10 cm.) clearance between my head and the roof, but the seat, alas, lacks any pretence at design; it gives no support to the back anywhere near where it is required: yet even in this roomy car I find that the inside of my right shoe gets worn by the brake pedal while the outside of the shoe is wearing away the panelling of the bodywork. I have driven cars in which I could not use the foot-brake without also depressing with the same foot either the accelerator or clutch: could anything be more dangerous or more likely to cause accidents? I must add that I am large but no giant, being a mere 6 ft. 1½ in. (1.8 m.) and taking size 10 shoes.

If present tendencies continue, our cars will only be fit for midgets. Let us hope that next year there will be more cars for men and more consideration for some elementary points of safety and simple anatomy.—I am, etc.,

Huntingdon.

R. T. D. FITZGERALD.

Neostigmine-resistant Curarization

SIR,—The dangerous and not uncommon condition of persistent post-operative oligapnoea after the use of relaxants in patients distended by ileus has been described by Dr. A. R. Hunter (*Journal*, October 20, p. 919) and subsequent correspondents under the resounding title of "neostigmine-resistant curarization."

So far I have thought of this state all too simply as a diaphragm-resistant ileus and have tried to relieve an endiaphragm-resistant ileus by adding a slight foot-down feeble and captive diaphragm by adding a slight foot-down tilt of the bed to the routine measures of resuscitation. I see now that this humdrum mechanical concept will not do; but I shall continue to worry about how the diaphragm, and curare-synergistic bacterial toxins, can ventilate the lungs when splinted by an abdominal balloon.

Many of these patients arrive, even without the aid of relaxants, neostigmine-resistant or not, at the stage of respiratory inadequacy well described by Dr. J. F. Rickards (*Journal*, November 10, p. 1114), where one may well ask:

"Can storied Urn or animated Bust
Back to its Mansion call the fleeting Breath?"

and Dr. Rickards answers specifically: "Drugs and hyper-ventilation have no effect." I feel that we should fix the more familiar causes of apnoea well in front of our eyes before we plunge deeper into biochemical speculations.—I am, etc.,

Exeter.

W. J. WALTER.

SIR,—I have read with interest, not unmixed with horror, the recent correspondence on neostigmine-resistant curarization. Surely the solution of the problem lies in its prevention—that is, in the avoidance of the use of any relaxant drugs whatsoever in cases of intestinal obstruction. No doubt it is extremely interesting to speculate on the possible causes of death in these cases, but our work should aim at the preservation of life rather than in the production of stimulating, scientific post-mortem discussions.

As has been shown in the recent survey of anaesthetic deaths,¹ our main worry is vomiting, and the obstructed patient is very prone to vomit during induction, even where an oesophageal tube has been inserted and suction applied

to empty the stomach of its contents. To use thiopentone and relaxant drugs on such patients is asking for trouble at the start, quite apart from any question of neostigmine failing to do the trick later on. I suggest that a safer though less spectacular method is the nitrous oxide-ether sequence with intubation. This may appear to some to be old-fashioned and unprogressive, but, if it results in a diminution in the number of fatal accidents, then I think there is something to be said for it.—I am, etc.,

Glasgow.

REFERENCE

- ¹ Edwards, G., Morton, H. J. V., Pask, E. A., and Wylic, W. D., *Anaesthesia*, 1956, 11, 194.

ALBERT CHRISTIE.

Cholesterol and Vascular Disease

SIR,—In a recent letter (*Journal*, November 17, p. 1172) Sir John McNee mentions that cholesterol dissolved in sunflower oil when fed to rabbits causes atherosclerosis, whereas similar experiments in cats caused no such lesions. Recent work by Bronte-Stewart¹ and others would suggest that the use of sunflower oil as a solvent in the above experiments was unfortunate.

It has been shown that vegetable oils (especially sunflower and peanut oils), by virtue of their unsaturated fatty acid content, protect the human subject from the rise in serum cholesterol which normally accompanies a cholesterol-rich diet. For the same reason, marine oils have a similar cholesterol lowering effect; whereas all fats of animal origin (including eggs and milk products) and saturated vegetable oils (as artificially produced by hydrogenation in the manufacture of margarine and most cooking fats) cause a sharp rise in serum-cholesterol.—I am, etc.,

London, W.1.

REFERENCE

- ¹ Bronte-Stewart, B., Antonis, A., Eales, J., and Brock, J. F., *Lancet*, 1956, 1, 521.

J. NICKSON.

SIR,—Sir John McNee's reminiscence (*Journal*, November 17, p. 1172) on Anitchkov's early experiments is a charming contribution to the history of experimental atherogenesis. However, his remark regarding the role of cholesterol in human vascular disease, that feeding experiments were only successful in one herbivorous animal, the rabbit, calls for some comment.

While for many years rabbits were used almost exclusively in these feeding experiments, further investigations in this line on other herbivorous animals showed surprisingly poor results. Experimental atherosclerosis could be produced only in two more herbivorous animals, in the guinea-pig and hamster,¹ and later on most of the experimental work was done on mixed-fed animals. Perhaps the most extensive studies were performed on chicks, mainly in Chicago, either by feeding large amounts of cholesterol alone² or adding stilboestrol to the cholesterol-rich diet.³ Steiner and Kendall⁴ produced typical vascular changes in carnivorous dogs by adding thiouracil to the cholesterol feeding, and after many failures atheromatous changes could be caused in "middle-aged" obese rats on diets "modelled on that of patients who developed coronary thrombosis."⁵ Incidentally, even in ducks and geese similar lesions could be effected by dietary means.⁶ Lastly, in an adult rhesus monkey extensive atherosclerosis, together with cutaneous manifestations of xanthomatosis, could be produced recently by prolonged high cholesterol feeding.⁷

Perhaps of even greater importance is the experimental production of extensive atherosclerosis by, not necessarily extensive, deficiency of different dietary factors. In rhesus monkeys widespread atheromatosis was produced by pyridoxine-deficient diet,⁸ and these findings were confirmed quite recently not only in monkeys but also in dogs.¹⁰ Furthermore, in cebus monkeys a cholesterol-supplemented diet, deficient in, but not completely devoid of, sulphur-containing protein produced extensive atherosclerotic changes.¹¹

In this short letter this vast subject cannot be discussed in detail. I only want to reiterate the statement that at the

present state of research little doubt exists about the intimate relationship of cholesterol metabolism and human atherosclerosis. It would appear that the most promising approach to this problem lies in more experimental and clinical studies on the *interrelationship* which influences the production and maintenance of high blood lipid levels in men; even more important is their permanent reduction, possibly by physiological means. Such work is in progress in several centres, and advances may be expected in the near future.—I am, etc.,

London, W.1.

Z. A. LEITNER.

REFERENCES

- Altschul R., *Amer. Heart J.*, 1950, 40, 401.
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- Horlick, L., and Katz, L. N., *J. Lab. clin. Med.*, 1948, 33, 733.
- Chalkoff, I. L., Lindsay, S., Lorenz, F. W., and Entenman, C., *J. exp. Med.*, 1948, 88, 373.
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- Wissler, R. H., Ellert, M. L., Schroeder, M. A., and Cohen, L., *Fed. Proc.*, 1952, 11, 434.
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- Rinchart, J. F., and Greenberg, L. D., *Amer. J. Path.*, 1949, 25, 481.
- Mussett, C. H., and Emerson, G. H., *Proc. Fed. Amer. Soc. exp. Biol.*, 1956, 15, 526.
- Mann, G. V., Andrus, S. B., McNally, A., and Stare, F. J., *J. exp. Med.*, 1953, 98, 195.

SIR.—Sir John McNee is to be thanked for referring (*Journal*, November 17, p. 1172) to his early demonstration of atheroma developing in rabbits fed with cholesterol, thus confirming the work of Anitchkov. Sir John emphasizes that this method was only successful in giving rise to atheroma in herbivores, and he states that he is unaware that atheroma has ever been produced in carnivorous or mixed-feeding animals by similar means. In this connexion it may be of interest to recall the more recent results of Steiner and Kendall.¹ These workers in fact succeeded in causing pronounced atheroma in dogs by feeding cholesterol along with thiouracil. In these experiments intense hypercholesterolaemia and also hyperlipaemia preceded the development of atheroma. Apparently, without simultaneous depression of thyroid activity, cholesterol in the diet cannot alone produce sufficient hypercholesterolaemia in dogs to cause atheroma; Steiner and Kendall used thiouracil so as to inhibit thyroid activity.

Sir John McNee suggests that the failure to produce atheroma, in any but herbivorous animals, by feeding cholesterol, diminishes the importance of the results with rabbits in their bearing on human disease. The work of Steiner and Kendall, however, indicates that excessive cholesterol in the diet, when coupled with depression of thyroid activity, may indeed be a potent factor in the generation of atheroma in omnivorous animals like man.—I am, etc.,

Cambridge.

KENDAL C. DIXON.

REFERENCE

- Steiner, A., and Kendall, F. E., *Arch. Path.*, 1946, 42, 433.

Degree in Nursing

SIR.—The Royal College of Nursing is convinced that nursing to-day is a truly academic discipline, and it recommends university training lasting perhaps five years. Dear, oh dear! As such graduates are intended eventually to become matrons and holders of other senior posts, does this mean that the less scholastic State-registered nurses will be bracketed with the State-enrolled assistant nurses and auxiliary helpers, and will be debarred from more responsible and lucrative posts?

Would it not help the recruitment of nurses if the syllabus of subjects for State-registration could be made less academic, and the course shortened by a year? As the evolution from student nurse to sister has repeatedly shown that in many cases "the ugliest duckling turned out to be the fairest of the swans," and vice versa, would it perhaps be a better plan to have a scheme by which each year a certain number of sisters could be sent to the universities to study politics, philosophy, and economics, if there are some posts for graduate nurses at home and abroad?—I am, etc.,

Crowthorne, Berks.

RUDOLPH PAYNE.

Irradiation-induced Malignant Hypertension

SIR.—The letter by Dr. R. W. Luxton (*Journal*, November 17, p. 1176), in which he states that we "appear to have made a somewhat limited examination of the literature" (*Journal*, October 20, p. 910), cannot go unanswered. Dean and Abels¹ did not describe a similar case, since their patient did not have malignant hypertension, nor did they claim it. Both Dr. Luxton's own patients who did have malignant hypertension died within seven weeks of the onset of symptoms, without nephrectomy.

Dr. Luxton regards as more serious that we did not mention that both kidneys may be badly damaged by radiation. It appeared so self-evident that when both kidneys have been exposed to the same dose of radiation they may suffer the same fate that it did not seem necessary to mention it, and in our particular patient the fact that there was a significant difference in the dosage sustained by the two kidneys was recorded. We believe that when, years after irradiation, one kidney is found after full investigation to be functioning normally the possibility that it has suffered serious damage can reasonably be excluded. In our case, we recorded that intravenous pyelography, chromocystoscopy, and micro-urea concentration all indicated normal function in the right kidney.

Finally, Dr. Luxton overlooks the fact that, where there has been an extensive upper abdominal deposit from a testicular growth, this is usually in close relation to one kidney and may by pressure or actual infiltration predispose to unilateral radiation damage. We did, in fact, mention this possibility in our patient. We are not quite certain as to the lesson which Dr. Luxton intends to point in his letter, unless it is that renal function tests are not to be relied upon in this condition. If, indeed, we had proceeded on that view, our patient would not have had his nephrectomy, and his life would not have been saved.—We are, etc.,

W. M. LEVITT.
S. ORAM.

London, W.1.

REFERENCE

- Dean, A. L., and Abels, J. C., *J. Urol.*, 1944, 52, 497.

Medical Relief Appeal

SIR.—I am very distressed to find political letters, or at least letters with a strong political bias, being published in the correspondence columns of the *Journal*.—I am, etc.,

London, W.1.

LIONEL TAYLOR.

Treatment of Iron-deficiency Anaemia

SIR.—Dr. A. Piney (*Journal*, November 10, p. 1118) and Dr. M. E. Lampard (p. 1119) take me to task on the subject of iron stores. Dr. Lampard says that my "statements are hardly credible, as 50% or more of the nation would be anaemic, or on the verge of anaemia." The credibility of a statement does not turn upon the size of the problem it purports to reveal. And 50% is, of course, Dr. Lampard's own figure: I quoted none because I know of none. However, here is an extract from a recent publication,¹ chosen at random: "Due to the periodic menstrual blood loss in woman during her reproductive life, the female enters pregnancy usually in a rather precarious state of iron balance, and may spend her entire life prior to the menopause in a state of greater or lesser iron deficiency." I do not know what one of Dr. Lampard's female patients would say about "having her hide pricked," as Dr. Lampard puts it; but I think I know what alternative she would suggest if told to take one iron tablet a day for the rest of her life. I think, too, that the Chancellor of the Exchequer might be interested in any such ingestion on a wide scale.

Dr. Piney objects to my statement that "at a haemoglobin level of 100%, iron absorption from any oral preparation is very small." I mentioned two supporting papers in my original letter. I will now quote from another of the many papers² on this topic. It says: "Although the intestinal uptake in iron-deficiency anaemia may be 2-10 times that occurring in the normal individual, it has been noted that once the anaemia is corrected, uptake slows down and tissue stores are only slowly reconstituted. Has Dr. Piney some

evidence to the contrary? Or does he think that after the haemoglobin level returns to normal in a case of iron-deficiency anaemia one should continue to treat the patient with oral iron for, say, twelve months or even, as Dr. Lampard suggests, for life? Would that really be better than four or five injections given in a week?

Dr. Piney mentions the danger of siderosis resulting from parenteral iron therapy. Siderosis may be a danger, but it has an air of unreality, for to my knowledge it has never been reported. Dr. Piney also says that there is no justification "for treating every case by the parenteral route." This is tilting at a windmill, for I did not say there was any such justification; though in fact I think a quite substantial windmill could be erected. The same criticism applies to his statement that "the saturation of rather hypothetical iron-receptors in the intestinal mucosa is too facile an explanation," for I did not mention hypothetical iron-receptors, saturated or otherwise. I used the term "mucosal block" as anyone writing about this subject is bound to. I know, as I am sure Dr. Piney does, that there are many hypotheses to explain the block, some of them facile; but none of them can be laid at my door.

Dr. Piney is absolutely right in saying I made the subject simple (though not, I think, unduly simple): I did so because, as with all important matters, the essentials are simple, and because the correspondence columns of the *Journal* are not the place for the minor subtleties of the matter.—I am, etc.,

S. BRADSHAW.

Benger Laboratories Ltd.,
Holmes Chapel, Cheshire.

REFERENCES

- Hamilton, H. G., Higgins, R. S., and Alsop, W. S., *West. J. Surg.*, 1954, 62, 205.
- Sacks, M. S., *Ann. intern. Med.*, 1955, 42, 458.

Glycyrrhetic Acid

SIR.—I have found difficulty in reconciling Dr. Brian Russell's comparative evaluation of glycyrrhetic acid (*Journal*, November 10, p. 1113) with his evaluation of hydrocortisone.¹ In the latter he could not emphasize too strongly the necessity of including a large number of patients in the trial to give conclusive results, a point with which we could all agree. In his letter Dr. Russell is ready to be dogmatic and claims to have evaluated the anti-inflammatory action of glycyrrhetic acid on the barest of evidence—namely, 7 cases of one brand and 8 cases of another.

I should like to show the fallacy of these miniature trials. Dr. Russell reports in his letter that out of 15 cases treated with hydrocortisone he obtained 13 improvements—namely, 87%; in his evaluation of hydrocortisone he obtained 87% improvements in 82 out of 132—namely, 62%. It is interesting, however, that 32 cases out of these 82 were only "slightly improved," showing that good results were only obtained in 38% cases. I am sure that this only emphasizes Dr. Russell's own warning on the dangers of small-scale trials.

Glycyrrhetic acid is a complex chemical, the value of which has yet to be fully appreciated,^{2,3} and where the vehicle can play such a great part it requires experience and selection of cases for a true appreciation of this drug. This is the key to the problem, and I find glycyrrhetic acid of great value for the subacute and chronic conditions, whereas hydrocortisone excels in the acute case, where glycyrrhetic acid is not so effective.

Dr. Russell in his evaluation of hydrocortisone reports 12 cases of infantile eczema: cleared without relapse—0; completely controlled—2; much improved—0; slightly improved—6; unchanged—4; worse or course abandoned—0. I consider these statistics a gross underestimate of the true facts, again illustrating the fallacy of figures.

I would like to compare his findings with 13 cases which I have treated with "biosone G.A.": cleared—3; much improved—8; failed—2. In addition to these cases my results with biosone G.A. in the treatment of "itchy inflammatory conditions" were: much improved—13 (48%); cleared—11 (41%); failed—3 (11%) (these results have been abstracted from a paper of mine dated July 5, awaiting publication).

I am sure that the results in selected cases prove "that glycyrrhetic acid has an anti-inflammatory action when applied to the skin." It is a question of selection of cases and the degree of response. In view of the possible lowering of costs continued investigation and trials are essential.—I am, etc.,

E. COLIN-JONES.

Hove, 2.

REFERENCES

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- Colin-Jones, E., *ibid.*, 1956, 2, 145.
- *British Medical Journal*, 1956, 2, 604.

Location of Veins by Palpation

SIR.—Venoclysis is a very common procedure in clinical practice. Very useful accounts of the procedure are given in most textbooks dealing with the subject, but scant attention appears to be paid to the technique of location of veins by palpation. Any surgeon who uses multiple ligation of varicose veins as part of his operation for varicose veins must have resorted to finding the veins by palpation when the ink-markings have been erased during pre-operative skin preparation. The finger tip when run horizontally across the limb feels a sort of emptiness and not fullness when it passes over the vein. In normal subjects, with little practice, the same method can be used to locate veins both in upper and lower limbs with fair ease, except perhaps in infants. In cases of burns involving the proximal part of limbs with oedema in the distal part this method appears to be the only method that will help. It is also particularly useful in shocked patients when the veins are collapsed.

Repeated futile attempts are often made to enter a vein with a needle. Much valuable time, particularly when dealing with a shocked patient, can be saved by an early resort to cutting down under local analgesia. A set of instruments can be easily kept available in a small sterile drum with the necessary towels, etc. Cutting down is both quick and certain. A cannula or a polythene catheter is less likely to get blocked or be dislodged. The use of a tourniquet to distend the veins when doing a cut-down is not only unnecessary but undesirable, as it only leads to bleeding and obscuring the operative field.—I am, etc.,

S. PARKASH.

Mansfield, Notts.

Standardization of Surgical Implants

SIR.—The recent article by Mr. W. H. Cater and Mr. J. H. Hicks on corrosion in metal used for internal fixation¹ has been considered by the British Standards Institution Technical Committee on the Standardization of Surgical Implants.

While this committee is not yet in a position to give an opinion on the best material to be used for this purpose, it is considered that, where stainless steel is used, it must be of the molybdenum-bearing type corresponding to specification En58J in British Standards 970 and 1449:1956, and that the use of all other types of stainless steel, including that commonly known as "F.S.L." (which has no molybdenum) and corresponds to British Standards specification En58E, is to be avoided. En58J is identical with the British branded material "F.M.B." and to the American 18-8 SMO. As it is made by a number of manufacturers under other trade marks, it is advisable to use British Standards nomenclature to avoid confusion.—I am, etc.,

NORMAN CAPENER,

Chairman, B.S.I. Technical Committee on the
Standardization of Surgical Implants.

REFERENCE

- Cater, W. H., and Hicks, J. H., *Lancet*, 1956, 2, 871.

Christmas Gifts Fund

SIR.—I would like to remind your readers who have not yet responded to the President's appeal (*Journal*, October 6, p. 824) that it is our custom to distribute the gifts some days before Christmas.

I hope all who can will send their contributions marked "Christmas Gifts" to the Secretary, Royal Medical Benevolent Fund, 1, Balliol House, Manor Field, Putney, London, S.W.15, as soon as possible.—I am, etc.,

F. A. JULER,

Honorary Treasurer,
Royal Medical Benevolent Fund.

London, S.W.15.

Obituary

Sir LIONEL WHITBY, C.V.O., M.C., M.D., D.Sc. LL.D., F.R.C.P.

Sir Lionel Whitby, Regius Professor of Physic at Cambridge, Master of Downing College, and a former President of the B.M.A., died in the Middlesex Hospital after an operation on November 24, aged 61. When appointed to the professorship at Cambridge he was mainly known as a bacteriologist, as an international authority on haematology, and as the organizer of the Army Blood Transfusion Service in the war of 1939-45.

Always a man to inspire confidence, he cheerfully accepted positions of great responsibility, coming to the right decisions firmly and without fuss; it was this quality in particular, combined with his geniality, which made his term of office as Vice-Chancellor of the University of Cambridge from 1951-3 so successful.

Lionel Ernest Howard Whitby was a West-countryman, the son of Mr. Benjamin Whitby, of Stoke St. Gregory, Somerset. Born on May 8, 1895, he was educated at Bromsgrove School, of which he later became a governor, and Downing College, Cambridge, to which he won the senior open scholarship. Instead of going straight up to Cambridge he enlisted in the Royal Fusiliers in 1914, and in the following year was commissioned as machine-gun officer in the Royal West Kent Regiment. During the war he served in Serbia, Gallipoli, Salonika, and France, where, in 1917, he was awarded the M.C. for gallantry at Passchendaele. In 1918, when he had reached the rank of major, he was severely wounded and had to have a leg amputated. After his recovery he began to study medicine at Cambridge, going on to the Middlesex Hospital, where he was Freeman scholar and winner of the Leopold Hudson prize and Hetley clinical prize. Graduating M.B., B.Ch. in 1923, he was appointed assistant pathologist at the Middlesex Hospital shortly afterwards, and was also bacteriologist to the V.D. clinic. He took the D.P.H. in 1924, the M.R.C.P. in 1927, and proceeded to the M.D. in the same year. Even at that time his interests were in the subjects with which his name came to be associated, for he was writing on pernicious anaemia and on the organisms causing empyema not long after he had qualified. From the very first he displayed an active interest in research and a characteristic ability to teach.

Whitby's name first came before the general public in 1929, when he was one of the group of physicians

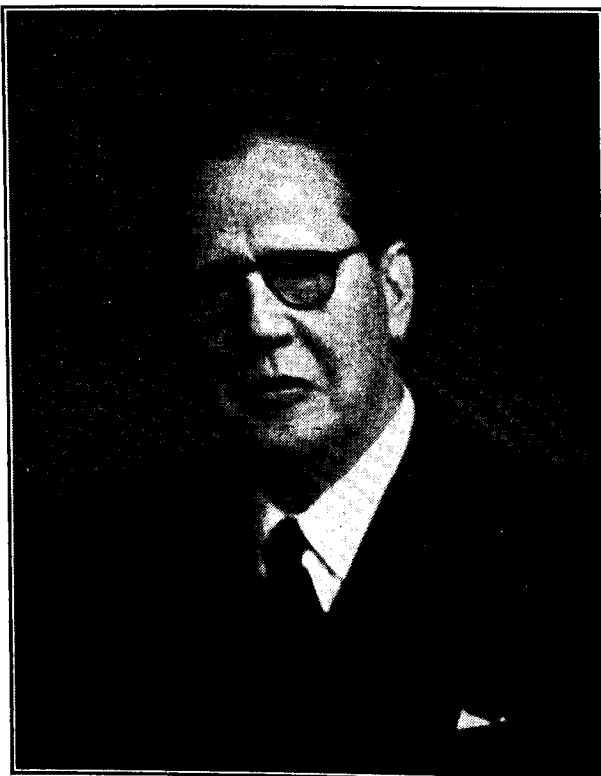
who attended King George V in his serious illness. Later in that year he was appointed C.V.O. His reputation as a brilliant clinical pathologist grew quickly, and he was elected F.R.C.P. in 1933. Besides being on the staff of the Middlesex Hospital as bacteriologist, he worked for some years as pathologist at the Hampstead Hospital for Children, and it was at this time that he wrote a number of well-known textbooks. With Sir Charles Dodds he was the author of *The Laboratory in Surgical Practice* (1931), and the first edition of *Medical Bacteriology* appeared in 1928 (sixth edition, 1956) and of *Disorders of the Blood*, which he wrote jointly with Dr. C. J. C. Britton in 1935 (seventh edition, 1953). When the sulphonamides were introduced in 1936 Whitby

eagerly turned to the study of their potentialities, and it was largely his work that led to the success of sulphapyridine (M & B 693) in the treatment of pneumococcal pneumonia. He summed up his research in this field in the Bradshaw lecture before the Royal College of Physicians in 1938. In the following year he was awarded the John Hunter triennial medal and prize by the Royal College of Surgeons for his work on sulphapyridine.

At the beginning of the second world war Whitby was a colonel in the Territorial Army and despite the disability of an artificial leg served throughout the war, attaining the rank of brigadier. As officer in charge of the Army Blood Transfusion Service he had an immense task which he per-

formed with outstanding success. Stationed for much of the time at the Army Blood Supply Depot at Southmead Hospital, Bristol, he was not only responsible for the collection of blood and its supply to armies in the field, but he established also a school for training Army officers in transfusion. He travelled constantly all over the British Isles and in the various theatres of war, and during the illness of Sir Winston Churchill in 1943 and 1944 he was called in to give advice on the chemotherapeutic control of the infection from which the Prime Minister was suffering. In Whitby's own description of the blood transfusion service of the Army he wrote: "One outstanding reason for the greatly improved results of treatment of casualties in the war of 1939-45 was the fact that the restoration of the general condition of the wounded man was made possible by the ready availability of blood (or its derivatives) which could be transferred into the circulation of the patient" (*The History of the Second World War—Surgery*, 1953).

Whitby was knighted early in 1945. The war over, he was paid the high compliment of being offered the chair of Regius Professor of Physic at Cambridge.



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Apart from welcoming this great honour he moved to Cambridge with a feeling of relief that this would take him out of the approaching National Health Service. Though he recognized that the cost of medical care made some kind of national provision of medical services inevitable, he disliked the shape of things that were to come, much of which went against the grain of his sturdy individuality and his sense of professional fitness. Yet with all this he was always ready to play his part, to moderate, to persuade, and to be firm without rancour. An old Downing man and an honorary fellow of the college, he was a popular choice for the mastership, which fell vacant in 1947. Since then Whitby immersed himself enthusiastically in the affairs of his college, of the Cambridge medical school, and of the university. His term of office as Vice-Chancellor, from 1951 to 1953, was a stimulating one, for he had a practical grasp of committee business which was the envy of his colleagues, and he and Lady Whitby lent distinction and charm to official gatherings of all kinds.

Honours came to Sir Lionel Whitby from all sides. He was a Commander of the American Legion of Merit and a Chevalier of the Legion of Honour. From the Royal Society of Medicine he received the triennial gold medal for his distinguished work on wound shock and the transfusion of blood and blood derivatives. He was also a gold medallist of the Society of Apothecaries and an honorary member of the American Association of Physicians and of the New York Academy of Medicine. In 1946 he was visiting professor of medicine at Harvard, where he gave the Cutter lecture, and he was president of the International Society of Haematology in 1950 and of the Association of Clinical Pathologists in 1951. He was an honorary fellow of Lincoln College, Oxford, an honorary LL.D. of the University of Glasgow, and an honorary D.Sc. of Toronto. When visiting Australia last year as Sims Travelling Professor, he delivered the Sir Richard Stawell oration before the Victorian Branch of the B.M.A.

Whitby was an ideal president of any international gathering of doctors. His unruffled demeanour, his friendly approach to all and sundry, and his orderly mind ensured that everything would go without a hitch and harmoniously. These qualities showed themselves to perfection when he was President of the First World Conference on Medical Education in London in 1953, an office he cheerfully assumed at short notice owing to the illness of Sir Henry (now Lord) Cohen. Whitby was on this occasion what our American colleagues call a "shirt-sleeves" President. His ability to get down to the essentials of the business was highly appreciated by the colleagues with whom he worked on that occasion, and his presidential address at the opening session of the conference in London made a great impact on the 600 delegates from 63 countries there assembled. Their appreciation of his masterly conduct of the conference was shown in a moving way at the Conference banquet when all present spontaneously rose to their feet by way of salutation when he got up to speak. He continued the work begun by this committee set up to study its *Proceedings* and to make recommendations for the second conference. In 1950 he gave the Sir Charles Hastings lecture in the Great Hall of B.M.A. House on the theme, "Can Disease be Prevented?" No one will forget his great services to the Association as its President in 1948-9.

At Cambridge, where he was honorary physician to Addenbrooke's Hospital, Whitby was closely concerned with the expansion of the medical school and saw many constructional and administrative changes during his tenure of the regius professorship. For his own college, too, he worked tirelessly and saw the opening of its impressive new buildings a few years ago.

Whitby was always proud of his West-country descent, and for a good many years before and during the war he had a cottage in south-west Dorset, to which he would retire for an occasional day or two and fish on one of the small streams in the neighbourhood. After this brief relaxation he would plunge once again into the multifarious activities of his professional life. As a man, Whitby was direct, friendly, and completely free from pomposity or affectation. He disliked wasting words and thus time in committee meetings. He always tried to suffer the foolish gladly, and he dealt with them firmly and imperturbably and never with malice or in an unkindly way. His own mind was clear, and he regarded the more involved mental processes of some of his colleagues with a good-humoured tolerance. He was convinced that Britain had a great contribution to make to world medicine, and this conviction he carried with him to the great benefit of his own and other countries in his extensive travels abroad. Whitby was a great patriot, a great lover of England, and an intensely loyal son of his own university of Cambridge. He never failed to respond to any request to help forward causes which appealed to his own mind and nature, and when it was suggested after the conference on education that he might take part in the central work of the World Medical Association he agreed to join its Council. At its meetings in different European capitals, and only this autumn in Havana, he played an active part, especially on the W.M.A.'s medical education committee. He and Lady Whitby quickly endeared themselves to the doctors and wives of other countries who gathered together at the annual assembly of the World Medical Association, and no better ambassadors for Britain and British Medicine could be imagined. In his many-sided activities Whitby was immensely helped by his wife, herself a doctor. As a major in the R.A.M.C., Lady Whitby worked side by side with her husband, and to her and their sons and daughter the heartfelt sympathy of their many friends in many countries will be extended.

We are indebted to the Rt. Hon. HENRY WILLINK, Master of Magdalene College, Cambridge (Minister of Health 1943-5), for the following appreciation:

Saturday's tragic news that Lionel Whitby had died shocked and grieved the whole university beyond any words. Comparatively few had known that he was seriously ill: many had seen him but a few weeks ago and had thought him to be full of strength and vigour. All who came into any sort of contact with him felt him to be at the height of a great career with many years of distinguished work ahead of him. This is not the opportunity nor am I qualified to make an adequate assessment of his services to his university, to medicine, or to the college over which he presided with such charm and distinction. I can only write as one who served with him on the central bodies of the university, as his immediate successor in his vice-chancellorship, and as a friend. His acceptance of the Regius Chair of Physic in 1945 was a most notable event for his university. It was not only that, it was an act of both sacrifice and vision. Others will speak with more direct authority, but there is no doubt in my mind that his tenure of the chair, with its great and complex responsibilities, will be

remembered in any history of the Cambridge medical school as a period of outstandingly constructive achievement. Though by instinct strongly conservative, he seized with both hands the opportunities for progressive change presented by the National Health Service. Nor is it for me to speak of his work for Downing College. The monuments of his Mastership are for all to see: a college chapel of great beauty, a fine addition to the spacious court, the college hall restored and beautified. Cambridge will sadly miss his friendly conversation. It will long remember the courage and patience which treated the serious wound of the first world war and the consequent severe lameness as of no account. But there are many who will most cherish the memory of Lionel Whitby in his home, not alone, but with her who shared his every interest and with one or more of the children to whom he was so devoted.

We are indebted to Professor H. R. DEAN, Professor of Pathology in the University of Cambridge, for the following appreciation:

In 1945 Whitby returned to Cambridge as Regius Professor of Physic and physician to Addenbrooke's Hospital. In 1947 he became Master of Downing College and for two years, 1951 to 1953, he was Vice-Chancellor of the University of Cambridge. By these three appointments, within a term of six years, Whitby's wisdom, experience, and capacity for management were greatly and widely approved. In 1945 the university medical school and Addenbrooke's Hospital were facing many problems. The return of the Leys School to Cambridge had reduced the number of available beds from approximately 700 to 400, while there had been no corresponding fall in the number of patients expecting admission. The long-delayed liaison between the university and the hospital had raised many problems, and the Health Service was imminent. As the chairman of the honorary staff committee and later of the medical and many other committees, Whitby soon showed his ability for effective but tactful management. While his work was always scrupulously prepared, he was always able to see all aspects of a problem and often to effect a speedy and happy solution. He had a happy knack of making friends and of disarming unnecessary friction. In the successful amalgamation of the hospital laboratories with the university departments, he took an active and effective part. As chairman of the hospital medical committee, Whitby has been a moving spirit in planning improvements to Addenbrooke's Hospital and to the United Cambridge Hospitals as well as in the preparation of plans for the new hospital in the Hills Road. In medical education, both for the undergraduate and the postgraduate, he was always greatly interested and has played an effective part in the development in Cambridge of a postgraduate medical school.

Of the mastership of his college this is no place to write, but his colleagues, the undergraduates, and the buildings of Downing College bear witness to Whitby's efficiency and popularity. For the two years when he was Vice-Chancellor of Cambridge his efficiency and popularity will be remembered by many members of the university, but those who knew him best will remember Whitby as a staunch colleague and a trusted friend.

Dr. C. J. C. BRITTON writes: There will be many people in many parts of the world for whom Sir Lionel Whitby's death will be a very grievous loss. I first met him personally some twenty-six years ago when he taught me, as a young pathologist from overseas, the principles and practice of medical research, and I have been working with him in the closest friendship ever since. I had known and admired him for some years before this, for, as a lecturer in bacteriology, I had found his book *Medical Bacteriology* to be the most succinct and useful book on the application of bacteriology to clinical medicine at the time in existence.

Whitby was a great man who had not lost the common touch. His great success and honours did not spoil him. He was always ready to help his juniors and to go to great lengths in forwarding their interests. He attracted the

loyalty of his assistants and extracted from them their best in their professional life. He had no place for jealousy, and the advancement of his colleagues always pleased him. He made friends wherever he went and in whatever country. His honesty, his obvious sincerity, his humour, his common sense, and his grasp of his subject made him one of the finest lecturers I have ever met. He had the power of correlation of facts on any subject that enabled him to give a practical, realistic, and logical review of any problem that he was discussing. He did not limit himself to the current state of a problem, but in the last decades he was able frequently to predict the results and advances to be expected in the future and to find his predictions proved correct.

His contributions to medicine are many. He did much work on the treatment of pneumonia with specific pneumococcal antiserum, and his work on the discovery of the value of sulphapyridine in pneumonia was outstanding and led to world-wide recognition of his work.

From the time of Munich he organized the Army Blood Transfusion Service into the first and finest in the world—a service which became the model for all later blood transfusion services organized by the Allied Armies. During the war many hundreds of medical officers of many nations were trained by him in blood transfusion organization and methods. At the end of the war, when he was appointed Regius Professor of Physic at Cambridge and Master of Downing College, he rapidly extended his influence in the wider problems of medicine and medical education throughout a large part of the world. He made a number of visits to America, sometimes as visiting professor, and gave many lectures in many countries. He had just returned from a tour of the West Indies and North America, and as a Sims Professor in Australia and New Zealand, when he was discovered to be suffering from the condition from which he died.

Very few people in their lifetime have accomplished so much in such a quiet way. Whitby was a true and perfect example of a clinical pathologist. He believed that the pathologist should be in close touch with the patient and should apply his knowledge of the science of pathology to the art of medicine. He felt strongly that the complete separation of the pathologist from the clinical side of his work was a retrograde step, and as Regius Professor of Physic at Cambridge he ensured that contacts between bedside and laboratory should be close. All his writings were clear, concise, readable, and practical, and his three textbooks *Hygiene for Nurses*, *Medical Bacteriology*, and *Disorders of the Blood* are all "best sellers" because of these features.

Many medical men from the Commonwealth and foreign countries have worked in his departments during his lifetime; all those whom I have met have told me of the benefit and encouragement they have received from Whitby. His recent tour was a succession of reunions with those whom he had made not only his intellectual debtors but his personal friends. His innumerable friends, and I know of no enemies, will mourn his loss deeply, and none more than I, but we have known and will have memories of a man who will always be an example and inspiration for our future. Whitby has died at the height of his career and of his powers, but he has left a great legacy of work, integrity, courtesy, and humour which can never be forgotten.

Dr. MARTIN HYNES writes: Whitby's laboratory in the mid-thirties was a place to stir the mind of any young man. In the far corner at the end of one long bench sat Whitby himself, and next to him Britton. Between them lay piles of manuscripts that by long discussion, sometimes fierce argument, and always prodigious hard work became the volume that elevated haematology from a superstition to a science. Before long the laboratory was invaded by boxes of white mice, which we injected with lethal doses of cocci and then fed with new sulphanilamide derivatives brought in by Ewing. Within a few months Whitby picked out one compound for clinical trial, and M & B 693 made the long-

drawn agony of pneumococcal pneumonia a thing of the past.

During these major activities Whitby somehow found time to supervise the routine bacteriology and blood counts of the Middlesex Hospital, to give his annual course of lectures and practical classes, to run a very extensive private practice, and to prepare two editions of *Medical Bacteriology* for the press. Yet he never seemed hurried. He would cheerfully leave whatever he was doing to advise the most junior of us on any problem we brought to him, whether pathological or personal, and under his unobtrusive guidance a stream of research came out of the laboratory.

In September, 1939, Whitby moved quietly to Bristol and began to create a transfusion service for the Army. Here for the first time he showed his genius for really large-scale organization. Throughout the war the Services' rising demands for blood and plasma were met without fuss and without strain. In the Army he won the same affection and respect as in civilian life, and on demobilization was appointed its adviser in haematology. In Cambridge Whitby revealed his full stature. His unaffected modesty enhanced the true greatness of his character, and added distinction to the dignities of Regius Professor, Master, and Vice-Chancellor. His counsel was universally respected, and he came between the faculty of medicine and the rest of the university. He became a leading figure in the world of international medicine, eagerly sought as lecturer and visiting professor in the United States, Australia, and New Zealand.

One's first memory of Whitby as a man is his unvarying kindness. He suffered even fools gladly and sent them away much wiser by his advice. He loved to show friends his garden, and to experts could talk with authority of fish and postage stamps. The full quality of his mind was always hidden by his modesty, and it was only in retrospect after a conversation that one realized his breadth of knowledge and clarity of vision. His premature death has left a gap that will not easily be filled.

D. MURRAY LYON, M.D., D.Sc., F.R.C.P.Ed. D.P.H.

Professor D. Murray Lyon, professor emeritus of clinical medicine in the University of Edinburgh, died at his home in Edinburgh on November 16, aged 68.

David Murray Lyon was born on September 12, 1888, in Wooler, where his father was a veterinary surgeon. He was educated in Edinburgh at George Watson's College and at the university, where he followed a family tradition by studying medicine. Murray Lyon graduated with honours in 1910 and quickly began to establish himself as a promising young clinician with a real flair for research. However, as an officer in the Special Reserve of the R.A.M.C. he was called to the colours on the outbreak of the first world war. Before joining the British Expeditionary Force in France he married Edith Dona Lloyd, who returned to her nursing post in the military hospital established in what is now the Western General Hospital, while he was in lance, in the retreat from Mons to the Marne, and to win a mention in dispatches. Murray Lyon spent much of the later part of the war as medical specialist at Rouen, and was demobilized after the Armistice with the rank of major.

Things cannot have been easy in those early post-war years, especially for a physician whose interests lay largely in hospital work and research rather than in the development of private practice, but clinical appointments in the Royal Infirmary, together with part-time teaching posts in the university and in the school of the Royal College, gave Murray Lyon, if not affluence, at

least the opportunity of following his own bent. In 1924, when Jonathan Meakins, first holder of the Christison chair of therapeutics, returned to Montreal, Murray Lyon was an obvious choice as his successor. By this time he was a Fellow of the Royal College of Physicians of Edinburgh (1916), and his research work published in various scientific journals had gained him the degrees of M.D. in 1920 (with a gold medal) and D.Sc. in 1924. When the British Medical Association held its Annual Meeting at Edinburgh in 1927 he served as vice-president of the Section of Physiology and Biochemistry.

The professor of therapeutics at Edinburgh also has charge of wards in the Royal Infirmary. This dual post Murray Lyon held until 1936, and during those twelve

years he acted as director of the clinical laboratories. He also fostered the growth of the department of dietetics which had been started at the instance of Professor Meakins; there Murray Lyon, with Sister Pybus, did notable pioneer work, building up a teaching and practising dietetic unit of international reputation. The burden of clinical, teaching, and administrative work entailed by all

these activities had the inevitable result that Murray Lyon's personal participation in research decreased; but he continued to be a tower of strength to his associates, at whose disposal he freely placed his clear mind and great powers of constructive criticism. Nevertheless his abiding interest in the metabolic diseases, and diabetes mellitus in particular, is reflected in a number of papers published during his tenure of the Christison chair. Perhaps the most important of these were the series, dating from 1923, which dealt with the treatment of diabetes and, by combining dietetic control with the use of insulin, provided valuable immediate help and a foundation for further improvements.

In 1936 Murray Lyon resigned the chair of therapeutics and was translated to the more senior Moncrieff Arnott chair of clinical medicine. A short time was spent in helping the development of the teaching unit established at the Western General and other municipal hospitals, and then he returned to his "charge" at the Royal Infirmary. He found time, in 1940, to undertake the editorship of the *Edinburgh Medical Journal*, a task he continued to carry out until his retirement three years ago. The war years and those following it brought increasing routine and administrative responsibilities with calls to serve on numerous committees in Edinburgh and elsewhere—he was, for example, a member of the Spens Committee on the remuneration of consultants and specialists. But at least one of these calls was a source of great pride and pleasure to him, for he was elected President of the Royal College of Physicians of Edinburgh, and served for the two years 1945 to 1947. As a young man he had also been senior president of the Royal Medical Society. He is survived by his wife, a daughter, and two sons. All three of his children are members of the medical profession, graduates of Edinburgh University, and members of the Royal College of Physicians of Edinburgh.



Dr. C. P. STEWART, to whom we are indebted for the above account of Professor Murray Lyon's career, also writes:

The last few years of Murray Lyon's tenure of the chair of clinical medicine were clouded by failing health, and, though "the Chief" with his indomitable spirit never referred to it and would doubtless have denied it vigorously had anyone else done so, his colleagues saw with concern that his work was costing him more and more in effort.

Murray Lyon was essentially a modest, shy, and sensitive man, and his main interests outside his work—his home and family and his garden—were in keeping with these personal qualities. The more closely one was associated with him the more one appreciated his absolute honesty, his keen sense of justice, his tolerance, and his kindness. These characteristics, indeed, were reflected in his teaching (which was a pleasure as well as a duty to him) and in his approach to his patients, who were *persons* he sought to serve and to help with all the art and scientific knowledge at his command.

In the thirty years during which I worked with Murray Lyon, first as assistant and later as independent colleague, he was always approachable, and always willing, no matter at what cost to himself, to help and advise in problems whether professional or personal. Like many others, I recall with gratitude numerous acts of kindness, often so unobtrusively performed that it was only in retrospect that they were fully realized and appreciated; his shyness, which overlay a warm-hearted and lovable personality, made him try to avoid receiving thanks, though it never made him avoid the act for which he deserved thanks. Much as we, his associates, valued his friendship while we worked with him, it is probably only now that we realize fully how much he helped us and how much his friendship meant to us.

J. K. S. writes: Selected in his mid-thirties to occupy a clinical chair, a post which at that time was regarded as a prerogative of those of advanced years, Professor Lyon must surely have been accepted into the climate of senior physicians, if not with suspicion, yet with undisguised reluctance. Yet his determined purpose and outward poise were such as enabled him to overcome the embarrassments which would have swamped a lesser character. Methodical and painstaking by nature and training, loyal to the traditions of the school he respected, but none the less shy and reserved, even difficult to know intimately, he was never at his best or really happy in the chair, since, unusual in these days, the other point of view was always given full emphasis. Whatever annoyance he felt from time to time at the adverse trend of events, there was always the joyful escape to his quite splendid garden with its unique shrubs and flowers, which, with his family of three while they grew up and his devoted wife, he tended most laboriously. No more lasting tribute could be paid to a doctor, less or great, than that his children—a daughter and two sons—should all follow in his footsteps. He never betrayed the slightest pride in his own or his family's achievement, but one could sense an inward satisfaction that duty was being accomplished. The pride now rests in the happy memories of the family, with whom we join in understanding sympathy.

DENIS CARROLL, M.R.C.S., L.R.C.P.

Dr. Denis Carroll, medical director of the Portman Clinic for Delinquency and a forensic psychologist of international renown, died on November 21 after a brief illness. He was 55 years of age.

Born on May 16, 1901, the younger son of Mr. A. J. Carroll, a distinguished mining engineer, Denis Charles Carroll was educated at King's School, Chester, and at Trinity Hall, Cambridge, of which he was a mathematical scholar. He graduated with first-class honours in both parts of the Natural Sciences Tripos and was elected to the Michael Foster Studentship of Cambridge

University, carrying out physiological researches in Professor Joseph Barcroft's department. Of these, a number were subsequently published in the *Journal of Physiology* and in the *Biochemical Journal*. Turning from physiology to psychology, he studied psycho-analysis and at the same time completed his medical training at the London Hospital, qualifying M.R.C.S., L.R.C.P. in 1927. After qualifying, he pursued his psychiatric training on the staff of the Maudsley Hospital, and in due course was elected an associate, later a member, of the British Psycho-analytical Society. About 1930 he began to devote an increasing amount of attention to the psychiatric aspects of criminology, and took an active part in the development of the Institute for the Study and Treatment of Delinquency (I.S.T.D.). One of the original co-directors of its psychopathic clinic, he was at one time director of research to the institute. He was also medical consultant to the "Q" camps experiment.

Soon after the outbreak of the second world war Dr. Carroll entered the R.A.M.C. and served as a psychiatrist, first at Dumfries Military Hospital in charge of officer psychiatric casualties. Later, he was given the rank of lieutenant-colonel and made psychiatrist to the Western Command, where he was in charge of Northfield Military Hospital, a unit of 1,200 beds, the largest psychiatric centre in the Army. The administrative and clinical duties he undertook in these capacities were extremely onerous, and his work was generally recognized as of the highest order.

Returning to civilian life, he devoted the larger part of his energies to criminological work. At the time of his death he was consulting psychiatrist and medical director of the Portman Clinic for Delinquency, a member of the Home Office Advisory Training Board on Probation, of the Home Office Advisory Council for the Treatment of Offenders, of the Home Office Departmental Committee for Children and Young Persons, of the council of the Medico-Legal Society, of the joint committee of the British Medical Association and the Magistrates' Association, and of the Institute for the Scientific Treatment of Delinquency, on the Scientific Committee and Scientific Group of which he also served. He was in addition at one time chairman of the medical section of the British Psychological Society. After the war he became chairman of a committee founded to train personnel to cope with the after-effects of the war on Austrian youth. He was elected president of the International Society for Criminology in 1950, and presided, with éclat, at the International Congress of Criminology held in London in 1955. The author of a number of papers on various aspects of delinquency, he was also a successful broadcaster on the subject and in constant demand as a teacher and lecturer at criminological training courses.

Dr. EDWARD GLOVER writes: Of the many different types of personality that are caught in the meshes of the faculty of medicine, there exists a small but distinguished band of whom it can be said that they are at the same time born scientists and the salt of the medical profession. Denis Carroll was one of this distinguished fellowship. Endowed with an acute intellect, a profound scientific curiosity, and a natural turn of judgment, he submitted himself readily to the disciplines of scientific training and research. Following a brilliant scholastic and academic career, he became in turn a mathematician, a research physiologist, and, after reaching out tentatively towards what was for him in the first instance the science of psychology, he became in turn a psychoanalyst, a medical psychologist, a general psychiatrist, and finally one of the most distinguished medical criminologists

of this generation. His medical qualification, which at first was a means to the end of comprehensive training, drew out in him the humanism that is the hallmark of the born physician; hence it was not surprising that, in addition to his many preoccupations in the administrative, clinical, and teaching fields of forensic psychiatry, he conducted a heavily laden consulting and psycho-analytical practice. Dr. Carroll was never known to turn down an appeal for professional help from whatever quarter it might come, and for many years carried cheerfully a staggering load of scientific, administrative, and medico-psychological commitments, a circumstance which contributed in no small measure to his tragic death at a time when he was approaching the apogee of his professional career.

For this reason, also, he left behind him a number of clinical communications which, although of a uniformly high quality, represented merely a tithe of the contributions he could have rendered the science he made so peculiarly his own, and which indeed he did so much to set on firm scientific foundations. Another reason was readily apparent to those who knew him intimately. Denis Carroll was one of a rapidly diminishing band of practised and polished *causeurs*. Set him, in course of casual conversation, a scientific problem and his mind literally raced to meet the challenge; almost without taking breath he would embark on an orderly and consecutive survey of the issue, garnished with aphorisms that were the crystallization of ripe and deep experience. Had an amanuensis been present on these often occasions the literature of medical criminology would have been enriched by many gems of scientific improvisation.

The same qualities gave a characteristic stamp to his private relations. Quick and nimble of wit, and master of an encyclopaedic range of general information, he was of an incomparable anecdotalist and could serve up his commentaries on life with a humour that was close to drollery. Behind this social mask there could be found a shy and sensitive individual, of sweet disposition and tender heart, qualities which he poured freely into his therapeutic work and which accounted easily for the esteem and affection in which he was held by his patients and by his closer intimates. In the laudatory idiom of post-mortem panegyric it is often said of a man that his death is a grievous loss to his profession and to his friends. In the case of Denis Carroll this is no mere manner of speaking.

M. J. STEWART, C.B.E., M.D., LL.D. F.R.C.P., F.R.F.P.S.

The obituary of Professor M. J. Stewart was printed in the *Journal* of November 17 at page 1179.

Dr. R. M. HEGGIE writes: A devoted editor, a keen diarist, and a unique character has passed on. He laboured indefatigably in life. Wherever one saw M. J. S., be it in his room at the Algernon Frith Institute of Pathology, which he was instrumental in having built, in the roadway to or from the station, in the train, or in his bed during sickness, he was surrounded by manuscripts, critically correcting. Behind his penetrating expression, characterized by greying hair, bristling eyebrows, steel-rimmed glasses, and a sallow complexion, was a puckishness which was as surprising as it was a delight to the junior members of his staff. He had the best collection of "Tonics and Sedatives" from J.A.M.A. that I know. Many pathologists throughout the country as well as clinicians and countless unknown patients must be for ever grateful to M. J. S. for his "opinion" so freely and expeditiously given. When you handed him a section he would look at the cleanliness of the slide, the mounting of the coverslip, for the presence of any odd air bubble that might have eluded you, and for perfection in the section cut and stained. If it wasn't just right he told you so in no uncertain terms, even as he refused to forgive anybody who asked two people for opinions without disclosing that they had done so. As a chairman he was most tolerant, but occasionally was piqued if you took a line contrary to his, especially since he

regarded you as a friend. He would then call you a term of endearment peculiar to the Senior Service and all was well. His kindness to me as to many others was unsurpassed in his home, his club, at his various society meetings, to which I was invited, and in the medical school of which he was a worthy dean.

Dr. ELSPETH STANFORD writes: As an old student and friend of Professor Stewart's I should like to add my tribute to him as a man. Field-Marshal Smuts said, "It is a great thing to be a man, a great thing," and Matthew Stewart was just that. I remember going with some trepidation to attend my first P.M. and being completely spellbound by the dynamic little man in charge. Of course it was Matthew Stewart. He dashed in like an eager Scotch terrier, and immediately everyone was rapt attention, and soon his spotless white coat was festooned with patterns of kidney and lung where he had dried off sections to show to students. He was a born teacher, with a great sense of humour and a way of making dry bones live, so that one picked up knowledge without realizing it. Then suddenly the delightful Scottish voice would declaim Hood's "Mary's Ghost," or begin a fund of stories about old students. One of the great secrets of his success as a teacher was that he did not look on us as ignorant medical students but as potential professors, and so most of us would have followed him to the end of the earth, and none of us could do shoddy or second-rate work after watching him always give of his best. A Saturday morning with Stewart was an education in itself. Nevertheless, students who interpreted his homely manners as a warrant for experiments in familiarity sustained a shock, as he was a great disciplinarian. It was an inspiration to see him in his own delightful home, both in Leeds and at Stoke Poges, as he tackled everything with enthusiasm. To wash up with him was sheer entertainment: he had the greatest respect for bacteria, so all utensils had to be washed as rapidly as possible in scalding running water. There was nothing humdrum when "Matt" was on the warpath. I should like to take leave of this great man as I last saw him, walking jauntily along a beautiful Buckinghamshire lane, with autumn leaves falling all round him. He was clasping a little boy's hand and telling him all about trees and flowers. And as age and youth walked and talked together I suddenly saw the great keynote of Stewart's life. It was his childlike, simple faith and his great reverence for life.

Dr. S. H. R. BOTTRELL died on October 20, some two weeks before his 90th birthday. Stanley Henry Reginald Van Ryck de Groot (he changed his name to Bottrell in 1930) was born at Georgetown, British Guiana, on November 5, 1866, and studied medicine at King's College, London, qualifying L.S.A. in 1892. While at King's College Hospital he became senior dresser to Lord Lister, and the late Professor Albert Carless was one of his oldest friends. Dr. Bottrell joined the Colonial Medical Service in 1894 as assistant surgeon in the Gold Coast Colony and was stationed at Accra, where he later became health officer of the port. In 1900 he was senior medical officer in charge of a base hospital of the Ashanti Field Force, being awarded the medal and receiving a mention in dispatches. He also served in the South African War, being awarded the medal with clasps. As a captain in the Natal Medical Corps he served in the Zulu rebellion of 1906, again being awarded a medal with clasp. He took the L.R.C.S.Ed. in 1905, and settled in practice at Pietermaritzburg, Natal. Throughout the first world war he served in the R.A.M.C., and when he left the Army he was granted the rank of permanent captain. During his career he took part in five campaigns, and he was at sea with the Merchant Navy for eighteen months during the second world war. Owing to his age at that time—he was well over 70—he decided to return to practice on shore, which he did until 1950, when his health broke down. He married the widow of Dr. E. Bottrell, of Sydney, Australia, in 1930, and she survives him.

Medical Notes in Parliament

Mental Illness Research

Mr. KENNETH ROBINSON (St. Pancras, North, Lab.) asked the Minister of Health if he would specify those research projects relating to mental illness and mental deficiency which were being currently sponsored or financed by the Medical Research Council, showing the estimated annual cost of each.

Mr. R. TURTON, replying on November 23, stated that a number of research projects relating to mental illness and mental deficiency were in progress in the Medical Research Council's social psychiatry research unit. Relevant studies were also in progress in several of the Council's units whose main effort was devoted to other problems. These included: a study of the prevalence of schizophrenia in a rural and an industrial community; the relationship of various social factors to the incidence of schizophrenia and manic-depressive psychosis; a survey of the effects of the operation of prefrontal leucotomy in the treatment of mental disorders; and a study of cerebral abnormalities in epilepsy and of the effects of treatment on the disease. In addition the Council were assisting by means of grants and fellowships to individual workers.

The Council's total expenditure in the current year on projects in the fields of mental illness and mental deficiency was estimated at approximately £30,000. In addition the Council was spending approximately £110,000 on research in applied psychology and neurology.

Mr. ROBINSON asked on November 19 whether the Minister would encourage the introduction into medical hospitals of clinical research teams to take advantage of the wide clinical field for research available there. Mr. TURTON replied that, apart from the Medical Research Council, work estimated at about £70,000 a year had been carried on under the Health Service. That work would be taken over in due course by the Medical Research Council.

Voluntary Patients

Dr. DONALD JOHNSON (Carlisle, Con.) asked the Minister what record he kept of patients who entered hospital as voluntary patients and who were subsequently certified while in hospital; and what was the number of such patients during the last most convenient year. Miss PAT HORNSBY-SMITH, Parliamentary Secretary, said that records for England and Wales were kept by the Registrar-General. In 1954, the latest year for which figures are available, 576 persons who entered as voluntary patients were subsequently certified while in hospital, representing 1.12% of total voluntary admissions.

Dr. JOHNSON asked that such steps as were possible should be taken to see that this figure was reduced to an absolute minimum. Miss HORNSBY-SMITH thought that recently published figures showing that the number of voluntary patients had gone up from 45 to 75% showed very much that, so far as possible, they had voluntary rather than certified patients.

Cancer Registration in Scotland

Mr. W. HANNAN (Glasgow, Maryhill, Lab.) asked the Secretary of State for Scotland on November 20 how many hospital regions had completed their cancer registration and follow-up arrangements. Mr. NIXON BROWNE stated that it had been possible in only two of the five regions to organize a reasonably complete system of cancer registration. The difficulties elsewhere appeared to be mainly medical and statistical, and the Secretary of State had therefore asked the Cancer Committee of the Scottish Health Services Council to inquire into them and suggest ways of overcoming them.

Mr. HANNAN asked him to emphasize the urgency of this information for research purposes. Mr. A. WOODBURN (Clackmannan and East Stirling, Lab.) asked him to ensure

that medical officers who were keen to push on with this work received every co-operation from the Scottish Office. Mr. BROWNE agreed to both points.

Grants for Prescription Charges

Mr. H. MARQUAND (Middlesbrough, East, Lab.) asked the Minister of Pensions and National Insurance what additional charge he estimated would fall upon the National Assistance Board as a result of increased charges for prescriptions under the Health Service.

Miss EDITH PITT, the Parliamentary Secretary, informed him on November 22 that, on the basis of the number of refunds made last year, the additional cost of assistance grants would be about £320,000 in a full year.

Flour Controversy Revived

The flour controversy broke out again in the Commons on November 21, when Dr. BARNET STROSS (Stoke-on-Trent, Central, Lab.) sponsored a motion for the annulment of the Flour (Revocation) Order, 1956, and the Flour (Composition) Regulations, 1956. The argument was concentrated on the latter, and the attack against it was made on three grounds: (1) that in accepting the advice of the Adrian panel the Minister had gone against the advice of his own scientific and medical advisers and of the Medical Research Council; (2) that the terms of reference to the panel were so limited that it was unable to examine the issue fully; and (3) that the Minister had listened much too readily to the millers. On the second point Dr. Stross complained that the panel was told that the only matter it had to consider was the difference between flour at 80% extraction rate unfortified and flour of 70% extraction with the three token nutrients added. Against the millers he argued that their claim that the 70% extraction flour met the popular demand was not proved; and that they preferred it because the wheat offals could be sold profitably for animal feeding-stuffs, or as patent foods to prevent people getting the constipation they were likely to suffer from as a result of eating white bread.

He regarded the report of the Adrian panel as showing nervousness and hesitancy in having to disagree with the scientists at the Ministry and with the Medical Research Council.

The Medical Research Council had pointed out that in addition to the three added nutrients there were four others which were essential to health, and that the 70% extraction must lead to a reduction in some of these. Finally he quoted the leading article in the *British Medical Journal* of June 9 (p. 1347), that a tried safety measure was to be discarded for an untried substitute, adding that if as the years went by it was found that the standard of health was falling off the blame must be placed squarely where it ought to lie.

Mr. HARMAR NICHOLLS, Parliamentary Secretary to the Ministry of Agriculture, Fisheries, and Food, insisted that the panel had covered the whole area of conflict between the experts, and that there was no question of it having to make a report on only one section. The terms of reference were not criticized at the time of its appointment, so there could have been no real complaint.

Dr. STROSS referred him to a sentence in the report: "Enrichment with other essential nutrients is outside our terms of reference."

Mr. NICHOLLS maintained that the matter had been going on for years; everyone knew what was under discussion; and the whole area of conflict was submitted to the panel. The suggestion that the Ministry had ignored the evidence of their own medical advisers could not stand. There were also administrative problems. There was no effective way of checking whether bread was being made at the 80% extraction rate, and there could be therefore a doubt about the presence of the required nutrients. The panel had advised that it would be wise to adopt the positive attitude that the nutrients must be contained in the bread. Consequently, under the new regulations, the test—instead of being the 80% extraction rate—was one which could be more effectively carried out, the determination of the presence of the

DEC. 1, 1956

specific quantities of the nutrients. What was being done achieved what Dr. Stross wished more effectively than the provisions that he wished to retain.

The motion was negatived.

Medico-Legal

ACTION AGAINST ORTHOPAEDIC SURGEON DISMISSED

[FROM OUR MEDICO-LEGAL CORRESPONDENT]

On October 31 at Liverpool Assizes Mr. Justice Jones dismissed a claim for negligence brought against Mr. E. N. Wardle, consultant orthopaedic surgeon at the David Lewis Northern Hospital, and against the United Liverpool Hospital Board by Mrs. J. B. Walker. Mrs. Walker's case was that when Mr. Wardle operated on her right knee he had failed to remove the whole of her cartilage, with the result that she had suffered considerable pain, and after a second opinion she had had a further operation at Charing Cross Hospital, when what Mr. Wardle had left behind was removed. She also complained that the two surgeon registrars and the physiotherapist to whom her aftercare was entrusted, and for whom the hospital board was vicariously responsible, had not carried out their duties properly.

In May, 1952, Mrs. Walker complained of pain in her right knee, and the diagnosis was that her right external semilunar cartilage was torn. On June 20, 1952, Mr. Wardle performed a meniscectomy at the Northern Hospital. He saw her two days after the operation, but apart from that entrusted her post-operative care, in accordance with the normal practice followed at the hospital, to two surgical registrars, and physiotherapy was also given. The evidence of the surgical registrars was that after the operation all the trouble that Mrs. Walker experienced was caused by failure to co-operate in doing the exercises required to restore her muscles from post-operative wasting. Mr. Wardle was so informed. He saw her again on September 24, 1952, and then found her fit for discharge.

In May, 1953, Mrs. Walker attended Charing Cross Hospital with trouble in her knee, which the consultant orthopaedic surgeon, Mr. David Trevor, diagnosed as a tag of cartilage remaining. A further operation was therefore performed at Charing Cross by Mr. Herbert Davis, who removed a piece of tissue which he thought at the time was cartilage, and which was recorded as such in the hospital records. The specimen was not sent for histological examination until about a month later, and a report which no one understood was made on it. It was then handed over to Mrs. Walker. After the action had been started the specimen was examined by Dr. G. B. Manning, a Home Office pathologist, and the slide which had been made at Charing Cross was examined by Dr. H. A. Sissons, of the Royal National Orthopaedic Hospital. It was common ground that what was removed from Mrs. Walker's knee in the second operation was not cartilage but regenerated tissue.

In his judgment Mr. Justice Jones said that he concluded without hesitation that there was no negligence whatever on Mr. Wardle's part and that the post-operative practice followed was the same as that carried out in all the big hospitals in the country. There was nothing to suggest that the two surgeon registrars and the physiotherapist did not carry out their duties in a perfectly satisfactory manner. Much of the responsibility for the action being brought must, he said, be attributed to the entry in the Charing Cross Hospital case notes which indicated that Mr. Wardle had not removed the whole of the cartilage, and which was quite wrong because what was removed during the operation in London was regenerated tissue. Mrs. Walker's action accordingly failed.

The Medical Defence Union instructed Messrs. Hempsons, solicitors, to act for Mr. Wardle.

¹ *Liverpool Daily Post*, November 1, 1956.

INFECTIOUS DISEASES AND VITAL STATISTICS

Summary for British Isles for week ending November 10 (No. 45) and corresponding week 1955.

Figures of cases are for the countries shown and London administrative county. Figures of deaths and births are for the 160 great towns in England and Wales (London included), London administrative county, the 17 principal towns in Scotland, the 10 principal towns in Northern Ireland, and the 14 principal towns in Eire.

A blank space denotes disease not notifiable or no return available. The table is based on information supplied by the Registrars-General of England and Wales, Scotland, N. Ireland, and Eire, the Ministry of Health and Local Government of N. Ireland, and the Department of Health of Eire.

CASES In Countries and London	1956					1955				
	Eng. & Wales	London	Scot.	N. Ire.	Eire	Eng. & Wales	London	Scot.	N. Ire.	Eire
Diphtheria ..	11	0	4	0	1	16	3	9	0	3
Dysentery ..	425	39	260	3	2	535	36	207	7	4
Encephalitis, acute	7	1		0		2	0			
Enteric fever: Typhoid ..	3	0	1	0		5	1	1	0	
Paratyphoid ..	9	0	0	0		12	1	6(B)	0	
Food-poisoning ..	252	19	44	3		544	37		1	
Infective enteritis or diarrhoea under 2 years ..				13	24				16	18
Measles* ..	3,094	232	257	132	143	2,355	36	63	26	61
Meningococcal in- fection ..	40	1	18	1	2	32	1	13	0	1
Ophthalmia neona- torum ..	22	0	6	0		26	1	5	0	
Pneumonia† ..	285	16	176	4		442	33	236	2	
Poliomyelitis, acute: Paralytic ..	72	16	13	1	15	127	15	21	4	13
Non-paralytic ..	49	7				99	9			
Puerperal fever§ ..	213	34	8	1		12	1	9	1	
Scarlet fever ..	643	43	164	24	29	1,011	49	157	31	19
Tuberculosis: Respiratory ..	584	60	133	18		677	66	121	22	
Non-respiratory ..	72	13	18	1		109	4	18	0	
Whooping-cough ..	1,825	81	323	18	16	1,072	62	94	92	80

DEATHS In Great Towns	1956					1955				
	Eng. & Wales	London	Scot.	N. Ire.	Eire	Eng. & Wales	London	Scot.	N. Ire.	Eire
Diphtheria ..	0	0	0	0	0	0	0	0	0	0
Dysentery ..	1	0		0		0	0			0
Encephalitis, acute		0		0			0			
Enteric fever ..	1	1	0	0						
Infective enteritis or diarrhoea under 2 years ..	6	0	2	0	0	4	0	1	2	1
Influenza ..	13	0	0	0	0	18	2	0	0	0
Measles ..		0	0	0	0		0	0	0	0
Meningococcal in- fection ..		0					1	3		
Pneumonia ..	204	23	20	10	10	280	49	21	10	8
Poliomyelitis, acute	2	0			0	8	0	3		0
Scarlet fever ..		0	0	0	0		0	0	0	0
Tuberculosis: Respiratory ..	63	8	4	0	3	62	9	6	1	3
Non-respiratory ..		1	1	1	0		0	2	0	0
Whooping-cough ..	2	0	0	0	0	1	0	0	0	0
Deaths 0-1 year ..	195	29	41	7	13	196	28	24	11	20
Deaths (excluding stillbirths) ..	5,315	785	624	116	153	5,375	795	583	103	166
LIVE BIRTHS ..	7,297	1,079	884	211	337	7,051	1,107	802	213	262
STILLBIRTHS ..	203	25	23			174	23	24		

* Measles not notifiable in Scotland, whence returns are approximate.

† Includes primary and influenzal pneumonia.

§ Includes puerperal pyrexia.

Vital Statistics

Infectious Diseases

The largest fluctuations in the trends of the notifications of infectious diseases in England and Wales during the week ending November 10 were increases of 287 for whooping-cough, from 1,538 to 1,825, 69 for scarlet fever, from 574 to 643, and a decrease of 33 for dysentery, from 458 to 425.

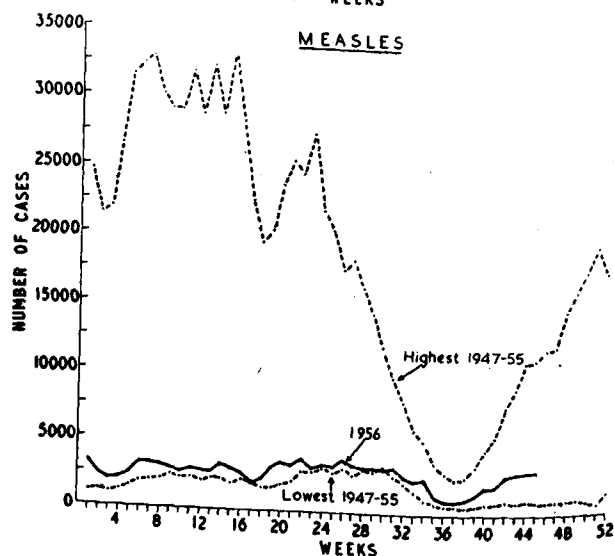
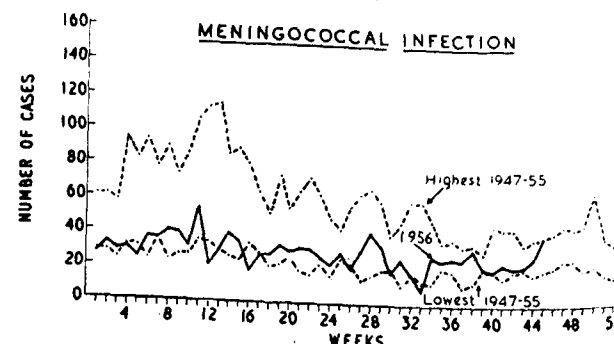
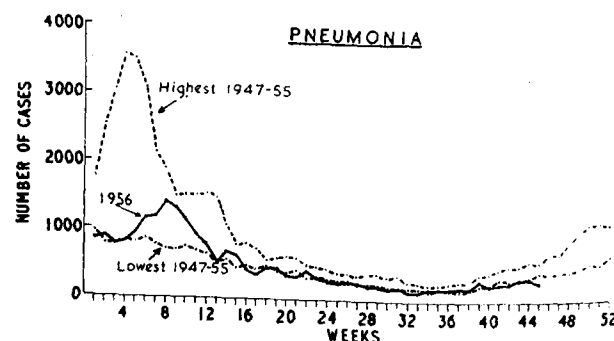
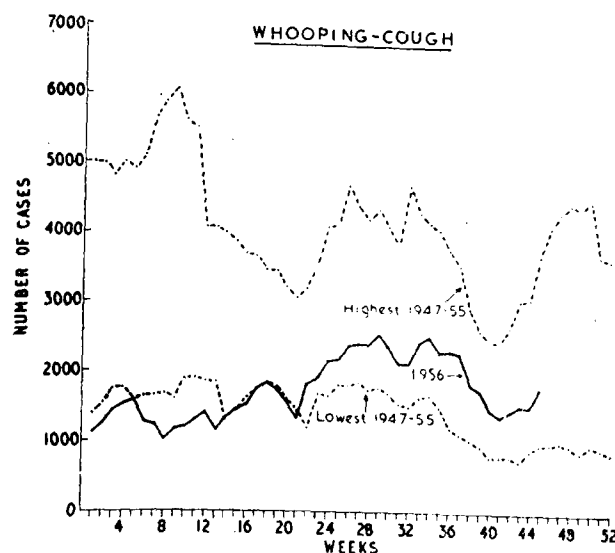
The largest rises in the incidence of whooping-cough were 59 in Staffordshire, from 49 to 108, and 38 in Yorkshire East Riding, from 41 to 79; the largest fall was 32 in Yorkshire West Riding, from 123 to 91. The notifications of measles numbered 3,094, being 5 more than in the preceding week; the largest variations in the returns were decreases of 70 in Yorkshire North Riding, from 139 to 69, 46 in Lancashire, from 924 to 878, and an increase of 55 in Yorkshire West Riding, from 190 to 245. 11 cases of diphtheria were notified, being 7 more than in the preceding week and the largest total for 40 weeks. 7 of the cases were notified in Yorkshire West Riding, Wakefield C.B. No large fluctuations were reported in the local returns of scarlet fever. 4 of the 9 cases of paratyphoid fever were notified in Yorkshire West Riding, Shipley U.D.

121 cases of acute poliomyelitis were notified. These cases were 4 more for paralytic and 18 fewer for non-paralytic cases than in the preceding week. The largest returns were London 23 (Lewisham 6, Battersea 4, Wandsworth 4, Chelsea 3, Greenwich 2), Lancashire 17 (Liverpool C.B. 3, Manchester C.B. 3, Oldham C.B. 3, Bolton C.B. 2, Accrington M.B. 2, Eccles M.B. 2), Middlesex 12 (Ealing M.B. 5, Willesden M.B. 2), Hertfordshire 10 (Bishop's Stortford M.B. 7), Cheshire 9 (Stockport C.B. 3, Runcorn R.D. 2), Sussex 8 (Brighton C.B. 4, Portslade-by-Sea U.D. 2).

The largest centres of infection of dysentery were Yorkshire West Riding 113 (Leeds C.B. 41, Rotherham R.D. 17, Bradford C.B. 16), Lancashire 62 (Liverpool C.B. 28), London 39 (scattered through 16 boroughs), Warwickshire 30 (Coventry C.B. 18, Birmingham C.B. 9), Durham 22, Lincolnshire 19.

Graphs of Infectious Diseases

The graphs below show the uncorrected numbers of cases of certain diseases notified weekly in England and Wales. Highest and lowest figures reported in each week during the nine years 1947-55 are shown thus ----, the figures for 1956 thus —. Except for the curves showing notifications in 1956, the graphs were prepared at the Department of Medical Statistics and Epidemiology, London School of Hygiene and Tropical Medicine.



Northern Ireland in 1955

The birth rate in Northern Ireland in 1955 was 20.8 per 1,000 of the population. It has been constant in Northern Ireland during the 5 years 1951-5, and during this period has been about 5 more than the rate in England and Wales and 3 more than the rate in Scotland, but slightly below the rate in Eire. The infant mortality rate was 32 per 1,000 live births and was the lowest rate ever recorded in Northern Ireland. The rate was 7 above that of England and Wales and 2 above the rate in Scotland but 5 below that rate in Eire. The death rate was 11.1 per 1,000 of the population, an increase of 0.2 on the rate for 1954. In recent years the death rate in Northern Ireland has been below that of England and Wales, Scotland, and Eire; in 1955 it was lower by 0.6, 0.9, and 1.5 respectively.

Deaths from the principal epidemic diseases numbered 208, being 54 more than in 1954. The deaths were 129 from influenza, 48 from diarrhoea and enteritis under 2 years of age, 18 from whooping-cough, 7 from measles, 5 from dysentery, and 1 from diphtheria. A further decline was reported in the death rate from tuberculosis, and the rate, 15 per 100,000, is the lowest ever recorded; it is now only one-third of the rate in 1951 and one-tenth of the rate in

1926. The rate was the same as the rate in England and Wales and 4 below that of Scotland and 14 below the rate in Eire. During the year 536 deaths were attributed to violence, an increase of 47 compared with 1954, though the deaths due to motor vehicles, 147, were 18 fewer. The number of deaths of males from cancer increased by 21 to 1,051 and the deaths of females rose by 92 to 1,119; the death rates were 1.55 and 1.57 per 1,000 of the population respectively.

Week Ending November 17

The notifications of infectious diseases in England and Wales during the week included: scarlet fever 696, whooping-cough 2,089, diphtheria 7, measles 3,492, acute pneumonia 362, acute poliomyelitis 95, dysentery 581, paratyphoid fever 5, and typhoid fever 2.

Medical News

Olympic Silver Medal.—An Oxford medical student, Mr. D. J. N. JOHNSON, won an Olympic silver medal for Britain when he came second in the final of the 800 metres at Melbourne on Monday. He was beaten by less than 2 feet by the winner, an American, after leading in the final straight until almost the tape. The race established a new Olympic record for the distance—1 min. 47.7 sec.—in spite of the strong head wind at the finish. In the words of *The Times* Olympic Games correspondent, "Johnson ran a race of superlative judgment." This is Britain's first medal in the event since the Games at Los Angeles in 1932. Mr. Johnson is a preclinical student at Lincoln College, Oxford. We offer him our warmest congratulations.

Virus Production Laboratory.—The Medical Research Council is setting up a virus production unit at its serum laboratories at Carshalton which is expected to start operation in April. Its main function will be to produce poliomyelitis virus on a fairly large scale. It will also provide for research on virus cultivation and for the preparation of tissue cultures on a pilot plant scale. Another function will be the production, for research purposes, of different strains of virus that may find a place in future poliomyelitis vaccines. The council gratefully acknowledges a gift of £50,000 from the National Fund for Poliomyelitis Research which will pay for the capital cost of fitting out the laboratory and for its initial running expenses. The need for this new unit is explained in a Medical Research Council statement as follows:

"While there is by now a substantial amount of experience on the use of Salk-type vaccines in different countries, there is no evidence that the use of such a vaccine could entirely prevent poliomyelitis. Experience of the use of killed vaccines against other diseases would strongly suggest that their use must always be combined with other preventive measures. For the prevention of poliomyelitis, very much more knowledge is required on the way in which the virus is disseminated through the population. It is also important that methods should be developed for the early diagnosis of the disease, and such methods will acquire an even greater significance should any chemotherapeutic method of treating poliomyelitis be discovered. Promising new tests for the detection of antibody in human serum are now under investigation. These tests and also the present methods available for early diagnosis—that is, the complement fixation test and the direct isolation of virus—all need large quantities of poliomyelitis virus as well as tissue cultures. At present a great deal of time is spent in research laboratories in preparing virus and cultures before any research can be carried out."

Rockefeller Grants.—Among the major benefactions by the Rockefeller Foundation announced last week are three to support biochemical research in Britain. A five-year grant totalling £30,000 has been made to the Cambridge Chemical Laboratory, directed by Sir ALEXANDER TODD, F.R.S., for work on biologically important molecules; sums of £8,600 and £20,000 have been provided to support research on the biosynthesis of organic compounds and steroid chemistry

at the Dyson Perrins Laboratory, Oxford, under Professor E. R. H. JONES, F.R.S.; and £8,250 to support investigations by Professor F. L. WARREN and Dr. H. HARRIS, of the London Hospital Medical College, on the genetic aspects of biochemical abnormalities in man. Other grants to workers in Britain support virus research under Dr. M. G. P. STOKER at Cambridge (£10,000) and pharmacological research under Professor J. H. GADDUM, F.R.S., at Edinburgh (£5,000). In India a grant of \$88,200 to the Indian Council of Medical Research will be used over the next three years to expand the programme of neuropathological research at the Indian Cancer Research Centre in Bombay: lathyrism, leprosy, nutritional deficiencies, and encephalitis are cited as among the diseases prevalent in India offering opportunities for neurological investigation. A grant of \$5,500 has been made to Dr. H. G. DIXON, of the Institute of Obstetrics and Gynaecology, London, to allow him to go as a visiting lecturer to the University College of the West Indies, Jamaica. Those awarded grants for travel abroad include Dr. P. G. H. GELL (Birmingham), to visit the U.S.A.; Dr. J. A. OWEN (Edinburgh), to visit the U.S.A. and Canada; and Dr. J. S. CARMAN (Christian Medical College, Vellore), to visit the U.S.A., Canada, and Britain.

Benger Prizes.—Benger Laboratories Ltd. has announced its establishment of three prizes for original observations of value in general practice. Awards, which in the first year will be of £250, £150, and £100, will be made annually on the recommendation of the College of General Practitioners. Entry will be limited to medical practitioners actively engaged in general practice anywhere in the world. Written reports may be submitted in any form, and the sole criterion of judgment will be the worth of the observation as a contribution to the advantage of general practice. Reports may be on any diagnostic sign, any method of diagnosis, any technique employed in any professional connexion, or any method of treatment, observed or devised by a general practitioner in the course of his own work. The first award will be made in 1957, and entries must be received by July 31. Further particulars may be obtained from the College of General Practitioners, 54, Sloane Square, London, S.W.1.

Royal College of Obstetricians and Gynaecologists.—At the council meeting on November 24 a number of lecturers and scholars for 1957 were appointed. Dr. EDWARD WHITE, of Melbourne, was appointed William Meredith Fletcher Shaw memorial lecturer, and Dr. C. W. TAYLOR, director of pathology at the Birmingham and Midland Hospital for Women, William Blair-Bell memorial lecturer. Dr. J. N. HUNT and Mr. F. A. MURRAY (jointly) and Dr. N. F. MORRIS were appointed Leverhulme research scholars. Dr. D. METHUEN and Mr. G. P. CHARLEWOOD Bernhard Baron travelling scholars, and Mr. C. A. SIMMONS to the Green-Armytage short-term travelling scholarship. Dr. J. MANN, of Toronto, was awarded a prize for his essay on methods for improving the results of forceps delivery. The College has lately issued its 27th annual report, for the year 1955. The first part describes the College's activities during the year and the annual meeting held in May, 1956; the second comprises the register of fellows and members and the list of those awarded the diploma of obstetrics in 1955. The statement of accounts shows assets at the end of 1955 of £431,342 compared with £275,249 the previous year, the rise being chiefly due to the gain of £143,926 during the year in the Silver Jubilee Building Appeal Fund, to which Lord NUFFIELD gave £75,000 and the Nuffield Provincial Hospitals Trust £50,000. The College's income during 1955 was £26,708, expenditure £24,095.

London University.—After the foundation day dinner at the Senate House on November 23, QUEEN ELIZABETH THE QUEEN MOTHER, Chancellor of London University, conferred the honorary degree of Doctor of Laws on Sir HAROLD HIMSWORTH, F.R.S., Secretary of the Medical Research Council. Dr. I. M. P. DAWSON, lecturer in pathology at Leeds, has been appointed to the university readership in

pathology tenable at Westminster Medical School. Dr. Dawson is succeeding Dr. G. D. LUMB, who leaves to become professor of pathology at Tennessee University, U.S.A. The title of reader in physiology has been conferred on Dr. R. D. HARKNESS in respect of his post at University College. Dr. J. G. SCADDING, dean of the Institute of Diseases of the Chest, is to represent the University at the Fourteenth International Tuberculosis Conference in New Delhi next month.

Richard Fox Linton Memorial Prize.—The parents and brothers of the late Squadron-Leader R. A. FOX LINTON, an R.A.F. medical officer who lost his life flying, have endowed a prize fund of £1,000 in his memory. The Richard Fox Linton memorial prize will be awarded annually to the R.A.F. medical officer who, in the opinion of the Director-General of Medical Services, has performed the most outstanding work in the investigation of flying accidents and the advancement of measures for the promotion of safety in flight.

First Abraham Colles Lecture.—Professor C. A. WELLS, professor of surgery at Liverpool University, delivered the first Abraham Colles lecture of the Royal College of Surgeons in Ireland on November 19 in Dublin. He lectured on duodenal ulcer.

COMING EVENTS

Institute of Dermatology.—Semi-permanent exhibitions on "Cutaneous Tuberculosis and Sarcoidosis," December 1-24.

Moynihan Lecture.—Professor I. S. RAVDIN, of Philadelphia, chairman of board of regents, American College of Surgeons, will deliver a Moynihan lecture at the Royal College of Surgeons of England on December 12 at 2.30 p.m. His subject will be "The Complexity of Liver Disease—Surgical Steps Toward Solution."

Society of Chiropodists.—Annual dinner, April 4, 1957, at the Park Lane Hotel, Piccadilly. Details from Mr. J. R. HALL, 8, Wimpole Street, London, W.1.

SOCIETIES AND LECTURES

A fee is charged or a ticket is required for attending lectures marked ●. Application should be made first to the institution concerned.

Monday, December 3

DENTAL AND MEDICAL SOCIETY FOR THE STUDY OF HYPNOSIS.—At Medical Society of London, 8 p.m., Dr. D. E. R. Kelsey: Hypnosis in Psychiatric Practice.

INSTITUTE OF CHILD HEALTH.—At New Lecture Theatre, Hospital for Sick Children, 5 p.m., Dr. John Caffey (New York): Some X-ray and Clinical Features of Normal Infantile Hips; Their Significance in Diagnosis of Predislocation of the Hips.

MARLBOROUGH DAY HOSPITAL.—8.15 p.m., Dr. D. F. O'Neill: A Psychiatric View of Gynaecology and Obstetrics.

Tuesday, December 4

FOUNTAIN HOSPITAL, Tooting Grove, S.W.—6 p.m., subject: Emotional Disturbance and Psychosis in Mentally Subnormal Children. Speakers, Dr. Mildred Creak and Dr. Mildred Pott.

INSTITUTE OF DERMATOLOGY.—5.30 p.m., Dr. R. H. Meera: Atopy. INSTITUTE OF DISEASES OF THE CHEST.—2.30 p.m., discussion for general practitioners: Acute Respiratory Infections. Dr. N. C. Oswald: Viruses Affecting the Respiratory Tract; Dr. J. G. Scadding: Patterns of Lung Involvement; Dr. J. R. May: Use and Abuse of the Laboratory; Mr. John Fry: The Practical Problem.

●INSTITUTE OF OBSTETRICS AND GYNAECOLOGY.—12 noon, Dr. H. Bettinger (Melbourne): Hydatidiform Mole and Chorion Epithelioma. ROYAL ARMY MEDICAL COLLEGE.—5 p.m., Dr. F. E. Camps: Forensic Medicine—Routine and Research (with lantern slides).

ROYAL STATISTICAL SOCIETY.—At Keene Lecture Theatre, Westminster Medical School, 5.30 p.m., Dr. H. F. Dorn: Medical Statistics at the National Institutes of Health, U.S.A.

ST. MARY'S HOSPITAL MEDICAL SCHOOL.—At Wright-Fleming Institute Theatre, 5 p.m., Mr. D. J. MacRae: Pregnancy and Labour Complicated by Heart Disease.

WEST END HOSPITAL FOR NEUROLOGY AND NEUROSURGERY.—5.30 p.m., Mr. K. I. Nissen: Median Nerve Palsy of the Wrist.

Wednesday, December 5

INSTITUTE OF DERMATOLOGY.—5.30 p.m., Dr. C. D. Calnan: Epidermal Sensitization.

INSTITUTE OF DISEASES OF THE CHEST.—5 p.m., Dr. A. I. G. McLaughlin: Pneumoconiosis in Foundry Workers.

INSTITUTE OF UROLOGY.—4.30 for 5 p.m., Mr. C. I. Murphic: Tuberculosis of the Renal Tract.

KING'S COLLEGE HOSPITAL MEDICAL SCHOOL.—4.30 p.m., Special Lecture by Dr. H. F. Bettinger (Melbourne): Multiple Malignant Tumours in Patients Suffering from Genital Carcinoma.

MANCHESTER MEDICAL SOCIETY: SECTION OF MEDICINE.—At Large Anatomy Theatre, Medical School, Manchester University, 4.30 p.m., Mr. G. D. JACK: Dysphagia—its Aetiology and Prognosis.

MIDLAND MEDICAL SOCIETY.—At 154, Great Charles Street, Birmingham 8.15 p.m., Mr. Rodney Smith, Dr. J. J. Stevenson, and Mr. W. P. Greening: Contribution of Radiology to the Study of Function.

OXFORD UNIVERSITY.—At Radcliffe Infirmary, 5 p.m., Litchfield Lecture by Mr. T. J. Millin: Surgery of the Prostate. POSTGRADUATE MEDICAL SCHOOL OF LONDON.—2 p.m., Professor W. S. Peart: Biochemistry of Hypertension. ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE.—3.30 p.m., Dr. H. D. Chalke: Contribution of the Social Worker to the Community.

Thursday, December 6

CHADWICK TRUST.—At Wright-Fleming Institute, St. Mary's Hospital, 5 p.m., Malcolm Morris Memorial Lecture by Dr. J. N. Morris: Clinical and Community Medicine.

FACULTY OF HOMOEOPATHY.—5 p.m., Dr. G. R. Mitchell: Infectious Diseases and their Nosodes.

GLASGOW UNIVERSITY MEDICO-CHIRURGICAL SOCIETY.—7.30 p.m., Dr. H. R. MacLennan: Women in Medicine—Patients and Practitioners.

HONYMAN GILLESPIE LECTURE.—At University New Buildings, Teviot Place, Edinburgh, 5 p.m., Professor G. F. Marrian, F.R.S.: Recent Progress in the Biochemistry of the Oestrogenic Hormones.

●INSTITUTE OF OBSTETRICS AND GYNAECOLOGY.—4.30 p.m., Dr. H. Bettinger (Melbourne): Mesodermal Fixed Tumours of the Female Genital Organs.

LIVERPOOL MEDICAL INSTITUTION.—8 p.m., Symposium to be opened by Mr. H. Morrison Davies, Mr. J. C. Ross and Dr. J. Dobson: Recent Advances in the Treatment of Tuberculosis.

POSTGRADUATE MEDICAL SCHOOL OF LONDON.—4 p.m., Dr. J. F. Goodwin: Cyanotic Heart Disease.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.—5.30 p.m., Otolaryngology Lecture by Mr. E. J. Radley Smith: Modern Application of the Physiology of the Pituitary Gland.

ROYAL SOCIETY.—4.30 p.m., Ferrier Lecture by Sir Wilfrid Le Gros Clark, F.R.S.: Inquiries into the Anatomical Basis of Olfactory Discrimination.

ST. ANDREWS UNIVERSITY.—At Physiology Department, Queen's College, Dundee, 5 p.m., Professor Ian Aird: Relationship Between the Blood Groups and Disease.

ST. GEORGE'S HOSPITAL MEDICAL SCHOOL.—5 p.m., Sir Paul Mallinson: psychiatry demonstration.

ST. JOHN'S HOSPITAL DERMATOLOGICAL SOCIETY.—4.30 p.m., demonstration and discussion of clinical cases.

UNIVERSITY COLLEGE HOSPITAL MEDICAL SCHOOL.—5 p.m., special university lecture in medicine by Dr. H. F. Bettinger (Melbourne): Genetic, Hormonal, and Practical Aspects of Intersexuality.

Friday, December 7

DUBLIN UNIVERSITY.—At Anatomy Theatre, School of Physic, Trinity College, 4.30 p.m., Frederick Price Lecture by Dr. Donald Hunter: Present Need for a Sense of Historical Perspective.

●INSTITUTE OF DERMATOLOGY.—5.30 p.m., Dr. F. R. Bettley: clinical demonstration.

INSTITUTE OF DISEASES OF THE CHEST.—5 p.m., Dr. K. F. W. Hinson and Dr. E. H. Hudson: clinico-pathological demonstration.

INSTITUTE OF LARYNGOLOGY AND OTOTOLOGY.—3.30 p.m., clinical meeting for general practitioners. Mr. C. L. Heanley: Plastic Surgery of the Nose and Face.

POSTGRADUATE MEDICAL SCHOOL OF LONDON.—10 a.m., Professor A. G. R. Lowdon: Surgery of the Spleen; 4 p.m., Mr. P. McG. Moffat, Griffiths: Sudden Death.

ROYAL MEDICO-CHIRURGICAL SOCIETY OF GLASGOW.—At Royal Faculty of Physicians and Surgeons of Glasgow, 8.30 p.m., Dr. T. F. Fox: Medicine in Soviet Russia.

SOCIETY OF MEDICAL OFFICERS OF HEALTH: WELSH BRANCH.—At 195, Newport Road, Cardiff, 6.30 p.m., Dr. A. H. Griffith: Tuberculosis Trends and Prevention; Dr. Ann Giv: Spastic Children; Dr. Lydia A. Knowson: Estimation of Intelligence in Babies.

WHIPPS CROSS HOSPITAL MEDICAL SOCIETY.—8.30 p.m., Dr. P. J. Lawther: Smor.

Saturday, December 8

●INSTITUTE OF ALMONERS.—At Conway Hall, Red Lion Square, W.C., 3 p.m., annual general meeting. Miss Helen Bate: Social Work in Medical Care; Miss Jean Snelling: Training for Medical Social Work.

INSTITUTE OF LARYNGOLOGY AND OTOTOLOGY.—11.30 a.m., Special Lecture by Dr. H. F. Schuknecht (Detroit): Surgical Management of Cancer of the Jaws.

●INSTITUTE OF OBSTETRICS AND GYNAECOLOGY.—9.45 a.m., Professor G. G. Lennon: Eclampsia; 11.15 a.m., Mr. J. A. Stallworthy: Genital Tuberculosis.

SOUTH-EAST METROPOLITAN REGIONAL TUBERCULOSIS SOCIETY.—At Middlesex Hospital W., 10.30 for 11 a.m., annual general meeting. Mr. T. Holmes Sellers: Present Position of Thoracic Surgery in the Treatment of Pulmonary Tuberculosis.

BIRTHS, MARRIAGES, AND DEATHS

BIRTHS

Adderley.—On November 21, 1956, to Jean and David Adderley, of 66, Boyne Road, Lewisham, London, S.E., a sister for Nicholas and Martin.—Ruth Margaret.

Brown.—On November 6, 1956, to Dr. Barbara Brown (formerly Jacob), wife of David Ferris Brown, of Mary's Meadow, Guildford, Surrey, a sister for Richard and Janet—Elizabeth Filmer.

Dunn.—On November 12, 1956, at Birmingham Maternity Hospital, to Sylvia Dunn, M.B., B.S., wife of Andrew Dunn, L.D.S., a second daughter—Siona Morag.

Smith.—On November 16, 1956, at B.M.H., Isertown, B.F.P.O. 34, to Dr. Dorothy Lindsay (formerly Grieve), wife of Captain Ian Inglis Smith, R.A.M.C., a son (stillborn).

Wisdom.—On November 21, 1956, to Drs. Anthony and Charlotte (formerly Hartstein) Wisdom, of 3, Woodstock Road, Strood, Kent, a daughter—Lucy Charlotte.

DEATHS

Atkinson.—On November 6, 1956, John Parkinson Atkinson, M.B.E., M.R.C.S., L.R.C.P., of "Avery," Findon, Sussex.

Campbell.—On November 8, 1956, Thomas Campbell, L.M.S.S.A., of Lytton House, Stevenage, Herts, late of Sandy, Beds, aged 77.

Freeland.—On November 4, 1956, at the London Hospital, London, E., Derek Ellis Freeland, B.M., B.Ch.

Logan.—On November 3, 1956, at Brighton, Sussex, Barbara Marshall Logan, M.B., Ch.B., D.L.O., of 232, Dyke Road, Brighton.

Sykes.—On November 1, 1956, Joseph Alfred Henry Sykes, L.M.S.S.A., of 18, St. Augustine's Avenue, Croydon, Surrey, aged 72.

Any Questions?

Ideal Weight

Q.—In treating obesity by dieting, to what level should the weight be reduced? Is there any simple way of calculating the ideal weight, or are tables available for this purpose? In what conditions is it necessary to observe caution in the rate or amount of reduction?

A.—Life insurance statisticians claim that adults of any age tend to live longer if they keep their weight close to the average weight of people of the same sex and height aged 20-25 years. Weight gain occurring after cessation of growth is due to accumulated fat, so that the proportion of fat in the body is probably optimal in the age range 20-25. "Ideal" weight cannot be calculated, but there are tables relating height and weight and sometimes age; for adults the weight given for age 20-25 should be used, regardless of the age of the patient. The thickness of a fold of skin and subcutaneous tissue on the anterior abdominal wall, taken near the midline and midway between navel and groin, is a good and simple measure of the proportion of fat in the body, and has the advantage of demonstrating to the patient how fat he is. In normal young men this fold, pinched up between finger and thumb, is no thicker than their little finger, and in young women no thicker than their thumb. The same standard applies to children over the age of 5.

There is no condition in which any degree of obesity is advisable. The rate of weight loss is determined by the calorie deficit, and, since a feasible reducing diet which provides adequate protein, vitamins, and minerals rarely contains less than 1,000 calories, the maximum rate of loss for most people is 2-3 lb. (0.9-1.36 kg.) a week after the first one or two weeks. This rate is safe, and a rate much less than this is tedious and disheartening to patient and doctor. Children, obese cirrhotics, and expectant mothers may reduce at this rate, provided their diet is adequate in proteins, vitamins, and minerals. A calorie-deficient diet may reduce milk production during lactation. Obesity resulting from overfeeding in the treatment of tuberculosis should be reduced cautiously.

Multiple Boils in Infants

Q.—How should persistent and widespread boils in infants be dealt with? The patient in question is a baby in Bombay aged 1 year, who has had boils all over the body for six months. Culture yields *Staph. aureus* sensitive to 10 units of penicillin per ml.

A.—This question involves a general medical problem and cannot be answered briefly. Here only the main points can be dealt with, and the Refresher Course article on recurrent boils should be consulted.¹

First, the diagnosis. Has the baby been on bromides? If not, a pustular bromide eruption is ruled out. Could this be cutaneous leishmaniasis? The widespread distribution makes this unlikely, though not impossible, for American troops in Iran during the second world war were seen with several hundred lesions each, resulting from sleep-seeing naked without protective nets. Cat or dog fleas may produce multiple pustules. Is the baby scratching? Has it eczema which has become secondarily infected or has it scabies? If the diagnosis of common boils is assured other questions arise. Is any relation or other person in contact with the baby suffering from boils or a purulent discharge from the nose or ears, the result of staphylococcal infection? Has the baby itself such a discharge? Is there any general condition present which might lower its resistance to infection?

Treatment depends on the answers to these questions. Local treatment should be mild and aim at reducing the population of staphylococci on the skin surface, which should be kept as healthy as possible. The baby should be

sponged twice daily with 1% cetrimide solution, its skin carefully dried, and then powdered with zinc oxide, calomel, and starch in equal quantities. Each boil, or better still the whole body, should be painted with 1% gentian violet solution or the following: Brilliant green ½%, hydrarg. perchlor. ½%, industrial spirit 99%. The boils should not be squeezed or incised, but dry gauze dressings applied and frequently changed so that the discharge of pus will not long remain in contact with the surrounding skin. Cotton clothing should be worn next to the skin, changed daily, and boiled. Moist fomentations macerate the skin and lower its resistance. If heat is required moderate exposure to sunlight or infra-red radiation is best. The antibiotics provide only temporary relief. More important is the consideration of the general resistance to infection. Diet, if not satisfactory, must be corrected. Plenty of protein and fresh fruit and vegetables and a minimum of starch are indicated. Extra vitamins may be given.

REFERENCE

¹ Anning, S. T., *British Medical Journal*, 1953, 1, 721.

Raynaud's Disease

Q.—How should a case of Raynaud's disease be managed? The condition is very troublesome even in warm weather. Have there been any notable advances in therapy lately?

A.—The most notable advances have been in prognosis, which is worse in cases associated with scleroderma. These have characteristic appearances in the skin of the fingers and also on the face around the nose and the lips. Changes in the lower oesophagus are sometimes seen on a "barium swallow." Another group of cases which do badly are those in which secondary thrombosis has occurred in the digital arteries. Gangrene of the finger tips is frequent in these. The changes may be shown by arteriography.

There is no cure for Raynaud's disease. The most effective form of therapy is cervical sympathectomy. A pre-ganglionic operation is now done which avoids the occurrence of Horner's syndrome. Vasodilator drugs are of some help, particularly those which act directly upon the smooth muscle of the vessel walls. Tolazoline is one, and "dibenyline," a longer-acting drug, another which is of help. The action of the latter on the peripheral circulation was the subject of a recent paper in the *Journal*.¹ Several preventive measures are also of importance. The patient should wear warmer clothes than other people, and take care to protect the forearms and hands. Neglect may lead to secondary thrombosis of digital vessels and in the more severe cases to gangrene of the finger tips.

REFERENCE

¹ Duff, R. S., *British Medical Journal*, 1956, 2, 857.

Treatment of Acne

Q.—Have there been any recent advances in the treatment of severe acne? Is carbon-dioxide snow of value? A healthy spinster of 35 has been having severe attacks for the last three years in spite of strict attention to diet. The condition began in adolescence but was mild until three years ago. Does this history suggest the need for any endocrinological assessment? Menstruation is normal.

A.—There have been no notable advances in the treatment of acne, though for acne scars the new abrasive techniques are sometimes valuable, and vitamin A by mouth has been claimed to be useful for treatment of the active lesions. The application of slush made by mixing solid carbon-dioxide and acetone is often effective for cystic acne. Although in adolescence acne may be regarded as normal—or perhaps an exaggeration of the normal—its persistence to the age of 35 suggests some constitutional cause.

Endocrine influences clearly play an important part in acne; it appears after puberty, is unknown in eunuchs, is often worse in girls before a menstrual period, and improves during pregnancy. The androgenic hormones seem to be of major importance. There is some evidence that women

with persistent acne excrete more 17-ketosteroids than normal, but the evidence is conflicting. In the patient described hormonal imbalance may be present and androgen secretion may be raised even though menstruation is normal. Estimation of the 17-ketosteroid excretion would be worth while. In any event treatment with oestrogens should be given—for example, stilboestrol, 0.5 mg., each morning—for three weeks after each menstrual period, but it should be discontinued if irregularity of menstruation results.

Persistent acne may be associated with a congenital defect of the sebaceous glands, sometimes familial, resulting in hyper-activity of the glands. Little can be done to affect this except palliative treatment, including frequent rinsing of the skin with 1% cetrimide solution to remove the sebum. There is little doubt, too, that stress affects the secretion of sebum, and some experimental evidence supports this view. Certainly students with acne often find it becomes worse before an examination. In an unmarried woman of 35 stress may play a large part and androgen secretion may well be raised. A consideration of her condition with these factors in mind might be useful.

Fibrinogen for Haemorrhage

Q.—When is fibrinogen specially indicated in the treatment of haemorrhage? Are there any contraindications to its use, and in emergency, when the cause of persistent bleeding may be unknown, is there any danger in using it empirically?

A.—Fibrinogen is specially indicated in the treatment of haemorrhage when the haemorrhage is due to or associated with fibrinogen deficiency. Fibrinogen deficiency may occur as a rare congenital defect or as a result of severe liver disease. Fibrinogen may also be reduced in the newly recognized defibrination syndrome which occurs in some obstetrical cases with antepartum haemorrhage or when a dead foetus is retained. In these latter patients the defibrination is due to removal of fibrinogen either by intravenous coagulation or by fibrinolysis. A similar state may occasionally occur in the immediate post-operative period, particularly following major thoracic surgery. The syndrome is associated with profound collapse and persistent bleeding and sometimes spontaneous bruising; it may be followed by anuria. The blood fails to clot as tested by the Lee and White method, and no clot is obtained on the addition of thrombin. The platelet count is also much reduced.

Persistent bleeding is only very rarely caused by fibrinogen deficiency. Fibrinogen should never be used for the treatment of bleeding when the cause is unknown. In these circumstances whole blood or plasma should be used. If the bleeding is due to deficiency of some blood constituent, it is more likely to be corrected by a fluid which contains all of the factors than by fibrinogen which provides only one. In addition, fibrinogen is in very short supply, and if it is used indiscriminately it will not be available for the obstetric and post-operative cases in which its use may be life-saving.

NOTES AND COMMENTS

Infirmity Mice.—Dr. W. LANE-PETTER (Laboratory Animals Bureau, London) writes: I am not altogether convinced by the explanation given for the disappearance of infirmity mice ("Any Questions?" November 17, p. 1190). Predation by cats might reduce their numbers but would be unlikely to eliminate the mice altogether. This type of predator/prey relationship does not have as a result the elimination of the prey. Other predators, such as wild rats, which are not primarily predators but competitors, can lead to complete elimination, but this is a different biological picture altogether. Control measures such as the use of rodenticides can be completely effective if properly carried out, but this cause of disappearance of mice is hardly likely to have been overlooked. Changes in the methods of handling and storing of foodstuffs, etc., might have produced an environment incompatible with the survival of the mice, but this would not

have occurred unless they had been made deliberately to this end and had been fairly radical; such changes, again, would not have been overlooked.

A more likely explanation of the disappearance of mice and a more ominous one is the appearance of a serious epizootic infection. Not all possible serious infections of mice are transmissible to man, but one of the more likely ones, mouse typhoid, is caused by a salmonella. If this is the cause of the mice disappearing, the infirmity should be on the look-out for an outbreak of food-poisoning.

Child Guidance Clinics.—Dr. P. A. TYSER (Cambridge) writes: I have no quarrel with the view expressed by a child psychiatrist and a medical officer of health ("Any Questions?" November 17, p. 1188); both have with admirable brevity dealt with a difficult question. Certain points are of such importance in my view that they require greater emphasis: (a) via the child guidance clinic much help is given to adult problems, often the child's need for referral being due to such causes; also many parents can be helped not to repeat incorrect handling with subsequent children. This constitutes an important additional curative function. (b) The child guidance clinic should not be considered as a service separate from other mental health services, both preventive and curative; it is an essential part of the whole. (c) There is much to be said for locating the clinic within the curtilage of the paediatric department of a hospital; this emphasizes to all that illness can be of both mind and body; the child does not feel it is being segregated; the parents are also made aware of the oneness of mental and physical illness. (d) Similarly, the part played by the school health services, educational psychologist service should be closely integrated with the child guidance clinic, since it will also be unearthing problems of a general mental health type as well as specific educational problems; a plea is entered here that educational psychologist services should not be made too narrow a pattern.

Alcoholic Excess and Mucous Colitis.—Dr. W. W. KAY (Epsom, Surrey) writes: In addition to the points mentioned in your reply to the question about alcoholic excess and mucous colitis ("Any Questions?" October 13, p. 893), it would be useful to consider the relationship of B-vitamin deficiency and achlorhydria to the mucous colitis. After indulgence in drinking, most alcoholics have a B-vitamin deficiency which in severe cases may manifest itself as pellagra with a superimposed thiamine deficiency. Usually this responds to treatment with full B-vitamin complex in substantial doses given parenterally at the beginning. In some cases mucous colitis is related to achlorhydria. A test-meal would decide whether there is achlorhydria in the case under consideration. If there is, then adequate doses of hydrochloric acid with meals would control the diarrhoea, whereas alkaline mixtures are likely to aggravate it.

Correction.—Mr. R. B. WELBOURN writes that, in the second paragraph of his letter on delayed emptying of gastric stump (*Journal*, November 17, p. 1172), instead of "(4) hypoproteinaemic oedema (correct fluid and electrolyte balance)," he should have written: "(4) hypoproteinaemic oedema (treat with plasma or protein hydrolysate intravenously); (5) hypokalaemia (correct fluid and electrolyte balance)."

Books of "Any Questions?" and Refresher Course Articles.—The following books are still available through booksellers or from the Publishing Manager, B.M.A. House. Prices include postage. *Any Questions?*, Volumes 2 and 3 (8s. each); *Refresher Course for General Practitioners*, Volume 2 (26s. 6d. inland, 26s. overseas); *Clinical Pathology in General Practice* (22s. 3d. inland, 21s. 9d. overseas).

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BRITISH MEDICAL JOURNAL

LONDON SATURDAY DECEMBER 22 1956

REFLECTIONS ON SOME CURRENT TRENDS IN MEDICAL EDUCATION IN AMERICA*

BY

WALTER BAUER, B.S., M.D.

Jackson Professor of Clinical Medicine, Harvard Medical School; Chief of Medical Services, Massachusetts General Hospital, Boston

The title of my discussion was carefully chosen as a restrictive one. American medical education to-day is an unusual mixture of discrete and often discordant parts—a heterogeneous collection of different schools, different techniques in teaching, and different philosophies of what the finished product of medical education should be. It would be impossible to present you with a clear distillate from this troubled brew, for the fermentation is still in progress. I shall therefore venture to examine briefly a number of seemingly unrelated topics which I believe to be of basic importance in this transitional phase of academic medicine in the United States. It is not without serious misgivings that I undertake this ambitious task, for much of what I have to say has been previously and skilfully examined here by a number of my distinguished predecessors. Their clear appraisals of our mutual problems in medical education have established a remarkable standard for this occasion.

Since the last war much thought and some experimentation have gone into many aspects of medical education in the United States. There have been a spate of conferences, a flood of articles, and a deluge of speeches concerning such topics as premedical education, the selection of students, the composition of the undergraduate curriculum, the recruitment of instructors, economic support of students and of the faculty, the pattern of postgraduate education in a profession marked by an increasing specialization, the responsibility of the medical school to medical research, the relative value of full-time versus part-time teachers, and so forth, *ad infinitum*. After attending many conferences, taking part in numerous discussions, and hearing the analyses of the few "experiments" on what ails medical education to-day, I think that some of the current confusion may be manufactured. Please do not misunderstand me; problems exist in medical education, and they need to be clearly defined and constantly met, but I am not convinced that the prognosis is so grim as to warrant radical measures at this time. One often hears such rotund phrases as "the complete physician," "the whole patient," "the fundamental or basic principles," "integrated teaching," "psychosomatic medicine," in ever-recurring themes and variations. My faith in such slogans is feeble. This is not to deny that

many of the new programmes in American medical education have a firm footing based on careful thinking of what may be accomplished by these innovations. I would only hope, however, that as we grope for "principles" in the teaching of medicine we do not ignore the words of your professor of medicine, Dr. W. M. Arnott (1955), who last year said:

"In education to-day we hear much about principles—always 'fundamental' or 'basic' principles, the teaching or inculcation of which is the proud prerogative of this school or that department. A good deal of snobbery is attached to these terms. The more basic or fundamental the principle is deemed to be, the nearer are all those concerned to some mystic state of academic grace. Much of this is little more than an example of the limitations of language. Logically it presupposes that there exists somewhere a finite body of fundamental truth. The detailed curricula of medical schools, the itemized requirements of examining bodies, even the recommendations of the General Medical Council, tend to be regarded as a supreme polypharmaceutical prescription, the accurate dispensing of which will result in the 'complete physician.'"

Some Generalizations

In the United States, as here, some would claim that there is desperate urgency to reconstruct the medical educational system. The problems we face are by no means unique to the field of medicine, and I may venture at this point to preface my scrutiny of American medical education with a few general remarks. We should realize at the onset that regardless of the educational systems we evolve, there will be a sizable proportion of medical graduates who will never be the physicians we would like them to be. This is a reality which we have to accept. One of the reasons we must accept is that all men are not born equal, although we may prefer to think they are. But whether or not they are born equal is of less importance than the basic obligation that we construct an environment permitting men to function at their maximal capacities, whatever these capacities may be. In a just world men may not be equal, but opportunity should be. This idealistic goal cannot be achieved by decree but should be constantly pursued in a democratic society. Despite how carefully they may be chosen, we know that our medical students are not of equal ability.

As candidates for our medical schools we should select young men with strong vigorous minds, stable personalities,

*Address given on October 1, 1956, at the opening of the new session in the University of Birmingham Medical School.

Opportunities for Students

May I now tell you about the experiences of medical students in a teaching hospital in the United States? One of the strongest points in the education of the student is the highly individual attention given to him in his clinical teaching. He is assigned to a ward with one or three more students, where he learns the methods available for studying and evaluating patients. Along with the resident and the intern, he is an integral part of the ward team. He has the responsibility for the complete clinical work-up of a certain number of patients. The pace is set such that emphasis is on thoroughness and quality rather than quantity. He must put his observations and evaluation into writing which forms part of the official hospital record. Each morning before the senior visiting ward physician and the rest of the ward team, he presents the history, the physical findings, the routine laboratory data, and his formulation of the case based on these facts. These findings are checked. There is a detailed discussion of the case in a spirit of free give-and-take. He is encouraged to speak his own mind freely, in agreement or disagreement, which he soon learns to do. Interpretation of clinical observations in terms of basic physiological and biochemical principles is emphasized. Stimulated by discussions of the case, the student acquires the healthy habit of reading journals to find the latest information about a disease, and this, in turn, stimulates further discussion. The visiting physician welcomes the opportunity to be drawn into a debate with the student. The atmosphere is created in which each is willing to learn from the other, without undue regard for rank on an academic scale.

Educational opportunities in a teaching hospital are unlimited, and, gratifying enough, most students take advantage of them. They spend much time in leisurely discussion regarding various medical topics with the senior ward resident and with various members of the consulting services. They attend and often participate in the weekly clinicopathological conferences, the grand rounds, and other group discussions, and are assured of a patient hearing at any of them. At the weekly ward social service rounds attended by social workers, the visiting physician, and the ward team, the student presents the social problems of his patients and learns something about rehabilitation, available social agencies, and the part they can play in alleviating the effects of illness.

The student thrives in this environment. He feels that there is no sharp distinction between students and physicians—all are students of medicine. Responsibility is given to him in so far as he demonstrates his ability to discharge it. His education is rapid, and is based on a genuine and active interest in his work.

University Teachers

Selection of academic staffs is a heavy responsibility. The faculty is composed of two types—full-time members, who receive relatively little income from private patients, and part-time staff, who can treat as many private patients as they wish, so long as private practice does not interfere with their assigned duties of instruction and, in some cases, research. The full-time members of the faculty are paid by salary and include almost all teachers in the preclinical science departments but relatively few in the clinical departments. A large proportion of clinical teaching in many medical schools, particularly those in large metropolitan centres, is carried on by part-time teachers who receive little or no salary. They are given hospital staff appointments and privileges to use the hospital facilities. The full-time teachers accept their positions because they are genuinely interested in academic medicine and are willing to serve at a financial sacrifice. Many of the part-time teachers donate their services out of the same motivation. Medical schools must find a way of raising salaries, particularly in the preclinical years, in order to attract promising medical graduates, for one of the main reasons for the dearth of physicians in the preclinical sciences is economic.

The full-time system at Harvard is rather unique in that private practice is allowed, with the proviso that income from this source is not to exceed the amount paid by salary. The system has worked well at Harvard, where the care of the patient and teaching responsibilities are shared by a large part-time clinical staff—and where, by tradition, the full-time men have voluntarily undertaken little or no private practice. A disquieting trend is the misapplication of this system in many university hospitals located in small suburban communities where little or no part-time staff is available to carry the heavy routine load. In these areas, prior to the introduction of the Harvard system, the bulk of the clinical faculty was, of necessity, so occupied with routine duties—ward rounds, out-patient clinics, and teaching activities—that there was little time for research. Now, with a full-time system that permits the clinician to earn in practice the equivalent of his university salary, the "full-time" clinician has even less time for research, reading, and furthering his own educational growth. This system is not in the best interest of academic medicine in America. This unfortunate outcome can, however, be corrected by substantial additions to the clinical faculties of the university hospitals concerned.

The full-time departmental heads at Harvard—and I suspect elsewhere—face another dilemma. Suitability for this position is determined in part by the candidate's productivity as an investigator. In his new position he finds himself saddled with too many responsibilities of an administrative nature. His research career all but comes to an end. Ruefully, Professor William B. Castle at Harvard said: "We become professors of administrative medicine."

Residency Programme, Postgraduate Training, and Specialization

Limited as our individual capacities are and vast as medical knowledge has grown to be, specialization has become a necessity. Specialization, I maintain, should begin only after three years of training in general medicine or surgery. The current practice of retiring to the sheltered confines of the left auricle or the right knee-joint after completion of one year of internship results in a specialist not properly equipped to deal with the general body of medical knowledge. Such specialists do not make effective members of a teaching hospital staff.

A training period of three years in general medicine has other things to recommend it. The limitations of human ability are such that only a few people make outstanding discoveries. The incoming interns do not realize this fact. Exposed as they are in certain university clinics to the powerful influences of their teachers, most of whom are engaged in research work, the majority of the new graduates in many large centres want to take up investigative careers. As I interview Harvard Medical School applicants each year for internship appointments at the Massachusetts General Hospital, I find that not more than one in thirty wishes to go into medical practice. Many of them are doomed to frustration; and therefore I constantly preach to these young doctors what I sincerely believe—namely, that giving good medical care is the primary duty of every physician, of every hospital, and that all research and all teaching should be subsidiary to good patient care. I say to them: "If you can do some research, God bless you; if you can do some teaching, God bless you; if you can do neither, you should be proud that you are capable of providing good medical care."

A three-year period of training in general medicine provides adequate time for the realization of one's assets and limitations as a physician. At the end of this period those who want to enter the practice of internal medicine will have had adequate training and will be ready to undertake their chosen profession as able clinicians. Others will move on for further training in their chosen fields.

A three-year postgraduate training programme has another advantage. As an intern in the first year, the young doctor learns, as he has never learnt before, how to accept responsibility,

how to evaluate emergency situations carefully and accurately, yet with some speed. His practical learning soars. He acquires competence in basic hospital procedures. As an assistant resident, he is in a position to make use of his previous experiences, to reach more mature judgments, to bring to bear on his patients' problems a fair measure of critical evaluation. As a resident, with fewer immediate ward responsibilities, he is in a position to mobilize his experience, to augment his work of the previous two years with extensive reading. His judgment bears considerable weight in the handling of difficult and equivocal patient-problems. Thus he has acquired a foundation on which to build in any direction he chooses. He is now equipped for the practice of internal medicine.

One of the most illuminating experiences this house officer has had during his three years' stay is his training in a variety of hospital settings. Does the teaching hospital which is divided into autonomous separate firms, each manned by a permanent chief and with little inter-communication, provide the same varied training experience for the house officer? There can be no doubt that he acquires coherent knowledge under this system. Is this, however, sufficient justification for its perpetuation? Does it inhibit the growth of critical knowledge, promote hero-worship, and, at times, respect for authority rather than for ideas? Will it lead to frustration when in the light of later experience these gods, not too infrequently, turn out to be "tin-gods"? Again, I can only raise these questions. I cannot answer them. Some of my British colleagues, visiting the teaching hospitals in the United States, agree with me in preferring the system in which the many wards within the service are not autonomous isolated units, but instead are supervised by carefully selected senior clinicians who are attached to the wards for periods of only two to four months each year. The house officer therefore comes in contact with many physician-teachers with differing ideas.

We face still another problem in the training required for specialty board certification. There is no doubt that for specialty boards have raised the standards of practice in America, yet they do impose severe burdens on the young doctor. In most instances board certification means prolonging his training period to four years or more. Often without such certification he cannot obtain an appointment even at the smaller non-teaching hospitals. This introduces an element of unwarranted pressure and great financial hardship on many competent young doctors who would make fine additions to hospital staffs, though not board-certified. Certainly in the academic field of medical education and research I see no need for specialty boards. It seems to me that a good medical education and three sound years of graduate training—plus a year or more in a basic medical science—equip a man for research in medicine if he has the other indispensable qualifications, which include interest, originality, and creativeness.

American Medical Association

Now, in approaching the end of my talk, I come to the difficult task of assessing the role of organized medicine in the growth of American medical education.

The American Medical Association, which regulates ethics and standards of the practice of medicine, is composed of practising physicians who, understandably, resent superimposed restrictions and impersonal remote supervision. The physician, by his nature and training, deals with people on an individualistic and personalized basis. He is in no mood to function at the command of a bureaucrat. In his mind he tends to be conservative, suspicious of encroachments by city, state, and federal agencies on his independence and freedom of action. It is not for me to decide that his attitude is good or bad, but I think we will all agree that many aspects of it are understandable.

In the United States to-day we face a real problem in the financing of our medical schools. Teachers are woefully underpaid, and schools are understaffed. Income from endowment can no longer carry the full cost. The demand

for doctors increases with the expanding population. It is in the public interest to train better doctors and more doctors, all of which is expensive. Where are the schools to get this money? Inevitably, of course, the schools are turning to the Federal Government for assistance. The American Medical Association, worried that the man who pays the piper will call the tune, has vigorously opposed efforts of the schools to achieve favourable legislation for financial assistance. The cry of socialized medicine can be heard over the battlefield, and I must confess that at times I am very confused as to what this term means. I gather that to the leaders of medical opinion in the American Medical Association, socialized medicine means the direction or undue influencing of the practice of medicine by a government body—notably a federal agency. How much of this alarm is derived from the inherent resistance of the American Medical Association to any new suggestion of change in medical practice I cannot say. As I said before, this would be understandable, but I think it is not necessarily realistic.

Proper legislation, with proper safeguards to protect the autonomy of the medical schools, could hardly be called encroachment of government influence over the domain of the private practice of medicine. Certainly federal grants for medical research have not demonstrated this predicted omnivorous tendency. In fact, they have become increasingly more liberal, often imposing fewer restrictions than many of our private granting agencies. Perhaps this is not an analogous "pilot-experiment" for federal support of medical education. The practitioner fears that if government interest extended beyond the financing of medical research the practice of medicine would be increasingly controlled and regulated by federal bureaucracy. It is my firm belief, however, that proper legislation can ensure financial support for medical schools without jeopardizing their independence of action in the teaching of students. Doctors themselves are beginning to contribute financially to the support of medical schools in larger numbers, but their contributions constitute only a trickle where a river of assistance is needed. I hope that the younger generation of doctors, working vigorously to express themselves within the American Medical Association, will ultimately help to siphon off the element of entrenched, unyielding reaction, to the extent that it exists. In this way the profession's view about the critical needs of the medical schools may be gradually broadened.

As I come to the end of my discussion, I wish to state that American medical education is basically sound. Problems are inherent in any human endeavour, yet man lives by problems. My attitude towards them is best summed up in the following quotation from Goethe: "Man is born not to solve the problems of the universe, but to find out where the problem begins, and then to restrain himself within the limits of the comprehensible."

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The first four issues of the *New Scientist*, a weekly magazine for those interested in the progress of science, have now appeared. Edited by Mr. PERCY CUDLIPP, formerly editor of the *Daily Herald*, it aims to tell its readers, in clear language, about scientific discoveries and their industrial, commercial, and social implications. In appearance the *New Scientist* is a 60-68-page magazine of similar format to week-end reviews such as the *Spectator* and *Economist*. Besides expository and reviewing articles by well-known scientists and scientific journalists, the magazine also includes shorter comments, a news section, book reviews, correspondence, an American newsletter, a guide to careers in science, and a section of short annotations called "It Seems to Me." A useful feature is the potted biographies of the principal contributors. The *New Scientist* is published on Thursdays and costs 1s. an issue.

INTRA-ARTERIAL OXYGEN IN PERIPHERAL VASCULAR DISEASE

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The injection of small quantities of oxygen or of various other gases into the brachial artery of the normal subject is followed by marked vasodilatation in the hand and forearm which persists for an hour or more (Duff, Greenfield, and Whelan, 1953). This observation suggested a possible application in the treatment of patients with ischaemic disorders of the limbs. Much of the disability in these patients is a direct consequence of reduced blood flow to skin and muscle, and it was felt that if vasodilatation could be obtained comparable in degree and duration to that in normal people symptomatic benefit might result. Intra-arterial oxygen has been employed as a mode of therapy in ischaemic disorders of the lower limbs by Lemaire, Loeper, and Housset (1948); they were impressed with its effect in improving symptoms. Since then several workers in Germany (Wernitz and Dörken, 1954; M. Ratschow, personal communication, 1955; Hasse, Köble, and Linker, 1955) have claimed therapeutic benefit from intra-arterial oxygen therapy.

This paper presents the results of a detailed study of circulatory changes induced by intra-arterial oxygen injections in patients with peripheral arterial disease involving upper and lower limbs. The changes are compared with those following intra-arterial injection of three potent vasodilator drugs: tolazoline ("priscol"), hydralazine ("apresoline"), and phenyl-iso-butyl-n-p-hydroxy ephedrine ("dilatal").

Methods

The investigations were carried out at a room temperature of 20-24° C. The patient rested on a couch for at least an hour before observations were made. In the case of the upper limb, injections were made into the brachial artery in the antecubital fossa; for the lower limb, they were made into the femoral artery in the groin. The limb into which the injection was made was raised slightly. A continuous infusion of 0.9% saline was maintained into the artery from a mechanically driven syringe, and the gaseous oxygen was added slowly to the stream of saline through a side-arm in the connecting tubing.

On most occasions measurements of blood flow were made by the technique of venous occlusion plethysmography (Barcroft and Edholm, 1943). The segment of limb being investigated was enclosed in a water-filled mechanically stirred plethysmograph (Greenfield, 1954), the water temperature being 31-32° C. for the hand and foot, and 34-35° C. for the forearm and calf. Normally the corresponding segment of the opposite limb was used for control observations, but on a few occasions on which it was desired to record simultaneously from the calf and the foot of the limb which received the injection no control observations were made. The venous collecting pressure was usually 50-70 mm. Hg, but at the peak of vasodilatation in the foot it was sometimes necessary to employ pressures as low as 30 mm. Hg. Cuffs at the ankle and wrist respectively were

inflated to a pressure of 200 mm. Hg for one minute before and during the recording of calf and forearm blood flows. After each injection of oxygen or of a vasodilator drug, blood flow records were taken at frequent intervals for one and a half to three hours. If at the end of this time the blood flow was still significantly raised further observations were made at intervals until it had returned to the resting level.

On some occasions changes in the skin temperature of the foot following injection were measured by a thermo-electric junction.

The dose of oxygen was 10 ml. for the upper limb and 30 ml. for the lower limb, given over a period of 10 to 15 minutes. In the case of the vasodilator drugs the quantities injected intra-arterially approached or equalled the full intravenous doses, so that a very high local concentration was attained in the limb injected. For the lower limb the quantities were: tolazoline 50 mg., hydralazine 20 mg., dilatal 10 mg.; for the forearm and hand the corresponding quantities were 25-40 mg., 10-12 mg., and 5 mg. The vasodilator drugs were administered steadily over 5 to 10 minutes.

Eighteen patients were studied, as shown in Table I:

TABLE I

Disorder	Male	Female	Total Cases	Under 50 Years	Over 50 Years
Raynaud's phenomenon	3	2	5	3	2
Intermittent claudication	8	2	10	4	6
Ischaemic necrosis of foot	2	1	3	0	3
Total	13	5	18	7	11

Appearances

Following injection of tolazoline the skin of the limb distal to the site of arterial puncture rapidly became bright red; this persisted for about an hour, then slowly faded. Colour changes subsequent to injection of hydralazine and dilatal were similar but less pronounced.

The sequence of colour changes in the upper limb (Duff *et al.*, 1953) and lower limb (Hasse *et al.*, 1955) of healthy subjects following intra-arterial injections of oxygen has already been described. Similar changes were noted in the diseased limbs of the present study. As the slow infusion of oxygen began blanching patches appeared in the skin distal to the site of injection. A crepitant sensation was imparted to the palpating finger by the passage of minute emboli through the radial and posterior tibial arteries; tinkling sounds were audible on auscultation over these vessels, and sometimes they could be heard by the naked ear up to 10 cm. distant from the vessel.

The patient was often conscious of a prickling sensation in the limb along the course of the major vessels, but real discomfort was rare. Five minutes later the limb was uniformly of a waxy white hue, the distal pulses were of poor volume, and the superficial veins were collapsed. Soon, however, the characteristic blue and then red patches appeared on the skin, spread concentrically, and coalesced to give a marbled appearance. Next the blue patches faded and the limb was uniformly erythematous. Colour changes were often noted in the ipsilateral lower abdominal wall and external genitalia owing to dispersal of gaseous emboli or vasodilator drug in the superficial hypogastric and external pudendal vessels. Localization of injected dilator drugs was sometimes seen, as evidenced by flushing confined to distinct areas, usually of the lateral or medial aspect of the thigh. Such localization was not seen after injection of oxygen, presumably because turbulence created by the fine stream of bubbles favoured more even mixing with the blood.

That the injected oxygen was distributed not only to the skin of the limb but also to the underlying muscle was demonstrated by measurement of the oxygen saturation of blood samples taken from a deep vein (draining muscle) and

a superficial vein (draining skin) before and after an injection of 5 ml. of oxygen into the brachial artery. Oxygen saturation was measured by a spectrophotometric technique (Roddie, Shepherd, and Whelan, 1956). Before the injection the oxygen saturation of the muscle blood was 55% and of the skin blood 69%. After injection the saturation of the blood from both sources rose simultaneously to attain values of 89 and 91% respectively within 25 minutes. Similar results were obtained in two other experiments, and indicate that the injection of gas into the brachial artery causes a dilatation of the vessels of both the skin and the muscle of the forearm.

Circulatory Changes in the Upper Limb

A typical series of results are shown in Fig. 1. This patient, a man of 64, suffered from severe Raynaud's phenomenon associated with arteriosclerosis; in addition he had worked with vibrating tools for a number of years.

Injection of 10 ml. of oxygen into the left brachial artery was followed by prolonged vasodilatation, the hand blood flow being still significantly increased after 48 hours. In contrast, the blood flow had returned to normal two hours after injection of tolazoline and four hours after injection of dilatal. The effect of hydralazine was intermediate, since the blood flow was still increased after five hours but had fallen to a normal level after 22 hours.

During a period of three weeks seven oxygen injections were given, the results of which are summarized in Table II. It is seen that the duration of vasodilator response is variable. After the fourth and subsequent injections the vasodilatation was no more prolonged than that obtained by tolazoline and dilatal. Similar results were obtained in the other patients with Raynaud's phenomenon.

TABLE II

No. of Injection	Hand Blood Flow (ml./100 ml./min.)			Approximate Duration of Vasodilatation (Hours)
	(i) Left Hand Before Injection	(ii) Left Hand at Peak of Vasodilatation	(iii) Right Control Hand Simultaneous with (ii)	
1	3.3	9.2	3.8	48
2	5.4	13.9	4.9	60
3	4.5	13.5	6.0	24
4	5.9	15.5	6.5	2.4
5	4.9	18.0	5.3	42
6	6.0	15.9	6.1	24
7	5.0	11.0	5.6	2.4

Circulatory Changes in the Lower Limb

Changes in calf blood flow following intrafemoral injection of oxygen and the three vasodilator drugs are illustrated in Fig. 2. The patient, a man of 37 with Buerger's disease, had suffered for two years from severe intermittent claudication; bilateral lumbar sympathectomy had produced only transient improvement and his

exercise tolerance was limited to 50 yards. Dilatal, tolazoline, and hydralazine produced moderate increases in blood flow, with a return to the resting level in a few hours. In contrast, vasodilatation following intra-arterial oxygen persisted for over 30 hours. Before the administration of oxygen this patient could make only 30 contractions of the calf muscles at intervals of two seconds against resistance; during the subsequent vasodilatation he was able to perform 80 similar contractions before the onset of severe cramp (Fig. 3). This suggests that the ability to perform work was improved by the injections; however, too much emphasis cannot be laid on this finding, since it is difficult to assess the role of psychological factors in the performance of such tests in intermittent claudication, and a precise measurement of work capacity (Shepherd, 1950) was not made.

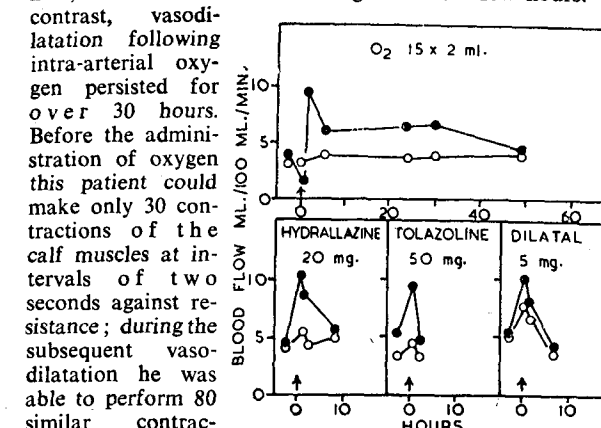


Fig. 2.—Comparison of effects of oxygen, hydralazine, tolazoline, and dilatal on calf blood flow of patient with severe intermittent claudication. Conventions as in Fig. 1.

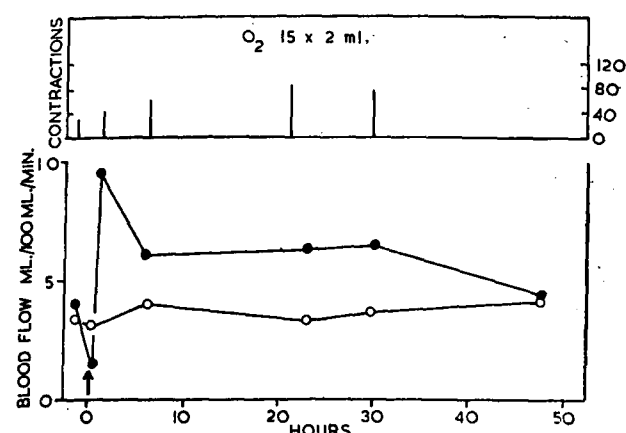


Fig. 3.—Effect of vasodilatation induced by intra-arterial oxygen on onset of intermittent claudication. Vertical lines in upper frame indicate number of contractions of calf muscles carried out at 30 per minute before claudication forced patient to stop. Other conventions as in Fig. 1.

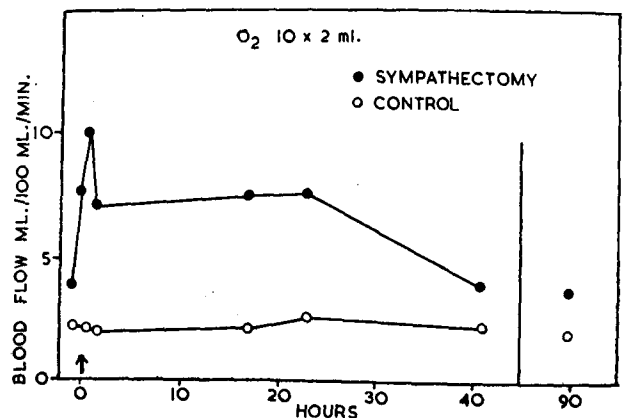


Fig. 4.—Vasodilator effect of intra-arterial oxygen on calf blood flow of a recently sympathectomized limb. Conventions as in Fig. 1.

regarded as significant if the disease was active and required treatment. Practically all the patients were proved to be excreting the tubercle bacillus from the respiratory tract. For the purpose of the survey we excluded patients with no fixed address, such as those living in common lodging-houses or in lodgings.

While 125 is not a large number of cases, we preferred to investigate a representative sample thoroughly and personally rather than depend on a mass of statistics culled from sources of uncertain dependability and completeness. The aspects of the survey considered here are (1) incidence of cases by age groups, (2) distribution by occupation, (3) frequency of contact history, (4) overcrowding and type of house, (5) household income in relation to age groups and numbers in the household, (6) the results of radiological and tuberculin examination of the household contacts, and (7) birthplace of patients.

Incidence of Cases by Age Groups

The distribution of the cases in age groups is given in Table I. The age distribution is similar to that reported by the Scottish Health Services Council (1951), although in the present survey there is a higher proportion of new active cases in the male age group 55-64.

TABLE I.—Age Incidence

Age groups:	14-24	25-34	35-44	45-54	55-64	65-74	75+
Males	18	16	10	6	18	3	1
Females	27	14	7	2	1	1	1
Total	45	30	17	8	19	4	2

Distribution by Occupation

In the group of 125 patients, 16 were employed in preparation or distribution of foodstuffs; one patient, for example, was a baker's vanman and five were grocers' assistants. The four females shown in Table II as working with children

TABLE II.—Occupations

Males	Females
Skilled	27
Unskilled	21
Apprentices	6
Food trades	5
Clerical	4
Unemployed	5
Retired	2
Other occupations	2
	72
Housewife	12
Food trades	11
Factory worker	12
Salesgirls	5
Working with children	4
Other occupations	9
	53

were a schoolteacher, a primary school dining-room attendant, a receptionist in a children's hairdressing department, and a wardmaid in a children's hospital ward; of these four, only the wardmaid had been previously radiographed. One of our patients, a woman aged 62 (suffering from active cavitation bilateral disease with strongly positive sputum), was engaged in making high-class confectionery (marzipan decoration). Of the 23 married female patients, 13 were attempting to combine the duties of housewife and wage-earner.

Frequency of Contact History

In 56 of the 72 male patients (77.7%), and in 40 of the 53 female patients (75.4%), a history of contact with a tuberculous case was definitely established after close questioning of the patient and family, thorough cross-checking of their statements, and an intensive search of the available records of previously notified cases. A positive contact history was accepted on one or more of the following grounds: (a) Present house contact with an active tuberculous case; (b) past house contact with an active tuberculous case; (c) frequent contact, past or present, with a relative suffering from active pulmonary tuberculosis but not living in the same house; (d) frequent contact with a known case of active pulmonary tuberculosis at work or socially. The figures are given in Table III.

Where a positive contact history was accepted on more than one of the above grounds, only the contact thought to be most significant is included in the four categories in Table III. The number of cases in which multiple contact was established is separately shown in the Table.

TABLE III.—Frequency of Contact History

	Males (72)	Females (53)
(a) Present house contact with active case	7	6
(b) Past house contact with active case	29	13
(c) Frequent contact with relative, not in same house	14	16
(d) Frequent contact with relative, at work or socially with active case	6	5
Total	56	40
Total groups a, b, and c	50	35
Multiple contact established	20	16
Contact established in percentage of total cases	77.7	75.4

Overcrowding and Type of House

Table IV gives the number of households overcrowded, applying the standards laid down in the Housing (Scotland) Act, 1950. For the purpose of this Act a person over the age of 10 is regarded as one unit, a child aged 1 to 10 years as half a unit, and a child aged less than 1 year is disregarded.

TABLE IV.—Overcrowding and Type of House (Figures to the Left and Below the Zigzag Line Show the Number of Households Overcrowded)

No. of Units	No. of Apartments				
	1	2	3	4	5
1	2	4			
2	5	10	3	1	
3	4	15	7	4	
4	1	6	12	3	
5	1	2	12	9	1
6		2		6	
7		1	1	4	2
8			1	1	
9				2	3

Households overcrowded, 22 (17.6%).
Households not overcrowded, 103 (82.4%).

In 3 cases out of the 22 overcrowded households the overcrowding was of a voluntary nature—namely, (1) a lodger had been taken in; (2) the overcrowding operated at the week-ends, when an 18-year-old relative stayed in the house; (3) a daughter of the household who had formed a liaison with a married man brought him and their two children to stay with her parents. The overcrowding figures for the households of male patients and of female patients were substantially the same, but overcrowding was found in only 4% of the households of patients over 54 years of age, probably owing to the fact that younger members of the family had left home on marriage or had obtained employment in some other district.

As the assessment of overcrowding according to the Housing (Scotland) Act, 1950, gives no indication of the types of houses in which our patients live, we classified them in the following groups: (a) municipal, further subdivided into (1) tenement type, (2) two-in-a-block, and (3) four-in-a-block; and (b) privately owned tenements which were subdivided according to assessment, after personal inspection of the general state of repair and environmental cleanliness, into good and bad groups. The results are given in Table V, which also shows the sex distribution.

It will be seen in Table V that 52 (41.6%) of the 125 new cases were living in municipal type houses. As such houses comprise approximately 29% of the total houses in the area (personal communication, divisional sanitary inspector), it would appear that there are proportionately more new patients arising in municipal houses than in non-municipal rented houses, as other types of housing in the area are insignificant. An explanation which suggests itself is that

TABLE V.—Type of Houses

	Municipal		Privately Owned	
	Female	Male	Female	Male
Tenement	16	12	12	23
2-in-a-block	7	10	17	21
4	1	6		
Totals	24	28	29	44
	52		73	

TABLE VI

	Period Rehoused (Years)						Total
	1	2	3	4	5	5+	
No. of patients	5	2	6	5	4	30	52

many of the patients had been recently rehoused by the local authority, and this possibility was investigated. The results are shown in Table VI.

The fact emerges that more than half of these patients had been living in satisfactory (by municipal standards) housing conditions for more than five years, but despite this had contracted tuberculosis. This group comprises a quarter of the cases in our survey, and only one of the 52 families concerned had been rehoused because of previous tuberculosis in the family. A higher proportion of female cases than male cases arose in persons living in municipal tenement houses, as opposed to the block-type of municipal house (66.6% and 42.8% respectively).

When the figures for cases arising in privately owned tenement homes are considered, we find approximately equal numbers in the good and bad types of houses (35 and 38 respectively), and of the 73 new patients living in privately owned tenements, 29 (39.7%) were females and 44 (60.3%) were males. There would thus appear to be a predominance of male cases arising in privately owned tenements.

Household Income

Accurate figures of household income are difficult to obtain because of a natural reticence on the part of the patient and sometimes a suspicion that the information divulged may be used to the patient's financial detriment—for example, in respect of national assistance or income tax. Another difficulty is that wage-earners of the household do not always disclose their true income to the others in the household, and wish to avoid the domestic unpleasantness which the truth would entail. Realizing these difficulties, we postponed close questioning until the confidence of the family had been gained and also gave assurance that any information obtained would be regarded as highly confidential. Care was taken to include in the household income figure all additional sources such as family allowances, pensions, and average overtime earnings. The results of this inquiry are given in Table VII.

This Table shows that household income varied widely from £1 12s. 6d. a week to £48 a week, but by far the greatest number were between £10 and £20. An income of £10 a week for the average household is, in our opinion, the lowest limit of income necessary to avoid undue financial strain, and our analysis shows that 70.4% of our patients were living above this level. In Table VIII we give a breakdown of the household income in relation to age group of

TABLE VII.—Weekly Household Income (All Sources) (Lowest, £1 12s. 6d.; Highest, £48)

		Age Groups of Patients				Total
		Males *		Females		
		Under 55	Over 55	Under 55	Over 55	
Less than £10	..	18	10	8	1	29.6%
£10-£20	..	25	9	38	2	59.2%
More than £20	..	7	3	4	—	11.2%

the patients and to the average number of units in the house. A person over the age of 10 years is regarded as one unit and a person less than 10 years as a half-unit. It should be pointed out that, whereas in the housing analysis using statutory standards children under 1 year were disregarded, for the financial analysis a child under 1 year is regarded as a half-unit.

Table VIII shows the average income per household unit and also the average number of units per house according to the age groups of the patients. In the age group most

TABLE VIII.—Income Per Household Unit

	Age Group						
	14-24	25-34	35-44	45-54	55-64	65-74	75+
No. of families	45	30	17	8	19	4	2
" " units	212	106	69	32	69	8	2
Income per unit	£3 16s.	£3 9s.	£2 10s.	£2 19s.	£3 15s.	£3 15s.	£2 10s.
Average No. of units per house	4.6	3	4	3.8	3.6	2	1

prolific of new cases—namely, 14-24—the household income per unit is highest and the number of units per house is at its maximum. This group therefore has an undoubted financial advantage over all other age groups, because, apart from higher income per unit, the finding of a higher number of units per household places them in an additionally advantageous position, as more people are sharing a common roof and household expenses compared with the other age groups. In the patients of the younger age groups, therefore, poverty cannot be accepted as a significant predisposing factor. On the other hand, study of the tables will show that our patients aged 65 years and over are at a financial disadvantage when the average income per unit and the number of units are considered together. The children of these old people have usually left home and no longer contribute to a household, the basic expenses of which (rent, rates, heating, etc.) remain as high as before.

Contact Examination

We endeavoured to persuade all household contacts to submit to x-ray examination and Mantoux-testing with 1:1,000 O.T. The results are shown in Table IX. In addition, many other family and social contacts were examined, but these results are not included.

Of the 21 contacts not Mantoux-tested, seven were patients with pulmonary tuberculosis in whom testing was not considered necessary. One contact was a merchant seaman whom we managed to radiograph, but not Mantoux-test, before he rejoined his ship; 10 were out working all day and refused. Another contact, a lodger, left the household precipitately before testing could be carried out. The remaining two contacts not Mantoux-tested were an 87-year-old incontinent woman whose daughter forbade any examination,

TABLE IX.—Household Contacts

Age group:	0-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71-75	76-80	80+
No. of contacts in household	43	47	40	49	39	30	20	21	29	19	22	17	20	8	7	2	1
" " " x-rayed	43	47	40	49	38	30	20	21	25	17	16	17	18	7	5	1	—
" " " Mantoux-positive (1:1,000)	26	36	32	44	35	24	19	21	25	17	16	17	18	7	5	1	—
No. of contacts Mantoux-negative	17	11	8	5	1	2	—	—	4	—	2	—	—	—	—	—	1
No. not Mantoux-tested	—	—	—	—	3	4	1	—	—	2	—	—	—	—	—	—	—

and a 23-year-old working girl who chose to rest in bed on a Saturday morning rather than have any test carried out. These latter two were also the only household contacts not radiographed out of a total of 414. Of the group, therefore, 94.6% were Mantoux-tested and 99.5% radiographed.

As a result of the x-ray examination of these 412 household contacts 21 (5.7%) were discovered to have active pulmonary tuberculosis and a further 31 (6.8%) had tuberculous disease, probably quiescent or inactive.

As one may confidently expect that a proportion of the 31 cases classified as quiescent or inactive will break down in the future, continued observation will swell the total of active cases detected at an early stage as a result of the survey.

Racial Factors

In view of the fact that Glasgow has a large number of citizens who were born in Ireland and the Scottish Highlands, we thought it would be interesting to ascertain what proportion of the patients in our group came into this category. Only four patients (0.8%) were born in Ireland and four (0.8%) in the Scottish Highlands.

The 1951 census gives the number of persons living in Glasgow and born in Ireland as 34,475, which is approximately 3% of the city's population. The corresponding figure for persons born in the Scottish Highlands and Western Isles is 19,680, approximately 2% of the population. It would therefore appear unlikely that there is any special prevalence of tuberculosis in North Glasgow among persons of Irish or Highland birth.

Discussion and Conclusions

If the figures given above are a fair reflection of the position in the area surveyed, and if we accept Greenwood's dictum quoted in the opening paragraph, we reach some conclusions which may be at variance with generally accepted concepts of tuberculosis epidemiology. Bradbury (1933), in a frequently quoted Tyneside study, found that the triad of factors particularly associated with pulmonary tuberculosis were poverty, overcrowding, and Irish nationality, but the figures in this survey do not suggest that these factors are of appreciable importance in Glasgow. Stein (1950), in Edinburgh, also suggested a highly significant relation between tuberculosis morbidity and overcrowding, as did Macgregor (1926) in Glasgow. McKinlay (1947), however, was critical of the older views on the association between tuberculosis and housing conditions, as he could find statistically no significant correlation between tuberculosis and overcrowding in either town or rural areas. Lockhart (1949), too, in Stirling, found no greater incidence in overcrowded houses, but suggested that this may have been the result of a vigorous policy of rehousing tuberculous families.

Our figures would suggest that Lockhart's surmise is incorrect, as only one of our 52 tuberculous families in municipal houses had been rehoused because of previous infection. It would also appear that the rehousing of overcrowded families affords them no obvious protection against the development of the disease, especially when it is considered that more than half our municipally housed families had been rehoused for more than five years. Perhaps the most striking result, however, of this investigation is that we could demonstrate a definite contact history in 77.6% of the male cases and 75.4% of the female cases. This should be compared with the figure of 40% obtained by Lloyd and Macpherson (1936) in their survey of 1,000 patients aged 15-25. These authors also quoted percentages of 41 in France and 36 in Leeds. The differences between these figures and ours is even more striking when we consider the London County Council report of 1937, which emphasizes that contact history is more frequent in young adults than in patients over the age of 40 years. Semple (1955) stated that in Liverpool one in twelve of new patients gave a history of contact with a known case, and Clarke (1952) states that in perhaps two-thirds of all cases of pulmonary tuberculosis there is no family history.

If the discrepancy in these figures from different areas is not accounted for by the relative intensity of the contact investigations then it would seem that the epidemiology of the disease varies so much from area to area that case-finding schemes profitable in one part of the country may be much less so in others. We consider it noteworthy also that the contact history in our series was of a familial nature in 88.5% of cases. This very high proportion has strengthened our conviction that in the detection of new cases of tuberculosis the emphasis should continue to be laid on full and relentless investigation of all familial contacts, whether living in the household or elsewhere. In this connexion it is important to investigate all such contacts regardless of their age, as in at least two of our patients, aged 55 and 56 years, the probability of their having been infected by younger members of their families is suggested by study of serial x-ray films. This emphasis on household and familial examination is justified by the incidence of 57 per 1,000 active cases found in a total of 412 contacts examined, which may be contrasted with the usual incidence of 5 per 1,000 in mass radiography surveys in the same area (Dr. T. Miller, Director Mass Radiography, personal communication) and which underlines the dictum that the most profitable yield of previously unknown cases is obtained by examination of the familial contacts.

The results of tuberculin-testing show that between the ages of 31 and 50 years all our household contacts were Mantoux-positive. Above 50 years 11% were negative reactors. This is an interesting finding which is at present being further investigated.

An extremely disconcerting fact which emerged was that 20 out of our 125 new patients were working in food trades or with children. It is difficult to avoid the conclusion that periodical x-ray examination of such persons is highly desirable, and the fact that the employee is in one of the older age groups should not be considered an adequate excuse for failure in this respect. School authorities have already attempted with varying success to implement this policy with regard to full-time employees. We suggest that this be extended as a condition of employment of part-time workers such as our patient, who was serving meals to primary-school children.

This work has given us some general impressions which we feel may be of value to other workers in the field. For example, we find that visits by the chest physician to the homes of new patients give the health visitor a feeling of greater interest and encouragement, with the added advantage that such visits serve to reinforce, and occasionally redirect, her activities to the best advantage. We also found that home visits made in the evening were most productive in eliciting information and in establishing rapport with the members of the household. Moreover, at such times recalcitrant contacts were found to be in a more amenable state of mind and willing to discuss the reason for their reluctance to be examined. As our figures show, this reluctance could usually be overcome as a result of our methods, which, however, sometimes involved a considerable number of visits.

An easing of the situation in obtaining the co-operation of tuberculosis contacts would be achieved by facilities for having x-ray examination carried out in the evening, as it is unreasonable to expect a working man or woman to lose a half-day's wages in conforming to a recommendation which is as much in the public interest as his own. Our firm impression is that such visitation is as useful to the chest physician as to the patient, since the domestic conditions which are important in this social disease cannot be visualized accurately otherwise, and help in treatment planning and management of the patient is thereby obtained.

If there is any tendency, as is sometimes suggested, for the modern chest physician to devote his energies too much to purely clinical activities it is not in the best interests of tuberculosis control. The tuberculosis situation cannot be viewed complacently until the incidence rate for new cases, which, so far, in most urban areas has shown only a negli-

gible or moderate decline, decreases in the same marked manner as mortality. Far from the volume of work in the tuberculosis field becoming less, a marked expansion in effort is necessary, with as much emphasis placed on prevention as on treatment. Plans for the detection of tuberculosis must be based overwhelmingly on examination of the household contacts, and it must be a long-term surveillance, especially as our figures of familial contact history would appear to support the theory that inherited susceptibility to tuberculosis is a major factor in the development of disease in the adult.

Summary

The results of an intensive investigation of the sociological and epidemiological features of 125 new cases of pulmonary tuberculosis in North Glasgow are given.

Overcrowding, poverty, and Irish nationality were found not to be significant factors.

The results of x-ray examination of 412 out of 414 household contacts are given with the results of tuberculin-testing of the majority, including adults. A reason for the increased incidence of tuberculosis in older males is suggested.

Figures show that the rehousing of families confers no obvious advantage in preventing the onset of tuberculosis.

The results of contact history examination showed a possible source of infection in a very high percentage, about double those in previous surveys. The contact history was of a familial nature in nearly 90%, and a suggestion was made for the better control of the disease on this basis.

Compulsory x-ray examination of food-trade employees and persons working with children is advocated.

It is a pleasure to thank Dr. A. W. Lees, consultant chest physician, Ruchill Hospital, for his interest and advice in this work, and also our medical, nursing, and clerical colleagues in the public health department.

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"In spite of the very real advances which have been made in the understanding and management of cerebral palsy during the last few years it is still unfortunately true that mitigation and alleviation of the result of the handicap are all that can be offered to-day," states the Annual Report of the British Council for the Welfare of Spastics for 1955-6. To mitigate the sufferings of 30 severely handicapped young adult spastics the Council established Ponds, a home which completed its first year in 1956. Although it would be premature to assess results there, the Warden, Dr. C. D. S. AGASSIZ, believes that practically every spastic admitted has improved socially and physically to some extent. The council regard Ponds as a long-term pioneer experiment to find out what can be achieved with spastics likely to need permanent care, and hope that it may eventually develop into a model on which local authorities may base their own schemes.

DEVELOPMENTAL SPEECH ANOMALIES IN APPARENTLY NORMAL CHILDREN

BY

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The aetiology of speech anomalies in children is often obscure. Particularly is this so when there is no physical handicap, such as cerebral palsy, cleft-palate, or deafness, and when the mental capacity is normal. The indications for treating delayed onset of speech, arrested speech development, and subsequent dyslalia are poorly defined. In view of the scarcity of information in the literature a study of these particular aspects of the problem was planned. On completion of the study, Morley *et al.* (1955) described 72 cases, seen over a six-year period, in which similar disorders of speech were observed.

Material

The cases were selected from children who within the previous five years had attended the medical outpatient department and speech clinics of the Hospital for Sick Children, Great Ormond Street, London. At the outset, 57 children were regarded as physically normal and of average intelligence, though on re-examination doubt was cast on the intelligence in 10 cases. The intelligence quotient (I.Q.) was estimated in seven of these, and two were found to score below 80, the level accepted by MacMeeken (1942) as the lower limit of normality in a study on schoolchildren. These two and the three children whose I.Q. could not be estimated were omitted from the study. Those selected showed no evidence of deafness or neuromuscular abnormality, and it was possible to confirm this by re-examination in 43 of them. Of the children who could not attend this research clinic, further information was obtained by questionnaire in four and the original notes were adequate for some parts of the analysis in 10. In 14 cases where there was some doubt about the effects of the speech abnormality on schooling, a report was obtained from the schoolteacher. Progress reports of five children who had been referred elsewhere for treatment were received from the speech therapists of other clinics. Of the original 57 cases, then, 52 (34 males, 18 females) were included in the analysis.

Normal Speech Development

One or two special points concerning the normal development of speech are worthy of reiteration. It is now generally understood that infants first have a realization of the importance of speech at about 9 months of age (Sheridan, 1945). What is less often appreciated is that the babbling which occurs much earlier (Sheridan, 1945; Schantz-Hansen, 1952; Van Riper, 1954) is of considerable significance and plays an important part in assessing subsequent speech abnormality.

During the course of normal development the child goes through phases of "echolalia," "perseveration," "lispering," and other mild articulatory difficulties. For example, "s," "sh," "th," and "r" are among the last to be learned, along with the tricky consonant combinations such as "pl," "thr," and "sk."

Knowledge of this nature is valuable in estimating the stage at which the development of speech becomes abnormal or arrested. A careful estimation of the child's present and

past accomplishments may indicate fairly accurately the time at which the trouble began. Any unusual influence operative at or just before this time is likely to play an important part in the aetiology of the condition.

It is realized that normal children may show transient "echolalia," "perseveration," "cluttering," "stammering," "dyslalia," and many of the other features detailed below. But when these are related to delayed onset or arrest of speech, or when they persist for months or years, they become an important abnormality.

Incidence of Anomalies

The specific anomalies under review—namely, delayed onset or arrest of speech in late infancy and very early childhood—with their secondary dyslalias, constitute a small group. Unfortunately, the exact incidence is impossible to estimate. Although most practitioners will have seen and themselves advised parents concerning the management of the milder forms of these conditions, there are sufficient severe varieties to constitute 8% (52 out of 610) of all new patients attending this hospital speech clinic.

The sex incidence is approximately 2:1 in favour of the males, the overall ratio of males to females at 1 year being only 1.05:1 (Registrar-General, 1954). This male preponderance has been observed in other speech disorders of childhood, the most striking being that of 5:1 in children with "stammer" (quoted by Nelson, 1954).

Specific Speech Disorders

The first important finding is that arrested development is much commoner than delayed onset of speech. Many children who at first seemed to start sound production late were, on closer questioning, found to have "babbling" at the normal time. Table I shows the age at which "babbling" and word production started. It is unfortunate that

TABLE I.—Age at Which Babbling and Word Production Started

Age of Onset	Male	Female
Babbling		
6-12 months	20	10
Over 1 year or absent ..	4	3
Indefinite	10	5
Words		
Before 18 months	10	5
18-24 months	6	5
Over 2 years	18	8

All except 5 of the above cases had an abnormal degree of dyslalia.

an accurate report concerning babbling could not be obtained in 15 children, but even if these cases were excluded from the lower half of the table the trend is unchanged. It shows that the "late talkers" considerably outnumber the "late babblers." In fact, only 7 out of 37 (52 minus 15 doubtfuls) were late in "babbling," and only these cases can be truly called "late talkers." The remaining 30 "babbled" at a normal age, and of these half showed minimal arrest with subsequent severe dyslalia and half showed arrest for a considerable period with similar sequelae.

The total number of cases is admittedly small, and some parents found it difficult to remember accurately the information required. In spite of this, there is little doubt that in the majority of these children "babbling" occurred normally, yet the correct use of words was delayed long enough for the condition to be regarded as frankly abnormal—that is, until after the age of 2 years (Sheldon, 1955; Morley *et al.*, 1955). A search for the cause of such arrest operating at or after 1 year of age is obviously indicated.

In only five cases could it be said that the late use of words was not ultimately accompanied by some other speech defect. Only one of these five attended the research clinic, and it is likely that if the other four had been seen they too would have been found to have secondary defects. At least it can be said that it is rare for these children to talk normally when they do begin to use recognizable words. It

is therefore obviously unwise to assume, as is so often done, that spontaneous correction will occur in time. These children should be watched with a view to speech therapy when the need becomes apparent.

Multiple dyslalia was found most often, being present in 25 boys and 13 girls (approximately 73% in each sex). The 2:1 ratio of boys to girls was roughly maintained throughout the analysis, so only the totals, in numerical order, will be given. No particular defect was selective for either sex.

General difficulty in consonant formation occurred in 10 children; and specific difficulty with "s" in 11, "t" and/or "th" in nine, "k," "sh," and "r" in seven each, with all other consonants giving trouble on odd occasions. "Cluttering" occurred in five cases, "idioglossia" and "monosyllabism" in four each, "echolalia," "rhinolalia," and "sigmatism" in three each, "multiple 'd' substitution" and "rejection of speech" in two each, and "hysterical mutism" in one case. The common substitutions were as follows: "t" for "k," "d" for "g," "f" for "th," "th" for "s," "s" or "th" for "sh," and "Vw," "l," or "y" for "r."

It is obvious that these children show no fixed pattern of abnormality, though, as might be expected, the last and most difficult of the speech skills to be acquired (the "s," "sh," "th," and "r" sounds) were the most often affected.

In about 16 children the prolonged use of gesticulation was obvious to the mother, though it is difficult for the untrained observer to know what degree of gesticulation is abnormal. In these 16, however, it was obviously excessive and lasted for many months.

Effect on School Work

Of the 32 children who had reached school age and whose scholastic record was obtainable, the progress of 12 (37.5%) was considered to be impeded by the speech defect. Some of these children had received treatment before starting school and yet their dyslalia proved a handicap. This indicates just how difficult a problem it can be in some cases. This figure (37.5%) is probably a fairly true estimate of the problem, as most of the minor cases not seen in hospitals will clear spontaneously before 5 years of age. There are some, however, who are allowed to reach this age untreated, and only when schooling begins is the need for therapy realized. In this series there were several 5-year-old children and one child aged 6 referred for advice for the first time. More significant is the finding that over 40% of the children were referred after reaching the age of 4 years (Table II), thus barely giving the speech therapist

TABLE II.—Age at Which Children First Referred

	2 Years	3 Years	4 or More Years
Males	5	13	16
Females	5	7	6

time to start correcting the defects before schooling begins. The age at which the other children were first seen in hospital is shown in Table II. Although the defect is evident to parents and doctors by the age of 2-3 years, up to three more years may elapse before skilled assistance is sought. A speech therapist accustomed to children can begin treatment in these patients with normal intelligence about the age of 3 years.

Response to Treatment

The intention is not to detail the methods of treatment but rather to indicate its overall value. The results shown in Table III were obtained from this hospital and from

TABLE III.—Response to Treatment

Response	Males	Females
Very good	4	5
Good	9	4
Fair	5	3
Poor	6	1
Unknown or no treatment given	10	5

reports kindly sent from local speech clinics in the London area. It can be seen that in the 37 cases in which accurate information was available 22 (60%) had a "good" or "very good" response to treatment. Some of the remaining cases proved to be severely disturbed psychologically, and in these a combined course of treatment in the department of psychological medicine and the speech clinic is sometimes necessary. A reasonably good prognosis can be given in most cases. If treated early enough, they should be able to start school with little or no handicap, thus avoiding further psychological trauma and possibly ridicule from the other children.

Alternatively, in certain cases, nursery schooling has more to offer than speech therapy (Sheridan, 1945). When psychological factors are operative contact with other children in a new environment may have sufficient influence to obviate the need for formal speech therapy at a later date.

Specific guidance to the mother is invaluable at an early stage. Many of the common mistakes can be avoided, such as threatening, scolding, taunting, or complete neglect of the problem, and the way paved for more specific therapy later. The visits to the clinic themselves allow the child to become accustomed to the hospital surroundings and to the staff—a very necessary preliminary to successful therapy in children whose difficulty is probably psychological.

Aetiology

In the course of detailed questioning more than one possible cause of the speech defect has often been brought to light. It is quite impossible to say which influence is the most important, though it became quite obvious that (as stated by Winnicott, 1931) psychological factors played a major part, and a similar disorder was often reported in other members of the family.

In 33 children there were factors in the environment which could have been operative in causing delay or arrest in speech development. These included seven in which there was obvious mismanagement of the children at home. The family relationships were bad or the parents seemed unsuited to their task of bringing up a family. On six occasions the speech difficulty began at the time of the birth of another child. Additional trouble might have occurred in two of these children, in that they were sent away from home during their mother's confinement. In two further cases separation from home and family for other reasons seemed to be the operative factor. Lack of stimulation, having to "keep the children quiet," or over-protection could account for the trouble in four children. The exact opposite occurred in one case in which the parents pushed a child beyond his capabilities.

It is sometimes said that young children may become bilingual with relative ease. The fact that four children who had lived abroad and travelled were among the cases reviewed would suggest that this is not always so. Whether it was the insecurity of much travelling or actual confusion of language which caused the difficulty it is impossible to say, but the former is suspected.

In five cases the psychological upset was related to trauma, though in only one was there any suspicion that the trauma had caused any relevant physical abnormality.

Seven children were the youngest of large families, and it is well recognized that this may in itself tend to produce abnormalities of speech (Allen, 1950). In a few of these there were some psychological factors in addition. Among the older children there were at least nine cases of "established" nocturnal enuresis. This incidence adds to the supposition that psychological factors were operative in these children.

No cause could be discovered in two children and no cause for an obvious psychological disturbance in a further eight. A more detailed investigation of these families might be helpful.

Many children must be subjected to the above influences and yet not develop a speech defect, and it seems likely that

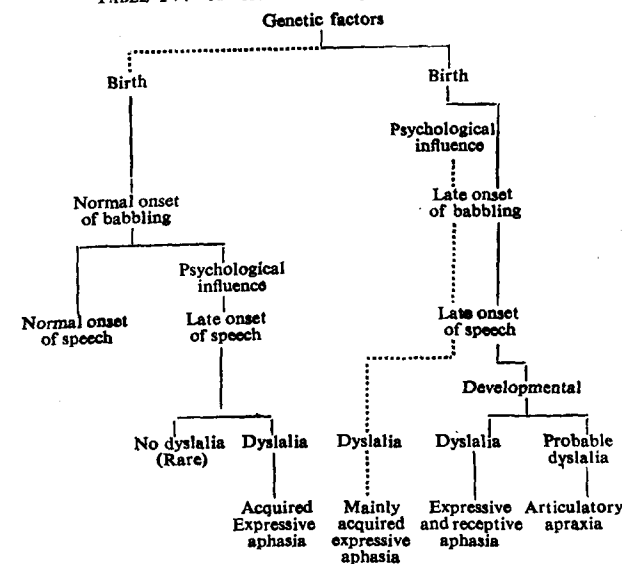
some other factor determines the development and site of the abnormality. There may be a genetic influence at work, because in 19 cases similar difficulties had occurred in other members of the family. Indeed, 5 out of the 10 children in whom the cause was entirely unknown were of this group. The remaining 5 are a mystery for the present.

All the children who attended the research clinic were tested for crossed laterality. In six the test results were not decisive enough for a laterality index to be made. Twenty-two children were "right laterals," one was a "left lateral," and ten (26%) were "crossed laterals." In view of the fact that in only one child could it be said that crossed laterality was the only discoverable cause for the speech defect, it is most unlikely that this factor plays an important part. Weight is added to this suggestion, by the knowledge that the incidence of crossed laterality (excluding crossing with the ear only) in an average school population was 28% (Pearce, 1953)—very similar to the incidence in this group of children (26%). Again, it has been suggested that children with complete left laterality may have some speech disturbance (Travis, 1933; McAllister, 1937; MacMeeken, 1942; Ford, 1952), but this cannot be an important factor in this group, as there was only one child with this laterality index.

Discussion

Only in recent years has the importance of speech disorders in "normal" children of pre-school age been fully appreciated. The present study indicates that about 80% of such children have arrested development (acquired aphasia) and the remainder have true delayed onset of speech (developmental aphasia or articulatory apraxia) with not infrequent subsequent dyslalia. Developmental dysarthria does not come into this group of "normal late talkers"; a suggested classification of the latter is given in Table IV.

TABLE IV.—Arrest and Delayed Onset of Speech



The psychological factors detailed above must, we feel, contribute greatly to the cause of these disorders, and others have expressed a similar belief (Winnicott, 1931; McAllister, 1937; Allen, 1950; Nelson, 1954). A family tendency to speech disorders may have some bearing on the outcome of these circumstances, which, it is realized, may have no outward manifestations in many another child. Crossed laterality, although occasionally providing some additional handicap and/or psychological disturbance, does not appear to play an important aetiological part.

Children who understand the spoken word and gesticulate in response to it probably have either "expressive aphasia" or "articulatory apraxia" (Morley *et al.*, 1954), and those who respond in the same way only to signs have "receptive aphasia." Excessive gesticulation was found in 16 children, most of whom had the "expressive" disorder. The presence of gesticulation and of babbling is helpful in assessing intelligence (Illingworth, 1955). Over-attentive siblings and parents help to perpetuate gesticulation and remove the stimulus for speech development.

Schantz-Hansen (1952) has suggested that treatment can profitably be started between 3 and 4 years of age, and we subscribe to this view. By attendance at a nursery school or speech or child guidance clinic, or by simply advising parents, 60% of these children can start school without an impediment. Still further psychological disturbance, such as described by Morley *et al.* (1950) and Ingram and Reid (1956), may thereby be avoided. Morley *et al.* (1955) suggest that the more severe and less responsive cases are due to "delayed neurological development"—a highly selective deficiency. As such cases are not always easy to recognize we believe that all these children should be given treatment in the first instance. If unresponsive, they should be watched so that therapy is given when neurological development is sufficient for benefit to be derived from it.

Conclusions and Summary

The purpose of the present study was to assess the very early development of children with so-called delayed speech and subsequent dyslalia in an attempt to discover possible causes and, in addition, to establish some indications for treatment. These children constitute about 8% of the work of the hospital speech clinic.

The larger proportion (80%) suffer, in fact, from arrested development, probably the result of non-specific psychological factors operating between the age of 1 and 2 years.

In about one-third of all the cases there is a history of other members of the family having similar speech anomalies. This, along with the unequal sex incidence, suggests that a genetically determined factor may also be operative. It may, however, be due to familial living characteristics being copied from one generation to another. Crossed laterality plays little or no part in the production of symptoms.

The specific speech anomalies have been described.

All cases should be given the benefit of a trial period of treatment. In this way many children will start school without handicap. Treatment should not be forced and should at first be on general lines. Attendance at a nursery school may be all that is required in the mild cases. A few of the severe cases, which may be due to delayed specific neurological development, may not respond. These should be reviewed regularly over the period of spontaneous speech development, and treatment for the inevitable sequelae should be given when they can derive benefit from it. Advice to parents and schoolteachers concerning their management is very important.

We wish to thank the Research Committee and the physicians and surgeons of the Hospital for Sick Children, Great Ormond Street, London, for giving their consent to this work and granting access to the case records of these children; to Professor A. A. Moncrieff for his kindly interest and advice; to the department of psychological medicine for the intelligence testing; to the Research Committee for providing funds for patients' travelling expenses, and for the secretarial work kindly performed by Miss Stringer and Miss Lépine. We also thank the schoolteachers and speech therapists who responded to our request for progress reports.

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TREATMENT OF ACUTE APPENDICITIS

BY

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Since the days when appendicectomy became a relatively safe procedure it has been fairly generally taught that the correct treatment of all cases of appendicitis is appendicectomy, and I am told that this is still the current teaching. Nevertheless, for over fifty years surgeons from various parts of the world have written from time to time advocating conservative treatment in some of the more advanced cases.

Twenty-five years ago I began to treat cases of appendix abscess conservatively, and was surprised that most of them resolved without any operative help. Since the introduction of antibiotics I have continued this line of treatment and have usually found that it is not necessary to operate, for most cases settle down.

If with the help of antibiotics the human body could absorb an appendix abscess, I began to wonder whether it was capable of dealing with burst appendices that did not localize. Experiment soon showed that it could.

During the last four years I have asked that every case of acute appendicitis of over 24 hours' duration coming into hospital under me should be treated conservatively. During this period I have had three registrars for periods of about a year who have nobly supported me, and, although doubters at first, have become converted. But I have had, for short periods on two occasions, temporary registrars who did not always fall into line. The results of this policy are the reason for the present communication.

Extending this policy still further, I have conservatively treated a number of cases of acute appendicitis received within 24 hours, and am satisfied that the condition can be safely and certainly dealt with in this manner.

Treatment

The treatment given is rest in bed in any position the patient finds comfortable, nothing of any description by mouth except water, which is given freely, six-hourly injections of penicillin, 250,000 units, and streptomycin, 0.5 g. in severe cases, chloramphenicol, chlortetracycline, tetracycline, or sulphadimidine may be given as well. Pain is relieved by pethidine and/or morphine, but we have found

that little is needed after the first 24 hours. If vomiting is at all marked, gastric suction through a Ryle tube is instituted, an intravenous drip is set up, and total fluid intake and output are carefully balanced daily.

When the pain and sickness have subsided and the temperature and pulse have fallen, glucose, milk, and other fluids are given by mouth, and there is a gradual return to normal diet, varying in time according to the severity of the attack. No purgatives or enemas are given. Liquid paraffin, $\frac{1}{2}$ oz. (14 ml.) night and morning, is given by mouth. As the condition subsides, a glycerin suppository is used if necessary.

In cases of appendix abscess the same treatment is given and usually resolution occurs. If this does not happen, a waiting policy should be adopted until the abscess either comes up to the abdominal wall or can be felt as a bulge in the pelvis. In the former case, when the percussion note is dull, under general anaesthesia a wide-bore needle is passed through the abdominal wall until pus can be aspirated. A stab incision is made with scalpel along the needle, a large artery forceps is used to enlarge the stab, the pus is evacuated, and a small drainage tube inserted. I think it is a mistake to do a formal gridiron operation and open up the muscle and fascial planes. In the latter cases, under general anaesthesia, the patient is placed in a lithotomy position, the sphincter ani is dilated, and the abscess is opened with sharp-pointed sinus forceps at the point of fluctuation. No drainage is necessary. Cases of burst appendices with localized, spreading, or general peritonitis, even with distended abdomens and paralytic ileus, were treated conservatively and settled down.

During the course of treatment of advanced appendicitis by conservative means it is not unusual to find distension of the abdomen with dilated loops of small intestine on a straight x-ray film. It is nearly always of a paralytic nature and settles with treatment. But it is important to realize that mechanical obstruction with colicky pains and peristaltic waves can develop during an attack of acute appendicitis, and that this necessitates operation. We had one such case under our observation—that of a woman who had late appendicitis which was treated conservatively, and who developed mechanical obstruction. At operation, a loop of ileum was found hitched on to an acutely inflamed appendix, causing kinking and obstruction. The adhesions were separated, the appendix was removed, and all went well.

Case 1

A mongol idiot aged 7, of poor physique and low mentality, was admitted to hospital with acute appendicitis and peritonitis. There was a history of abdominal pain and vomiting for three days. On admission he was gravely ill and slightly cyanotic; temperature 102° F. (38.9° C.), pulse rate 150 and almost impalpable. The abdomen was distended, generally rigid, and tender, especially in the right lower quadrant. Straight x-ray films of the abdomen and chest were normal. The white blood cells numbered 22,000.

Continuous gastric suction was instituted, water only was given by mouth, and a continuous intravenous drip was set up with "polythene" tubing. Continuous individual nursing was necessary to stop him pulling the tubes out. His fluid balance was kept right by a carefully maintained intake and output chart.

During the first week he was treated with penicillin, streptomycin, and tetracycline, and during the second week with penicillin and sulphadimidine. For four days he was gravely ill, and it was the general opinion that his chances of survival were not good. But after this he made an astonishingly rapid recovery and was discharged from hospital 17 days after admission, free from all abnormal signs and symptoms.

Comment.—I have chosen this case to disprove the theory that the peritoneum in children cannot stand up to infection as well as in adults, which I do not believe, and to demonstrate the efficiency of treatment in an extremely severe case under the most difficult circumstances.

Case 2

A girl aged 15 was admitted to hospital with acute appendicitis and pelvic peritonitis. There was a history of five days' abdominal pain and vomiting. On admission the temperature was 102° F. (38.9° C.) and the pulse rate 140. The lower abdomen was tender and rigid, particularly in the right iliac fossa, where a diffuse hard swelling could be felt. The pelvic peritoneum was very tender on rectal examination, straight x-ray films of the chest and abdomen showed nothing abnormal, the W.B.C. was 12,000, and the urine was normal.

Conservative treatment was instituted, and for 14 days antibiotics were administered. Her temperature fluctuated during this time between 103° F. (39.4° C.) and normal, and her pulse rate between 140 and 100. After the first three days she had little pain and no vomiting, and she said she felt reasonably comfortable.

At the end of 14 days a fluctuating swelling could be felt in the anterior rectal wall. This was opened under general anaesthesia without any difficulty, and rather more than half a pint (280 ml.) of offensive pus evacuated. No drainage tube was inserted. Her temperature and pulse rate soon fell to normal and all abnormal physical signs gradually disappeared.

She was discharged from hospital 16 days after the operation free from all abnormal signs and symptoms.

Comment.—This case shows how a severe appendix abscess which does not resolve with conservative treatment can be brought to a successful termination by simple means, without removing the appendix during the acute stage.

Case 3

A boy aged 9 (the son of an experienced nurse) was admitted to hospital with acute appendicitis. There was a history of abdominal pain and vomiting for four days. On admission his temperature was 101.5° F. (38.6° C.) and his pulse rate 120. The abdomen was rigid and tender in the right iliac fossa.

Conservative treatment was adopted and nothing was given by mouth except water. Injections of penicillin and streptomycin were given six-hourly for seven days. In 24 hours his pain and vomiting had gone. In three days his temperature and pulse rate fell to normal and stayed there. In 12 days he was sent home free from all abnormal signs and symptoms.

Four months later he was readmitted to hospital for an interval appendicectomy. The operation was easy; there were no adhesions to the abdominal wall, but some adhesions between the caecum, ileum, and appendix were present. He made an uninterrupted recovery, his temperature and pulse rate remaining normal throughout.

Comment.—This is a typical case of acute appendicitis, received late, treated conservatively, and brought to a successful conclusion by an interval appendicectomy.

Results

In the years 1953, 1954, and 1955, in my general surgical clinic at the Rotherham Hospital, 609 appendicectomies were performed by myself or, in my absence, by my deputy, my registrar, or my house surgeon. Of these, 395 were cases of acute appendicitis; 100 were cases of chronic recurrent appendicitis or were interval appendicectomies; 23 were cases in which no pathological lesion was found; and 91 were done *en passant* in cases of gall-stones, duodenal ulcer, ovarian cyst, carcinoma of the colon, etc. Five cases of appendix abscess were drained, and 137 cases of acute appendicitis of more than 24 hours' duration were treated conservatively.

During these three years we have had two deaths from appendicitis.

The first was that of a man aged 78 who was admitted with advanced appendicitis and peritonitis, which settled down with conservative treatment. His temperature and

pulse rate became normal, his pain and vomiting stopped, and his tenderness, rigidity, and distension went. On the 17th day, however, he began to get "chesty" and rapidly deteriorated, and on the 19th day he died from bronchopneumonia. He was a frail, feeble old man, and I very much doubt whether his chances of survival would have been greater if we had operated on him on admission.

The second fatal case was that of a man aged 58, who was operated on eight weeks previously in another hospital for gangrenous appendicitis, followed by a second operation for a pelvic abscess. He became depressed and, very foolishly, went home against medical advice. He deteriorated at home, with diarrhoea, malaise, sweating, abdominal pain, etc., and when I saw him he was gravely ill. He refused to go back to the hospital where his appendix had been removed, and only under great pressure did he agree to come into the Rotherham Hospital. In spite of treatment he died a few days later. It is an interesting speculation whether he might have survived if he had been treated conservatively from the start.

Among the 609 appendicectomies performed, 395 were for early acute appendicitis with no deaths; and 137 cases of late appendicitis were treated conservatively with one death. One patient died whose appendix had been removed elsewhere in the late stage.

Points for Consideration

The treatment of late acute appendicitis by conservative measures is, in our experience, a sound procedure and is justified by the results. But there are also other matters that must be considered.

When cases of severe appendicitis are operated on in the acute stage, suppuration in the abdominal wall may complicate matters. This may settle down and healing take place, but a weak spot may well be left. This may cause slight inconvenience at the time, but as the patient ages and the muscles weaken, and particularly if large deposits of fat appear in the abdomen and abdominal wall, ventral hernias may develop later. During the three years under review six cases of ventral hernia following appendicectomy were treated by operation. One of these was irreducible; one was obstructed; one was done more than 40 years after the appendicectomy; and one was performed through a gridiron incision. Adhesions, too, may form between the omentum and the small bowel and the abdominal wall. These usually cause little trouble, but they can jeopardize the patient's life even many years later. During the three years we have had three cases of acute intestinal obstruction, requiring operation, caused by such adhesions.

Adhesions may also form between loops of bowel and cause trouble. During this year we lost a youth who had had an appendicectomy in 1944, done at a late stage, complicated by suppuration in the abdominal wall, and followed by a weak scar. He had a massive volvulus involving the greater part of the small intestine. It is possible that the story might have been different if he had been treated conservatively in 1944.

It is, of course, correct to argue that adhesions may follow conservative treatment, and may cause trouble subsequently. We have had many opportunities of testing this matter when doing interval appendicectomies. No doubt some adhesions are found, but we have usually been surprised to see how beautifully nature has cleared things up, and how few are the adhesions present. Often after a really severe appendicitis, or after quite a large appendix abscess, all that is found is a wizened appendix.

We have usually found these interval appendicectomies easy operations, and often there are no adhesions to the abdominal wall. The secret is to wait for at least three months before doing the interval operation.

The argument is sometimes put forward that conservative treatment of severe appendicitis in the female may lead to sterility. It is true that sterility may follow pelvic suppuration, but it is my belief that fewer adhesions form after

conservative treatment than after operative treatment, particularly if a drainage tube is inserted. One of my cases of pelvic abscess due to appendicitis, treated conservatively in the early stage, then by rectal incision followed by interval appendicectomy, later had a successful pregnancy.

Appendix abscesses should not be drained during the early acute stage. The case of appendicitis that gave us most trouble during the three years was such a case. A young man with an appendix abscess was operated on through the peritoneal cavity, and drained, by one of my temporary registrars. He developed a faecal fistula that later became a discharging sinus, which had to be excised. We had trouble with this patient for many months.

From time to time circumstances arise that make an operation for acute appendicitis undesirable. Medical examples that we had were appendicitis with measles, appendicitis in pregnancy, appendicitis in an old man with severe bronchitis, appendicitis in a woman with auricular fibrillation and heart failure, and appendicitis with influenza. Another example is that of a case on board ship at sea. I recently removed a wizened appendix from a ship's engineer who had had acute appendicitis in mid-ocean and who was fortunate enough to have a ship's surgeon who treated him conservatively.

One cannot help feeling that all cases of acute appendicitis occurring away from skilled surgery and adequate surgical surroundings are best treated conservatively. The unskilled surgeon will be saved a lot of anxiety and the patient have a better chance of survival.

Confidence in the excellence of conservative treatment permits the more frequent use of that most valuable process, observation. Observation prevents many errors in diagnosis and unnecessary operations. We have had two cases sent in as appendicitis that after two or three days' observation turned out to be infective hepatitis. At a meeting of a local medical society some years ago, during a discussion on influenza, a well-known surgeon said he had just removed a normal appendix from a case of influenza. Observation would have saved a lot of trouble. Two years ago I removed a stone from the right ureter of a young man who had had his appendix removed elsewhere a month previously. All doctors and surgeons could quote similar examples.

The point I wish to make is that if there is any possible doubt of the diagnosis it is safer and wiser to observe and treat conservatively, and allow time for investigation. A year ago a young girl was admitted to hospital as a case of appendicitis, and presented some of the symptoms and signs, but operation was postponed. After observation for a period, she was found at operation to have regional ileitis, and an enterectomy was performed. We all felt afterwards that it was wiser and safer that the operation was done "on a list" rather than as an emergency at night.

Emergency operations, done under difficulties, perhaps in the middle of the night, perhaps by relatively inexperienced surgeons, with inadequate assistance, without a consultant anaesthetist, with a scratch theatre staff, and perhaps during a period of overwork and fatigue, may lead to errors that observation and conservative treatment would prevent.

Comments

All cases of acute appendicitis, or of doubtful acute appendicitis, should be admitted to a hospital or nursing home at once, if possible, in order that they may have constant skilled surgical and nursing attention.

In cases of doubt it is not wise to observe the case in a private house, and in cases where a firm diagnosis has been made it is not safe to adopt conservative treatment at home. Nobody can say at the beginning of an attack how severe it is going to be, and the treatment of an advanced case may require calm courage and firm nerves in addition to skilled surgical and nursing technique.

We are still getting many cases of acute appendicitis too late. During my three years, 395 cases of acute appendicitis were under 24 hours old when admitted, but 137 cases were more than 24 hours old when admitted.

A great deal of trouble and anxiety, not only to the patient, relatives, and doctor, but also the hospital staff, could be saved if we can get a higher proportion earlier.

Summary and Conclusions

An account is given of a series of cases of acute appendicitis treated conservatively with some illustrative cases.

During the course of over 30 years of surgery, a good deal of which has been emergency surgery, I have gradually been tending more and more to conservative treatment in cases of advanced appendicitis.

For many years I have believed it best to treat appendix abscesses conservatively. For more than four years I have believed it best to treat all cases of acute appendicitis over 24 hours old conservatively.

It is probably wise to treat all cases of acute appendicitis under 24 hours old by an emergency appendicectomy, and this is our usual custom.

One sometimes wonders whether it would not be a sound procedure to treat all cases of acute appendicitis conservatively. They seem to settle down quite nicely, and some never seem to have any further trouble: the appendix has wizened.

We should then be left with appendicectomy for recurrent acute appendicitis, and for chronic appendicitis—the "grumblers" with faecaliths in the appendix, with kinks, and with adhesions.

Looking into the future, one cannot help feeling that our successors will be more conservative in their outlook in this matter, and may look back on us as having been too "appendicectomy-minded."

I acknowledge the assistance of my three registrars, Mr. K. Drummond, Mr. R. Kotariya, and Mr. R. Mansharamani, without whose help, skill, and co-operation this work would not have been possible.

EXFOLIATIVE CYTOLOGY IN THE DIAGNOSIS OF LUNG CANCER EXAMINATION OF ONE LABORATORY'S RESULTS

BY

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Although much of the early work on the recognition of cells exfoliated from tumours was done in this country, little use is made here to-day of the techniques of exfoliative cytology in the diagnosis of cancer, though there have been signs recently of a renewed interest in the subject (Osborn, 1953; Philips, 1954).

After I had spent several months in Dr. Papanicolaou's department a service in cytology was offered in this laboratory for some four and a half years. The majority of requests have been for the examination of sputum. A review of the results obtained might be of some value in assessing whether exfoliative cytology has any contribution to make towards the diagnosis of lung cancer.

Material and Method

Specimens of sputum have been sent to the laboratory from a wide area, most of them coming from chest clinics and chest hospitals. In 1955, for example, 567 specimens out of a total of 855 arrived from such

sources. The remainder were from general hospitals and general practitioners.

All specimens, whether sent to the laboratory by post or not, had been collected by getting the patient to cough directly into a jar containing 70% alcohol. This routine, which is necessary only for specimens that cannot be examined at once, has proved very satisfactory in practice. Any possible slight loss in quality has been preferred to the risk of specimens being spoilt altogether by delay in sending or examining material not so treated.

It is not intended to describe the laboratory procedures that have been followed. No new methods have been developed, and the techniques and the reporting of results have followed closely those described by Papanicolaou (1954). Specimens have been placed into one of five classes: (1) absence of atypical or abnormal cells; (2) atypical cytology but no evidence of malignancy; (3) cytology suggestive of, but not conclusive for, malignancy; (4) cytology strongly suggestive of malignancy; and (5) cytology conclusive for malignancy. For the purpose of this report, specimens which had been reported originally as class 3 have been called "suspicious" and those which had been placed in class 4 or 5 have been called "positive."

Results

Table I shows the outline of the results obtained for the years 1952-5. For the years 1952, 1953, and 1954 the number of specimens examined, the number of patients from whom they came, and the number and percentage of patients diagnosed cytologically as suspicious and positive are given.

TABLE I

Year	Total Specimens	Total Patients	Suspicious or Positive	
			No.	%
1952	200	107	10	9.4
1953	444	232	27	11.6
1954	743	329	44	13.4
1955	855	351	42	11.9

For the year 1955 a more detailed analysis is possible. A request for information was sent to the doctors concerned in respect of the 42 patients diagnosed as suspicious or positive and full information was obtained about 40 of them. The smears from 23 of these 40 patients were reported as positive and from 17 as suspicious (Table II).

TABLE II

	Final Diagnosis of Cancer	Final Diagnosis Not Cancer	Histological Evidence of Cancer	Cancer Cases with Positive Smears and Negative Biopsies
Positive group (23 cases)	23	0	11	2
Suspicious group (17 cases)	12	4 and ?1	5	2

During 1955 all cases from which positive smears were obtained were finally diagnosed as cancer. Histological confirmation in all cases was not available. Several patients were too ill for further investigations and bronchoscopy was refused in one case. The final diagnosis of cancer was taken from the opinion expressed by the doctor concerned in his answers to the questionnaire. In some cases, therefore, the final diagnosis of cancer rests on clinical findings, plus radiology, smears, and histology; in others, one or more of these pieces of evidence will be lacking, but in no case was the doctor in any doubt about the diagnosis. In the suspicious group it is seen that four

cases for certain and a possible fifth turned out to be non-malignant, whilst 12 were confirmed as malignant either by histology or on clinical grounds, or both. In 10 of these 40 cases the doctor concerned said that the smear result had been the first objective evidence of malignancy. The series includes two cases reported as positive where a biopsy was negative; two cases reported as suspicious also had negative biopsies. In one of these four cases operation showed an epidermoid carcinoma. In all the others the diagnosis was of inoperable carcinoma, and two patients have died whilst one was alive six months after diagnosis was made.

Discussion

The results obtained over the past few years have shown that exfoliative cytology is of real value in the diagnosis of lung cancer. It is not suggested that it should replace any of the existing diagnostic methods but that it is a most useful additional aid. In the first place, the method is simple and practicable for patient and clinician. No preparation of the patient is necessary, he does not have to attend hospital, and additional specimens can be readily obtained. For the laboratory the method has the advantage that no elaborate equipment is required, although it is certainly true that experience is needed before confident results can be given.

It has been found that reliance can be placed on positive results. In 1955 all of 23 cases reported positive were finally diagnosed as malignant, and in no case was any doubt expressed on this point by the clinician concerned. In four of the 17 suspicious cases the clinician was satisfied that the diagnosis was non-malignant, and in a fifth case the patient died before a firm diagnosis was made.

It is clear, therefore, that if a confident diagnosis of malignancy is made on cytological grounds there is a very high probability of proving malignancy, and that most of the cases regarded as suspicious will also prove to be malignant. Further experience will probably reduce the number of specimens placed in this category. Negative results are of less significance. It has not been possible to ascertain the number of malignant cases on which negative results were returned, but there were undoubtedly instances of this. Apart from inadequate examination or inaccurate appraisal of cells seen, negative smears may be found in cancer cases for several reasons: it may be that no tumour cells were being exfoliated at the time of the examination; the tumour may not communicate with a bronchus, or, even if it does, the bronchus itself may have become obstructed by pressure so that no escape of cells can take place (Osborn, 1953).

The results presented and the answers to the questions asked of the clinicians show that the method is of value in the early diagnosis of cancer, and this is of especial importance in this disease. In 1955, 40 cases were regarded as positive or suspicious, and in 10 of these the clinician stated that the positive report issued after cytological examination constituted the first objective evidence of malignancy. It is here that the extreme simplicity of the method—from the patients' point of view—is so important. It is a simpler matter to arrange for cytological examinations of sputum than to arrange for other special examinations to be performed, and it seems reasonable that earlier recourse should be had to cytological methods for that reason. It is undoubtedly true that small early tumours produce recognizable exfoliated cells, and "carcinoma *in situ*" of the bronchus has been diagnosed by cytological methods (Papanicolaou and Koprowska, 1951). In the case described by these authors it is stressed that positive cytological findings were repeatedly obtained in spite of negative biopsies, and the diagnosis of carcinoma *in situ* was finally established at the post-mortem examination following death from pneumonia.

It is difficult in such a small series to attempt to compare the value of cytological diagnosis with that of other special methods of examination. However, even among these few cases two reported as positive and two as suspicious were

negative according to the biopsies. These four cases were subsequently regarded as undoubtedly malignant. In one case the diagnosis was proved at operation; the other three cases were found to be inoperable. Herbut (1951) referred to 500 cases of lung cancer in which cytological methods gave positive results in 88% and bronchoscopic examination a positive result in only 31%; in 29% of the proved cases cytology gave positive results and bronchoscopy was negative. Again, Benioff (1951), referring to 162 proved cases that came to operation, showed that in 24% of these cytology provided the only pre-operative evidence of malignancy. The conclusion seems justified that cytological methods will disclose more positive cases than will bronchoscopy.

The objection is sometimes raised that it is a time-consuming method of investigation. This is true, but it is also true of many other laboratory procedures which, nevertheless, are in common use. Over a four-year period more than 10% of patients from whom specimens have been sent to this laboratory have been regarded as showing definite evidence of malignancy or as affording strong grounds for suspicion. This compares well with the percentage of positive material obtained in many other laboratory investigations. The actual examination of the slides takes somewhat longer to perform than does an examination for tubercle bacilli; and here, where the preliminary screening is done by an experienced technician, some seven to eight minutes is spent in examining a negative smear.

Summary

The incidence of "positive" and "suspicious" smears from sputum suspected of containing malignant cells is surveyed for the years 1952-5.

For the year 1955 the results are followed in greater detail and the accuracy of the cytological diagnoses is assessed.

It is concluded that the method is of great value in the diagnosis of lung cancer, and especially in early cases; that the positive results are reliable; and that in accuracy it compares favourably with bronchoscopic examination.

The method is extremely convenient for the patient and clinician, and demands no elaborate laboratory equipment.

My thanks are due to Mr. E. C. Darnell for expert technical assistance and to all those clinicians who provided information about their cases.

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A medical manuscript written very legibly in Anglo-Saxon before the Norman Conquest was bought for £550 at Sotheby's on December 11 by the Wellcome Trust. Although the text covers only one side of a single leaf, there was brisk bidding from both English and American buyers. The manuscript contains recipes for making medicines and salves for "heartache," disease of the lungs and the liver, and for tumours. It was incorporated in the binding of a book printed in Antwerp in 1558 which later came into the library of Lord Robartes. This fragment must have belonged to the vast quantity of mediaeval manuscripts which were thrown out of the monasteries at the time of the Dissolution and used for all kinds of menial purposes. As Bishop Bale wrote in 1549, "Some they sold to the grossers and sopesellers, and some over see to the bokebynders, not in small nombre, but at tymes whole shyppes fulle, to the wonderynge of the foren nacyons."

RECOVERY FROM PERITONITIS FOUR YEARS AFTER BILATERAL TRANSPLANTATION OF URETERS

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Not until the past five years have the biochemical abnormalities that follow uretero-colic anastomosis been extensively studied. Ferris and Odel (1950) found that of 141 patients who had undergone bilateral uretero-sigmoidostomy, 80% showed a reduced alkali reserve and 79% a hyperchloraemia. The condition of hyperchloraemic acidosis was usually associated with a high blood urea. These findings were confirmed in the series of 201 cases collected by the British Association of Urological Surgeons (Jacobs and Stirling, 1952), in which 78% had a lowered alkali reserve, and 31% the full syndrome of hyperchloraemic acidosis with raised blood urea. In only 6% were the levels of the blood urea, chloride, and alkali reserve all normal. Hypokalaemia was present in about a third of the patients.

Symptoms attributable to electrolyte disturbances in patients with bilateral transplantation of the ureters include general weakness and fatigue, thirst, nausea, vomiting, anorexia, a salty taste in the mouth, hyperventilation, and loss of weight. There may be rectal urgency, and polyuria with diarrhoea. Osteomalacia due to chronic acidemia with consequent renal loss of calcium may occur with bone pains and multiple fractures (Pines and Mudge, 1951; Badenoch, 1952; Moore, 1952).

Excessive reabsorption of chloride and urea from the colon forms the basis of the electrolyte disturbance, but it is now considered that an impaired renal function is necessary for hyperchloraemic acidosis to develop (Lapides, 1951; Parsons *et al.*, 1952; Pyrah, 1954). Such an impairment results from an ascending infection from the colon, or back-pressure effects, leading to a diminished capacity of the distal tubules to acidify the urine. Hypokalaemia is probably mainly due to loss of

base in patients with polyuria and diarrhoea, and is therefore a secondary manifestation (Jacobs and Stirling, 1952).

Any intercurrent illness associated with diarrhoea or vomiting, but especially an attack of acute pyelonephritis, may precipitate acute symptoms in patients with bilateral transplantation of the ureters. The electrolyte balance of these patients can be more easily upset than in the normal. Westlake (1954) has described the recovery of a man in acidemic coma with hypokalaemia, precipitated by acute pyelonephritis, four years after operation. In this paper the recovery is reported of a man with transplanted ureters who had intestinal obstruction and peritonitis due to a band four years after total cystectomy for carcinoma. The post-operative care was undoubtedly complicated by the transplantation. As patients with bilateral ureteric transplants into the colon become more numerous such problems will be seen more often in non-urological surgical units, as in the present case.

Case Report

In 1945 the patient, aged 55, underwent a partial cystectomy for papillary transitional-cell carcinoma. He remained well until November, 1950, when he again developed haematuria. In December, 1950, Mr. V. C. Pennell performed a total cystectomy with transplantation of the ureters into the sigmoid colon, by Coffey's method, in two stages. This was complicated by the development of a faecal fistula between the rectum and the anterior abdominal wall which was excised in March, 1952. After this third operation he remained well except for loss of appetite and a slight loss of weight. An x-ray film of the dorso-lumbar spine in November, 1952, showed moderate osteoporosis, and another in May, 1954, following a slight fall from a ladder, a fracture of the lower end of the right ulna with extreme osteoporosis. In January, 1955, his blood urea was 78 mg./100 ml.

On March 24 he was readmitted to Addenbrooke's Hospital with a history of six days' upper abdominal colic and vomiting which over the last 24 hours had become faeculent. When examined he was an ill, dehydrated, but fully conscious man with no clinical evidence of acidosis or uraemia. His abdomen was resonant but greatly distended, with tenderness in the upper half and a generalized positive release sign; a few bowel sounds were present. A straight x-ray film of the abdomen showed distended loops of the jejunum and proximal ileum, with fluid levels.

Laparotomy revealed peritonitis with a fibrous band between the lower ileum and the anterior abdominal wall.

Blood Electrolyte State and Fluid Balance During Post-operative Period

Post-operative Day:	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	27
Serum Na (mEq/l.) (normal 135-140)		142		151		162			173		158		141			136
" K " (" 4-5)		3.0		3.3		2.7			3.7		3.7		3.1			6.0
" Cl " (" 100-105)		109		108		117			113		114		109			107
Blood urea (mg./100 ml.) (normal 20-40)		160		201		228			230		115		58			31
Blood CO ₂ -combining power (mEq/l.) (normal 25-30)				30		30.4			35.4		29.1		23.6			22.7
Daily oral intake (g.):					10	10	20	20	20	12	12	12	12	20	20	Stop
Potassium citrate										7.5	7.5	7.5				
chloride																
Daily intravenous fluid (pints*):																
Blood	1															
Normal saline	2	1	3	3	1											
N/5 saline with 4% dextrose		2	1	1	1											
Darrow's solution		1	5	6	55											
Daily oral intake (oz. *)	8	14	5	6	6	6	66	116	119	166	159	126	144	102	102	96
" gastric aspirations (oz.)	15	36	37	4	6	30	25	11+	38+	29+	56	58	52	32+	38+	76
" output of urine (oz.)	0	59	31	67	38+											
Antibiotic																
Oxytetracycline																
6-hourly																
Chloramphenicol																
250 mg. orally 6-hourly																
Sulphadimidine																
hourly																

* To convert pints and fluid ounces to millilitres, multiply by 568 and 28 respectively.

by 10 p.m., and on noisier nights several were still awake at 10.30 p.m.

It has been said that each tablet was not given an equal number of times on the four nights. Accordingly separate figures are given for each tablet on each night. Without any formal tests of significance it can be seen that this fact has not materially affected the results. For instance, the figures for the control are the lowest on three of the four nights.

TABLE I.—Objective Assessment by Night Nurses*

Tablets	Nights. Hours of Sleep and Mean Scores				Hours of Sleep and Mean Scores for Tablets	Standard Error of Mean Scores for Tablets
	1st	2nd	3rd	4th		
Amylobarbitone sodium	6½ 27.2	6½ 26.7	7 29.4	6½ 28.2	6½ 27.9	0.40
Butobarbitone	6½ 27.8	6½ 28.1	6½ 27.3	7 28.7	6½ 28.0	0.38
Methypyrilone	6½ 27.2	6½ 27.8	6½ 28.2	6½ 27.7	6½ 27.7	0.37
Control	6½ 26.4	5½ 24.0	6½ 26.9	6½ 28.4	6½ 26.3	0.43
Hours of sleep and mean scores for nights	6½ 27.1	6½ 26.6	6½ 28.0	6½ 28.2		

*Calculation of Approximate Duration of Sleep from Mean Score.—On the basis that the night nurse gave a patient 2 marks each half-hour he was asleep (see text), duration of sleep may be estimated in hours by dividing the night's score by 4. This, however, implies that the patient has been asleep for half an hour when the first 2 marks are given. If an average time of a quarter of an hour is allowed for him to get to sleep after the tablet or the last half-hourly observation, then 1 mark, representing nearly a quarter of an hour's sleep, is subtracted from the score before dividing by 4. The formula Hours of sleep = $\frac{(\text{score}-1)}{4}$ probably gives too generous an estimate, as it does not allow for waking between observations, but the mean scores would be open to the same objection if taken as absolute values. Their translation into hours of sleep is given for the sake of convenience. (Maximum possible score: 34 marks, representing 8½ hours' sleep.)

TABLE II.—Onset of Sleep

Tablets	Did You Get to Sleep		Total	Mean Scores of 1 and 0
	Quickly? (1)	Slowly? (0)		
Amylobarbitone sodium	64	36	100	0.64
Butobarbitone	79	21	100	0.79
Methypyrilone	74	26	100	0.74
Control	56	44	100	0.56

$\chi^2=15.73$. D.F.=3. $P<0.01$.

TABLE III.—Quality of Sleep

Tablets	Was Your Night's Sleep				Total	Mean Scores of 3, 2, 1 and 0
	Sound? (3)	Fair? (2)	Poor? (1)	Bad? (0)		
Amylobarbitone sodium	41	40	18	1	100	2.2
Butobarbitone	46	42	11	1	100	2.3
Methypyrilone	48	43	7	2	100	2.4
Control	26	47	24	3	100	2.0

$\chi^2=13.90$. D.F.=6 (third and fourth columns taken together). $P<0.05$.

TABLE IV.—After-effects

Tablets	Did You Wake				Total	Mean Scores of 3, 2, 1, and 0
	Fully Refreshed? (3)	Reasonably Clear in the Head? (2)	Stale and Drowsy? (1)	"Drugged" and Confused? (0)		
Amylobarbitone sodium	16	50	33	1	100	1.8
Butobarbitone	25	48	25	2	100	2.0
Methypyrilone	16	53	28	3	100	1.8
Control	11	64	25	0	100	1.9

$\chi^2=10.51$. D.F.=6 (third and fourth columns taken together). $P>0.05$.

The distribution of answers to the three questions is shown in Tables II-IV. Analysis of the answers relating to onset and quality of sleep (Tables II and III) shows a significant difference between the forms of treatment (see χ^2 tests at the foot of each table), which is clearly attributable to the lower score of the control. This is not so for the answers to the question on after-effects (Table IV). In none of the tables are there any demonstrable differences between the three drugs. A similar analysis shows that there is no significant difference between the four nights in any of the questions.

The only side-effect recorded was headache, which occurred twice after each drug and once after the control. Patients sometimes volunteered that a particular night was the best they had had for a long time. They did this five times after amylobarbitone sodium, five after butobarbitone, six after methypyrilone, and twice after the control.

Discussion

Standards of comparison for hypnotics, such as onset and duration of action, quality of sleep, and nature of after- and side-effects are generally accepted, but reports of controlled trials are comparatively infrequent. In hospital it is possible to supplement the patients' own impressions with objective observations. Even the quality of sleep, although usually best judged by the patients themselves, can be assessed with considerable accuracy by a nurse looking after a reasonable number of patients.

An obvious criticism of this trial is that each drug was tried once only on each patient. This raises the question of whether one patient will respond fairly consistently to one hypnotic. If this is so, more information will be gained by studying the effects of each tablet on every patient than by using the available time in any other way. Hare (1955) has made a detailed study of the comparative efficacy of hypnotics in a neurosis unit. He observed 30 female patients for an average time of three to four weeks each. His results show that each patient responded fairly consistently to any one hypnotic, although great variation was found between different patients. This confirms strong clinical impressions from the routine use of hypnotics in the wards.

The investigation of after-effects remains the least satisfactory part of the trial. Many patients found it difficult to distinguish between waking heavy-headed as a result of excessive sedation and waking tired as a result of lack of sleep. On other points the patients proved reliable witnesses. With a few notable exceptions, their impressions corresponded well with the nurses' observations.

As equivalent doses of the three drugs were deliberately chosen it is not surprising that the results were similar, but the high figures for the control are interesting. It would probably have been worth while to include a fifth night without any tablet, but co-operation for this might sometimes have been more difficult to enlist, especially on the day after the operation, when the wide difference between the control and the drugs (Table I) would seem to show that a hypnotic is a valuable part of treatment at this time.

The present trial has shown methypyrilone to be a reliable hypnotic of comparable efficacy and onset and duration of action to amylobarbitone sodium and butobarbitone. If subsequent investigation confirms the rarity of side-effects found by previous workers, methypyrilone should prove a valuable addition to the non-barbiturate hypnotics.

Summary

Methypyrilone, a piperidine hypnotic, was investigated in 100 patients in the ear, nose, and throat wards of a general hospital. The onset and duration of action, quality of sleep, and nature of after-effects were compared with those of amylobarbitone sodium, butobarbitone, and a control. Nurses' observations supplemented and were usually consistent with patients' impressions. No significant difference was found between the three

drugs. The score of the control was not greatly lower, but the difference was statistically significant.

Methypyrilone is a reliable non-barbiturate hypnotic of comparable effect to amylobarbitone sodium and butobarbitone.

The patients in the ear, nose, and throat wards were under the care of Mr. C. P. Wilson, Mr. J. P. Monkhouse, and Mr. D. Ranger, and I thank them for permission to carry out the trial. I also thank Dr. J. D. N. Nabarro for his criticisms and encouragement in the preparation of the paper; Mr. M. P. Curwen, of St. Bartholomew's Hospital, for his invaluable help with the pre-statistics; Dr. Margaret Briggs, of Roche Products, for the preparation and dispensing of the tablets; and the night sisters and their nursing staff, whose enthusiastic co-operation made this trial possible.

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TOXIC EFFECTS AND SIDE-EFFECTS OF METHYLPENTYNOL

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Novelty has all the appeal of invention, and it is common experience that newly introduced drugs pass through a phase during which they are esteemed too highly. Methypentynol ("oblivon") has been no exception, for early reports were unanimous in emphasizing its distinct paucity of toxic complications (Allen and Krongold, 1951; Hirsh and Orsinger, 1952; Malone *et al.*, 1952).

Margolin *et al.* (1951) studied the acute toxicity of the drug with animals and found that the LD₅₀ ranged from 600 to 900 mg. per kg., whereas chronic toxicity experiments disclosed no gross or microscopical changes following the daily oral administration of 200-300 mg. of methypentynol, an equivalent of seventy times the recommended human dose. The drug has also been given daily by mouth to human subjects in a dose ranging from 0.1 to 1.5 g. for six months without any undesirable side-effects (Chevalley *et al.*, 1952), although Schaffar-zick and Brown (1952) reported that two out of six epileptics given the substance developed a strongly positive cephalin flocculation reaction. As a corollary, it was noted that the livers of rats given methypentynol in their drinking-water exhibited a diminution of hepatic cell cytoplasmic basophilia.

The effect of single doses of methypentynol has been assessed by Trotter (1954), who found that speed of reaction, concentration, and co-ordination were either unimpaired or enhanced after 500 mg. of the drug. Sinton (1954) was also unable to detect any deleterious result from 1 g. of methypentynol, although Macdonald (1955), using half this dose, noted an 8% deterioration on a numerical test.

In view of these predominantly eulogistic appraisals, it is hardly surprising that a wide field of application has been found for methypentynol: for example, as a

hypnotic for elderly patients (Simpson, 1954), as a pre-operative sedative for tonsillectomy (Simmons, 1954; Gusterson, 1955), for allaying apprehension before dental operations (Trotter, 1953), as a prophylactic against nocturnal attacks of asthma (Bendkowski, 1955), and for reducing anxiety at childbirth (Bourne, 1954).

Recently attention has been directed to the drug's potential toxicity. May and Ebaugh (1953) noted drowsiness, ataxia, and slurred speech in five patients who had ingested between 3.89 and 10.16 g. of methylpentynol during periods ranging from two to six days. They also described a confusional episode in a woman who had swallowed at least 10 g. of the drug. Glatt (1955a) referred briefly to the appearance of a "confused and highly emotional state with slurring of speech and ataxia" in alcoholics after taking up to 20 capsules (each of 250 mg.) daily for two to three days. He amplified this subsequently (Glatt, 1955b), describing the cases of 15 patients who after excessive doses of methylpentynol presented a picture of "gradually increasing confusion with lack of concentration and attention, tearfulness, depression, speech difficulties, and ataxia." Diplopia, nystagmus, and slight ptosis were each seen separately in three patients, while visual hallucinations were also encountered. Cares *et al.* (1953) reported a death after a dose of 4.5-6 g., and it is also on record following 2.25 g. of methylpentynol in conjunction with 20 pento-barbitone sodium ("nembutal") tablets (*British Medical Journal*, 1955). Recovery after 8.75 g. and 10 g. of methylpentynol has been noted respectively by Lemere (1952) and Brown and Ellis (1955); and Lovelace and Roith (1955) documented an attempted suicide with a combination of methylpentynol and "persomnia" (carbromal and bromvalerone). Recently, two youths who had each taken 0.75-1 g. of the substance were involved in a motor accident associated with a fatality (*Lancet*, 1955).

Case Histories

Eight brief illustrative case histories of toxic reactions to methylpentynol are described, followed by a synopsis of the side-effects—as distinct from toxic phenomena—observed in two groups each of 15 patients, the one given therapeutic doses of methylpentynol (0.5-2 g. a day) for one to six weeks, and the other receiving larger doses of methylpentynol (approximately 5 g.) during labour.

Case 1

An unmarried woman aged 24, suffering from an anxiety state, had taken eight capsules of methylpentynol (2 g.) daily for four days. She now complained of feeling cold and shivery, of declining appetite, and of being unsteady on her feet.

On examination the positive abnormalities consisted of unsustained nystagmoid jerks on conjugate lateral deviation of the eyes, loss of tone in the facial musculature, dysarthria, and tremor of the protruded tongue. The gait was ataxic and Romberg's sign positive. There was a static tremor of the hands, with cerebellar defects in both upper and lower limbs, including ataxia on the finger-nose, heel-shin tests, and dysidiadokinesis. The tendon reflexes were diminished, and were associated with an overall reduction of tone. The urine was normal.

Her mood was one of depression and, although denying hallucinations, she appeared to be hallucinated one evening, insisting there was a woman standing beside her bed. Orientation was correct, but she performed only moderately at serial sevens (the subtraction of serial sevens from 100), the digit span (number of correctly repeated non-consecutive digits in same or reverse order as given by the examiner) being seven forwards and six backwards. She

remarked that her body felt unreal as if "belonging to someone else" and that it seemed to be "light and floating." She noticed, too, that the passage of time was accelerated.

Three days later she had recovered apart from residual mild depression. The digit span had increased to eight forwards and six backwards, while serial sevens were accomplished accurately. No withdrawal phenomena occurred, although there was a partial amnesia for events relating to the toxic episode.

Case 2

This patient, an unmarried woman aged 43, was referred to hospital after having taken 26 capsules of methylpentynol (6.5 g.) during the previous six days. She was drowsy and complained of loss of appetite and the recent onset of double vision.

The physical signs included bilateral ptosis, pupils reacting sluggishly to light, and suffused conjunctivae. There was loss of tone in the facial musculature, dysarthria, and ataxia of gait, with a positive Romberg's sign. Muscular tone and the deep reflexes were decreased, although there were no cerebellar defects in either the upper or the lower limbs. She was obviously depressed and expressed suicidal ideas. Hallucinations were denied and orientation was intact. The digit span was six forwards and three backwards, combined with impairment of attention and concentration. She stated that since she had been on the drug "time seemed to pass more swiftly." The serum bromide was less than 25 mg. per 100 ml., and the urine gave a positive Rothera reaction persisting for two days.

Within three days the physical signs vanished, serial sevens were performed accurately, and the digit span had risen to six forwards and backwards. There were no withdrawal features, but mild depression persisted for a further four weeks.

Case 3

A man aged 46, suffering from paranoid schizophrenia, swallowed 10 g. of methylpentynol during a period of two days, at the same time taking phenobarbitone, 2 gr. (0.13 g.) at night. Twenty-four hours later he showed rhythmic nystagmus on conjugate lateral deviation of the eyes, with diplopia in all directions of gaze, as well as right-sided ptosis. The gait was ataxic with a negative Romberg sign. Muscular tone was increased with positive Hoffmann and Wartenberg signs, together with augmented deep reflexes. The urine was normal. Mentally there was affective blunting and ideas of reference, but no hallucinations. Orientation was intact, but the patient failed badly on serial sevens, the digit span being six forwards and five backwards.

A week later there were no abnormal neurological signs, but the affective blunting and ideas of reference remained. He was still unable to manage serial sevens, but the digit span had increased to eight forwards and five backwards. There was a patchy amnesia for events during the toxic episode.

Case 4

A married woman aged 36 became noisy and excited after taking 1.5 g. of methylpentynol daily for four days, together with a small quantity of alcohol.

On examination the pupils were dilated and reacted sluggishly to light, there was rhythmic nystagmus on conjugate lateral deviation of the eyes, and dysarthria was present. Her gait was ataxic, Romberg's sign was negative, and the deep reflexes were just present on reinforcement. The urine was normal. Her mood was one of elation, and, curiously, she showed no apprehension even when insisting there were black spiders climbing up the walls and that there was a cow in the room. The hallucinations—or possibly illusions—occurred during both day and night. Orientation was correct, but both attention and concentration were impaired. The serum bromide was less than 25 mg. per 100 ml.

Four days later the neurological abnormalities had disappeared but she remained drowsy. Her mood was now one of mild depression combined with irritability. There were

no hallucinations, and memory-testing revealed a selective amnesia for the toxic period. Attention and concentration were good.

Case 5

A primigravida aged 23 was admitted to hospital on account of persistent tachycardia at rest (pulse rate 140–160 a minute). No cardiac abnormality was discovered, but in view of her apprehension she was prescribed 0.5 g. of methylpentynol three times a day for eight days, the resting pulse rate falling to 92 a minute. The patient then went into labour, receiving a further 5.5 g. of methylpentynol during the subsequent 24 hours. Within the next eight hours she was reported as "feeling drunk."

On examination there was rhythmic nystagmus on conjugate lateral deviation of the eyes, bilateral ptosis, loss of tone in the facial musculature, dysarthria, and tremor of the protruded tongue. She complained also of double vision on lateral and vertical gaze. There was ataxia on the finger–nose and heel–shin tests not compensated for by vision, and the gait was ataxic. Romberg's sign was positive, both muscular tone and the deep reflexes being within normal limits. The corneal reflexes were absent and the jaw-jerk barely elicitable. The urine was normal.

The patient was paraphasic and euphoric, but there were no delusions or hallucinations, and orientation for time, place, and person was intact. Nevertheless, attention and abstract thought were impaired, as she was unable to attempt serial sevens or interpret proverbs. The digit span was five forwards and four backwards.

Two days after delivery the neurological signs had disappeared and the mental state was normal, the digit span now being eight forwards and six backwards.

Case 6

A primigravida aged 18 was admitted in labour and during the next 48 hours the following were prescribed: a total of 200 mg. of pethidine, heroin $\frac{1}{2}$ gr. (11 mg.), quinalbarbitone sodium ("seconal"), 3 gr. (0.2 g.), and potassium bromide, 30 gr. (2 g.), with chloral hydrate, 30 gr. (2 g.). As she still remained tense, 1 g. of methylpentynol was given, this dose being repeated after an interval of four hours. Soon afterwards she was reported as being very drowsy.

On examination the pupils reacted sluggishly to light, accommodation, and convergence, and sustained rhythmic nystagmus on conjugate lateral deviation of the eyes, bilateral ptosis, loss of facial muscular tone, dysarthria, and nominal dysphasia were present. Rapidly alternating movements were performed clumsily; there was static tremor of the fingers and marked ataxia on the finger–nose and heel–shin tests not compensated for by vision. Muscular tone was increased, Wartenberg's and Hoffmann's signs were positive and were associated with sustained bilateral patellar and ankle clonus and augmented deep reflexes. The urine was normal.

The patient, who was now lethargic, denied hallucinations, was orientated correctly, but unable to attempt serial sevens or comprehend simple proverbs.

Within three days the neurological signs had abated and the mental state was normal apart from impaired retrospective memory for the toxic episode.

Case 7

A man aged 28 became unsteady on his feet after taking 6 gr. (0.4 g.) of phenobarbitone and 1.5 g. of methylpentynol.

On examination the only physical abnormalities were dysarthria and an ataxic gait. The serum bromide was less than 25 mg. per 100 ml.

He was drowsy, paraphasic, and euphoric, denied hallucinations, and was orientated correctly although attention and concentration were impaired. He slept a great deal the next two days, and afterwards remarked that during this period he had seen a "vision" of two men and had felt "someone he could not see tugging at his bedclothes."

After a further 48 hours the physical signs disappeared, the mood was within normal limits, attention and concen-

tration improved, and the digit span increased. Retrospective memory for the period of illness seemed excellent.

Case 8

A man aged 42 had been taking 5–6 methylpentynol capsules daily for 10 months. Three days after stopping the drug he suddenly felt tense and unwell. He began to have shivering attacks, palpitations, and recurrent nightmares. There was marked loss of appetite. He saw "writing and figures on the wall" during the day, and on other occasions "it seemed that a stream of people filed into the room behind his back and beckoned to him." These abnormalities persisted for a week before abating.

Side-effects

Dizziness and light-headedness were the most frequent of the side-effects noted in the 30 individuals not exhibiting toxic reactions to the drug. Even so, the most prominent feature was deviation of the mood pattern, ranging through elation, euphoria, and irritability with feelings of anxiety and tension, to apathy and even depression. Motor activity and congruence with the mood change, elation being associated with overactivity and reduction of activity with depression. Likewise, heightening of mood went with increase of appetite and a decrease with depression. A number of patients commented spontaneously that the passage of time seemed accelerated and mild body-image disturbances were noted, including increase or decrease in weight or size of either the whole body or its various members.

Discussion

One of the striking features of the case histories epitomized above is the facility with which toxic reactions to methylpentynol might result from the ingestion of small quantities of the substance. The clinical picture so produced emulates that seen in acute alcoholic intoxication, and, for that matter, methylpentynol belongs to the series of higher alcohols. Howells (1952) depicts the findings in 40 persons suspected of being under the influence of alcohol, these including dilatation of the pupils with impaired reaction to either light or accommodation, suffused conjunctivae, nystagmus, and ataxia with a positive Romberg sign. Identical phenomena have been elicited in either acute or chronic barbiturate poisoning, and Isbell and White (1953) have pointed to the similarity between alcoholic and barbiturate intoxications.

In our series a fairly characteristic indication of overdosage with methylpentynol was loss of tone in the facial musculature together with unilateral or bilateral ptosis. Other abnormalities on examination of the cranial nerves were dilated pupils reacting sluggishly to all stimuli, sustained rhythmic nystagmus on conjugate lateral gaze, diplopia, ished corneal reflexes, suffused conjunctivae, in the dysarthria, and fine tremor of the protruded tongue. In the light of recent work by Howells (1956) nystagmus is probably one of the earliest of these signs to appear.

When present the ataxia was of either cerebellar or posterior column variety, or an admixture of the two. In consequence, muscular tone was usually decreased but could be augmented, with clonus and positive Hoffmann's and Wartenberg's signs. Similar findings were reported by Hirst (1955). In the same way, Isbell (1950) found that chronic barbiturate intoxication might occasionally present with transient ankle clonus and extensor plantar responses.

Paraphasia or nominal dysphasia was also evident with sufficient frequency to be worth comment. Curran (1944), who believed he could distinguish features specific to drug intoxications, stipulates that paraphasia is one of the hallmarks of bromide delirium, although Mayer-Gross *et al.* (1954), who are of a dissentient opinion, allude to its occurrence in delirium tremens. Weinstein and Kahn (1955), arguing from a holistic viewpoint, have preferred to regard these phenomena as a mode of adaptation to illness rather than individual defects.

One of the other diverting facets to the action of methylpentynol was its ability to produce differential mood alterations. This aspect has excited little comment hitherto, but was seen both in the toxic reactions and in those patients on a regime within the prescribed therapeutic dosage. The spectrum of mood deviations ranged from elation to depression; moreover, it seemed that depression might be induced *de novo*, or a pre-existing depressive mood be so intensified that the patient expressed suicidal ideas. Such affective changes were reversible, usually disappearing within a few days of withdrawing the drug. Alterations in motor activity and appetite were subordinate to the particular mood deviation. It is pertinent that Bourne (1954) remarked on a "pleasantly carefree attitude" in patients after taking methylpentynol, and of interest that hypomanic mood disturbances were noted by Curran (1944) in some instances of chronic barbiturate poisoning. Non-specific alterations of mood pattern by drugs has also been recorded by Thorner (1935), Cleghorn (1952), and Wikler (1952).

Disorientation, amounting to confusion, was another of the features reported by some authors in their cases after overdosage with methylpentynol (Hollander, 1954). Levin (1951) formulated the entity of "partial delirium," which depended on the fact that orientation for time, being an abstract concept, was more vulnerable and consequently more likely to be upset than either orientation for place or for person. However, none of our patients exhibited any disturbance of this modality, although attention, concentration, and abstract thought were impaired. Reduction of digit span occurred in most cases, this being a recognized concomitant of drug intoxications. Hoch (1906), in an analysis of the defect, found that the average number of numerals retained was only four.

Visual hallucinations were also noted. In a discussion on the nature and non-specificity of deliria, Wolff and Curran (1935) pointed out that the dysfunction was characterized by being worse at night than during the day, that visual hallucinations were frequent, that defects in grasp and sustained attention were prominent, and that, on recovery, recall was usually good. Our patients showed all or most of these aspects, apart from a patchy amnesia for events during the illness, a discrepancy which may be related to the amnesia ascribed by Bourne (1954) to the action of methylpentynol itself.

In all groups of patients occasional abnormalities of "ego-function" were seen, including mild depersonalization and derealization, *déjà vu* phenomena, time distortion, and body-image disturbances classifiable into Bonnier's (1905) category of paraschemata, the best examples of which are usually seen in drug intoxications (Critchley, 1950).

Withdrawal symptoms after discontinuing methylpentynol occurred in one instance. The time sequence of the development of these is important, as Isbell *et al.* (1950) noted with barbiturate addicts that anxiety, tremor, loss of appetite, and insomnia appeared during the first 24 hours after stopping the drugs, whereas hallucinations, illusions, or delusions became evident only after a lapse of three days. A similar continuum of events seems to have befallen our patient.

No patient showed any skin reactions to methylpentynol as have been reported by DeLamater (1952).

A criticism that could be raised at this stage is that for three patients the toxic reaction followed the combination of methylpentynol with other drugs, and in another case appeared to be precipitated by the consumption of alcohol. Nevertheless, the clinical picture was identical with that seen in those patients following the ingestion of methylpentynol alone and similar to that due to methylpentynol intoxication previously reported (Marley, 1955).

Finally, as Perlman and Johnson (1952) and Perlman *et al.* (1953) have shown, methylpentynol does not accumulate in the human body, so the paradoxical situation of toxic reactions developing with therapeutic doses of the drug is probably attributable to unusual sensitivity. In view of this,

and as methylpentynol is an important sedative (Sears, 1956), factors contributing to susceptibility are now being examined.

Summary

Eight case histories of methylpentynol intoxication are described, presenting with pupillary abnormalities, nystagmus, diplopia, ptosis, loss of facial muscle tone, dysarthria, tremor of the protruded tongue, and cerebellar ataxia in the limbs or admixtures of this with posterior column ataxia. Muscular tone, although occasionally augmented, was usually diminished. Plantar reflexes were flexor and sensation remained unaffected.

Mood change, particularly depression, dominated the accompanying mental state. Orientation was preserved even in a setting of impaired attention and concentration. Nominal dysphasia, paraphasia, distortion of subjective time experience and body image were noted. Illusions or possible hallucinations were common, as was impairment of memory for the toxic episode. Withdrawal features were seen in one instance.

Side-effects in a further 30 individuals were confined to minor alterations in the mental state.

The resemblance to barbiturate or alcoholic intoxications is emphasized, as is the small dosage and brief duration of therapy which precipitated toxic reactions. This was particularly valid for the patients with psychiatric disorders.

We thank Drs. C. P. Blacker, A. D. Leigh, and E. Stengel, of the Maudsley Hospital, Mr. D. R. Kilgour, of the Southampton General Hospital, and Dr. G. Hirst, general practitioner, Thornton Heath, for their kind permission to publish these cases.

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TROPICAL PULMONARY EOSINOPHILIA

BY

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Although tropical pulmonary eosinophilia is common in certain parts of the world few cases have been reported in this country. Since, however, it appears to be a disease in which relapse is not infrequent, and as a steadily increasing number of Indians are coming here to seek employment, it is likely that cases will be encountered more frequently.

Case Report

A Hindu aged 31 came to England for the first time in February, 1955. He had spent his childhood in the Punjab and then lived in Calcutta. Shortly after his arrival here he caught a cold and developed a troublesome cough; the coryza disappeared after a week or two, but the cough persisted and became particularly disturbing at night; it was usually non-productive, but occasionally he had a little viscid sputum. Apart from his cough he felt well and his general health remained good. He first sought medical advice in October, 1955. No abnormality was found on clinical examination at that time, but an x-ray film of the chest showed a diffuse mottling throughout both lung fields. The opacities were rather coarser than those of miliary tuberculosis; both lungs were equally affected, and the middle and lower zones were involved more than the apices. Repeated sputum examinations were negative for tubercle bacilli, he was afebrile, and his sedimentation rate was normal. The total white cells numbered 21,100 per c.mm. (polymorphs 23%, lymphocytes 13%, monocytes 2%, eosinophils 62%).

On admission to hospital he first denied any previous illnesses, but subsequently said that he had suffered from "eosinophilic lung" in the past and gave the following history. In November, 1951, he developed what he thought to be an ordinary upper respiratory infection; however, it persisted, and he soon developed a cough which was dry initially but later productive of a little viscid sputum. After a few weeks he noticed he was having attacks of dyspnoea and wheeziness at night. When he had had symptoms for about three months he asked his doctor if he could have a blood count, since his symptoms were so similar to those of a friend who had recently been diagnosed as having tropical eosinophilia. His blood count showed an eosinophilia and he was given five injections of arsenic. He rapidly improved after the first injection and was symptom-free by the end of the course. Thereafter he was well until September, 1953, when he developed a pyrexial illness which lasted a few days and left him with a cough and nocturnal wheeziness. At this time a chest radiograph showed "numerous small opaque shadows along the increased bronchial markings, suggesting an eosinophilic lung condition." He was again given five arsenic injections, and subsequently remained well until shortly after his arrival in this country some 16 months later.

After his admission to hospital in October, 1955, repeated blood counts showed a persistent leucocytosis with a high eosinophilia. He had scanty sputum, which contained eosinophil cells on several occasions, and fat globules were present in every specimen examined. Several 24-hour specimens of sputum were examined for mites, but none were found. In view of the paucity of his sputum, bronchoscopy was performed and a trap specimen of bronchial secretions was obtained and examined for mites, but with negative results. Gastric aspiration was attempted on several occasions, since it was thought that mites might be swallowed and therefore be obtainable in the fasting gastric juice, but the patient steadfastly refused to swallow a Ryle tube and

the attempts had to be abandoned. Repeated stool examinations were negative for parasitic ova and cysts, and the blood Wassermann and Kahn reactions were negative.

It was concluded that he was suffering from a relapse of his tropical pulmonary eosinophilia, and treatment with oral arsenic was begun on November 25. He received 0.26 g. of acetarsol twice daily for four days, followed by two days' rest and then a further 0.26 g. of acetarsol twice daily for six days. For a few days after the course of arsenic his cough was rather worse than formerly, but it then started to improve and had completely disappeared about three weeks later. He was discharged from hospital in December and has remained well since. Serial chest radiographs showed progressive clearing of the lesions, and in February, 1956, his chest x-ray film appeared normal. His blood count slowly returned to normal (see Table).

Date	Total W.B.C. per c.mm.	Eosinophils	
		%	No. per c.mm.
31/10/55	21,100	62	13,000
21/11/55	17,900	61	10,919
25/11/55	17,000	72	12,240
25/11/55	Acetarsol commenced		
28/11/55	19,000	68	12,920
5/12/55	22,500	60	13,500
6/12/55	Acetarsol discontinued		
8/12/55	18,400	74	13,616
15/12/55	12,600	48	6,048
10/1/56	5,600	7	392
8/2/56	9,100	3	273

Discussion

Historical.—Tropical pulmonary eosinophilia is a well-recognized disease. Although commonly known as Weingarten's syndrome the first description of the disease was given by Frimodt-Møller and Barton (1940).

Aetiology.—Carter, Wedd, and D'Abrera (1944) suggested that tropical pulmonary eosinophilia is due to pulmonary infestation with various species of mites. This theory has received considerable support (Soysa and Jayawardena, 1945; Carter and D'Abrera, 1946a, 1946b), but it has not been universally accepted (Ball, 1950). An allergic basis has been suggested (Chakravarty and Roy, 1943; Lal, 1945), but the eosinophilia is much higher than is commonly met with in allergic diseases and there is usually no personal or family history of other allergic manifestations.

Geographical, Racial, and Seasonal Incidence.—The disease occurs mainly in India and Ceylon, but cases have been reported from other Asian countries, Africa, South America, and the West Indies (Parsons-Smith, 1944; Wilson, 1945; Stephan, 1946; Soysa, 1949). A pulmonary condition associated with eosinophilia is common in Samoa (Thompson, 1950). Cases occurring in this country have been reported by Apley and Grant (1944), Hunter (1946), and Hall (1946); most of their patients had been overseas, but in one of Hall's cases the disease appears to have originated in this country. All races are susceptible to the disease, the different racial incidence being accounted for on a geographical basis. The symptoms may start during a period of wet weather, or if symptoms are already present they may be aggravated if the humidity of the atmosphere increases (Ball, 1950).

Age, Sex, Family, and Occupational Incidence.—The disease occurs in all ages and in both sexes. It is much commoner in men than in women, probably owing to occupational factors. There is no familial predisposition to the disease (Weingarten, 1943). Although in many cases the patient's occupation has no bearing on the development of the disease, it has been noted that many of these worked in dusty atmospheres and among food, and the mites usually recovered from the sputum are of species which are commonly present in stored products (Carter *et al.*, 1944; Soysa and Jayawardena, 1945).

Symptomatology.—Characteristically the illness starts with lassitude, slight fever, and coryza. After a week or two a

cough develops (typically worse at night), and there is usually a little viscid sputum. The patient gradually becomes wheezy, and attacks of nocturnal asthma develop after the illness has lasted for several months; physical examination may be negative, but there are usually signs of bronchitis.

Blood Changes.—A massive eosinophilia in the peripheral blood is a constant finding. The degree of eosinophilia varies from case to case, and from time to time in any one case; it is not proportional to the severity of the symptoms, and may be found before the clinical features and x-ray changes have fully developed; it may persist while the symptoms are in natural remission (Soysa, 1952) and is commonly the last feature of the disease to disappear (Menon, 1945). The erythrocyte sedimentation rate is sometimes raised. A positive Wassermann reaction is a frequent finding (Menon, 1945; D'Abrera and Stork, 1946), but this is usually associated with a negative Kahn test. A high titre of cold agglutinins is found in some cases (Ball, 1950).

Radiological Changes.—Typically, a diffuse miliary mottling is seen in both lungs; the miliary nodules are never confluent and are often most numerous in the perihilar regions; the lower zones are usually more affected than the apices. These appearances are present in only about 50% of cases (Soysa, 1949; Ball, 1950). In other cases there may be no radiological changes, or only some increase in the bronchial markings.

Differential Diagnosis.—In allergic asthma there may be a slight eosinophilia, but it is never as high as that which occurs in tropical pulmonary eosinophilia. It must be remembered that nocturnal asthma may be a symptom of tropical pulmonary eosinophilia. Loeffler's syndrome is probably an allergic phenomenon in which transient pulmonary infiltrations and a slight or moderate eosinophilia are associated with little in the way of constitutional disturbance. Infestations with helminths may be associated with asthmatic attacks and a slight eosinophilia. In these cases ova are recovered from the stools and the condition responds to the appropriate anthelmintic treatment. The radiographic appearances may be confused with those of miliary tuberculosis, pneumoconiosis, sarcoidosis, and chronic pulmonary changes due to long-standing heart disease. Sarcoidosis is the only one of these diseases in which an eosinophilia may occur, and, if present, it is usually only of slight degree. There is an uncommon condition of pulmonary eosinophilia with asthma which occurs mainly in women and is often associated with polyarthritis (Crofton *et al.*, 1952). Its cause is unknown. Abnormalities are sometimes seen in the chest x-ray film in polyarteritis nodosa, and a blood eosinophilia may occur in this condition. Eosinophilic leukaemia is the only disease where the eosinophilia in the peripheral blood may exceed that which may occur in tropical pulmonary eosinophilia (Weingarten, 1943). As the other features of the two diseases are distinctive, difficulty in diagnosis should not arise.

Prognosis and Treatment.—Tropical pulmonary eosinophilia is a benign condition, but if untreated it may run a prolonged course (Lal, 1945). It invariably responds promptly to treatment with arsenic, either by mouth or by injection. A temporary exacerbation of the symptoms and of the eosinophilia may occur shortly after treatment is started, but there is a rapid improvement with the continuation of treatment. Treu (1950) estimates the relapse rate at 20%, but a case that has relapsed responds to arsenic as well as one that has not previously been treated.

Summary

A case of tropical pulmonary eosinophilia is described. The patient, a Hindu, first had symptoms in 1951 and subsequently had two relapses—in 1953, and again shortly after coming to England in 1955. The clinical course of his illness in 1955 is described, together with the radiological and haematological changes at that

time. Repeated examinations of his sputum failed to reveal any mites. He responded well to arsenic.

The literature on the disease is briefly reviewed and the various aetiological theories are discussed. Tropical pulmonary eosinophilia is widely considered to be due to pulmonary infestation with various species of mites, but this cause has not been universally accepted. Although the disease occurs mainly in India and Ceylon, cases have been reported from many other countries. Relapse is common, and may occur after the patient has moved from a tropical to a temperate climate.

My thanks are due to Dr. A. P. Prior for carrying out the pathological investigations.

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Medical Memorandum

Bilateral Thrombosis of the Renal Artery

Spontaneous thrombosis of both renal arteries is extremely rare, and I can trace only two recorded cases. Below is a report of a third case.

CASE REPORT

A man aged 63 was admitted to hospital with a diagnosis of anuria of unknown aetiology. His only complaints were that he had not passed urine for 33 hours, and that he had had slight pain in his loins for 36 hours. He had had angina pectoris for five years, and both the right and the left leg had been amputated for senile gangrene 16 and 6 months previously respectively. He had made uneventful recoveries from these operations, had two artificial legs, and enjoyed fair health up to the time of the present illness. He developed pain in the left loin 36 hours before admission, and developed pain in his right loin shortly after. The pain was never severe, and, although still present on admission, it had eased to but a slight ache. He had never felt ill, vomited, or been nauseated. There was never any abdominal pain. He had passed urine normally 33 hours before admission, but since then had been able to pass only a "teaspoonful of cloudy, muddy" urine.

On examination he was a fairly healthy-looking, well-nourished man, with an appearance no older than his age. Both legs had been amputated above the knee and the stumps were healthy. His temperature was 101.2° F. (38.4° C.) and pulse 110. The tongue was slightly coated, but moist, and the breath clean. Examination of the abdomen revealed no abnormality. There was a little tenderness in the right renal angle, but none in the left. Rectal examination revealed a slightly enlarged smooth prostate but no tenderness. His pulse was regular, with a palpable radial artery. The B.P. was 170/105. The apex beat was displaced to the left, but no abnormality was noted on auscultation of the heart. The lungs appeared to be clear. A straight x-ray film of the renal tract showed no radio-opaque calculi. On catheterization no urine could be obtained.

A provisional diagnosis of anuria due to an acute pyelonephritis was made, and intramuscular streptomycin therapy was begun along with an intravenous drip of sodium sulphate solution. There was no change in the patient's condition whatsoever until he suddenly collapsed six hours after admission and died within a few minutes.

At necropsy, examination of the abdominal aorta revealed that just above the origin of the renal arteries the lumen was occluded by an ante-mortem thrombus which was attached to the wall and extended down to the iliac bifurcation. It also extended about 0.5 cm. into each of the renal arteries and into the root of the inferior mesenteric artery. The thoracic aorta showed many atheromatous plaques. The coronary arteries were greatly narrowed by atheroma and only just patent. Both kidneys showed some scars from previous small infarcts, and the whole substance of both of them was rather plum-coloured, with loss of normal definition, and appeared to be in the early stages of necrosis. The other viscera showed no significant pathology save that the lungs were the site of an early bronchopneumonia.

COMMENT

An appreciable number of cases have been recorded (McKenna, 1928) of bilateral thrombosis of the renal artery occurring secondary to multiple embolism, but a spontaneous thrombosis of both renal arteries due to atherosclerosis is extremely rare. The first of the two recorded cases was reported by Halperin (1908). A man of 44 presented with a similar history to the case reported above, but the pain was severe and was associated with vomiting and headache. The pain did, however, in this case also gradually subside. The patient survived six days with an almost complete anuria. Necropsy revealed thrombosis identical to that of my case. It is noteworthy that this case also had had a leg amputated 18 months previous to his renal thrombosis. The other case was reported by Oudenal and Hulst (1925). A woman of 67 was seen complaining of anuria of two days' duration. She never at any time complained of pain. She was reported as being alert and showing no signs of uraemia, comparing with the identical circumstance of my case. Further, her temperature was similarly somewhat elevated, and a diagnosis of urinary sepsis was made. She eventually passed into uraemia and died six days later, after an operation to decapsulate the left kidney. Necropsy findings were as in the other two cases.

None of these three cases was diagnosed clinically, but this is probably because renal artery thrombosis is a diagnosis the clinician seldom considers. Wolffe (1943) maintains that thrombosis of a single renal artery is quite a common condition, and urges that it is one that should be far more often diagnosed and treated. The three cases described, however, suggest that the clinical picture can be very variable, systemic upset and the onset of uraemic symptoms being inconstant. Goodyear and Beard (1947) admit the very variable and inconstant findings in unilateral renal artery thrombosis, but assert that severe pain is one consistent feature. This is quite contrary to the findings in two of the three bilateral cases described.

The diagnosis in bilateral thrombosis might be regarded as of only academic interest anyway. But with the great advances being made in the techniques of arterial grafting, especially in the use of synthetic cloth prostheses, operative treatment of such cases, if diagnosed early, might now be within the bounds of possibility.

I am grateful to Mr. J. I. C. Mason for permission to publish this case report.

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Reviews

REFRESHER COURSE

Refresher Course for General Practitioners. Specially Commissioned Articles from the British Medical Journal. Third Collection, April, 1952, to September, 1953. (Pp. 548+xvii; illustrated. 25s.) London: British Medical Association. 1956.

This is the third collection of Refresher Course articles for general practitioners. The articles appeared in this *Journal* in 1952 and 1953, and have been revised by their authors. The editor is to be congratulated on his selection of subjects. They cover a wide range. There are chapters on antenatal care by Professor Nixon and on death certification by Dr. Logan, ranging literally from conception to the grave. All the subjects are of importance to general practitioners, and each has been written by an expert. It must be unique in medical literature for so many experts to be gathered within the covers of three comparatively slim volumes, all dealing with general practice. One of the objects of such a course is to refresh the general practitioner's mind on the diagnosis and treatment of emergencies. Articles by Dr. Wallace on resuscitation after drowning and by Professor Glaister on the treatment of accidental poisoning will remind him of the advantage of the Holger Nielsen method of artificial respiration and of the importance of keeping an emergency bag for the treatment of poisoning.

Medicine and medical treatment are changing daily, so that a particular method of treatment may be out of date by the time it appears in print, but the ideas which lead to the changes are often less impermanent. For instance, it has long been known that shock and sepsis are the chief causes of death in burns, and that whole-skin burns take a long time to heal and cause serious scarring. The virtue of the chapter on the treatment of burns by Dr. Bull and of the chapter on the treatment of burns by Dr. Bull and Mr. Jackson of the Medical Research Council burns unit of the Birmingham Accident Hospital lies not so much in the particular antibiotics used but in the lesson that infection of burns can be prevented, that shock can be treated by transfusion, and that whole-skin burns can now be grafted at once. This is also an example of the increasing responsibilities of the general practitioner to-day, for he must decide whether a burn on the finger has caused full thickness or partial thickness skin loss. A wrong decision may cause permanent crippling in his patient. The general practitioner will find another aspect of the widening scope of his responsibilities in an excellent article by Sir Harold Whittingham on the medical aspects of air travel. Then, of course, there is cancer. Surgeons expect general practitioners to diagnose cancer just after, if not before, it occurs. Two surgeons—Mr. Malcolm Donaldson, who writes on irregular vaginal bleeding, and Mr. Atkins, on carcinoma of the breast—question the validity of recent statistics which appear to disprove the value of surgical removal of cancer. However that may be, it seems certain that statistics based on the survival rate after operation have little or no importance. Whether he agrees or disagrees with modern ideas, it is important for the general practitioner to know what his consultant and specialist colleagues are thinking and doing even when their thoughts are faintly patronizing. Professor Nixon must surely know that many general practitioners were regularly getting chest radiographs of all their expectant mothers well before 1947, and that they are more in sympathy with his ideas on the emotional aspects of pregnancy and labour than are many of his consultant colleagues.

This volume contains a classified list of the articles in all three volumes. Classification of such diverse subjects is difficult, but it is not easy to understand why Dr. L. B. Cole's thoughtful and helpful article on prevention and treatment of tetanus should be listed under general surgery and under tropical medicine. Perhaps in future editions it might be possible to have an alphabetical list of authors

with their contributions. When all is said, it remains true that this is a remarkable collection of opinions on modern medicine which will be invaluable to the general practitioner.

C. W. WALKER.

DEVELOPMENT OF THE CHILD

Discussions on Child Development. Edited by J. M. Tanner, M.D., Ph.D., D.P.M., and Bärbel Inhelder. Volume 1—Proceedings of the First Meeting of the W.H.O. Study Group on the Psychobiological Development of the Child, Geneva, 1953. (Pp. 240. 25s.) London: Tavistock Publications Ltd. 1955.

This is an account of the papers and discussions of a Research Study Group on the Biological, Psychological, and Cultural Aspects of Human Behaviour and Development, under the auspices of the World Health Organization. It is the first volume, and a second volume is being prepared. Among the participants in the meeting were such experts as Bowlby, Fremont-Smith, Inhelder, Lorenz, Margaret Mead, Piaget, Tanner, and Grey Walter. The subjects discussed included the physical, physiological, and psychological aspects of child development, comparative behaviourology, the behaviour of anencephalic monsters, and electroencephalography. Piaget's criteria of the stages of mental development and Wallon's description of motor development are discussed in detail. Each chapter is opened by a short paper, which is followed by many pages of discussion. The papers and discussions are full of interest for those who are concerned with the development of normal children and who have made psychology a special study. The book is not one to which a practising paediatrician would refer for help with individual problems, but he would find it of interest for its theoretical explanations of child development.

Drs. Tanner and Inhelder are to be congratulated on making this valuable book so readable and for providing us with such important material which otherwise would not be readily available, because of language difficulties. One looks forward to reading Volume II.

R. S. ILLINGWORTH.

PAEDIATRIC ALLERGY

Allergy in Childhood. By Jerome Glaser, M.D. (Pp. 529 +xxii; illustrated. 90s.) Springfield, Illinois: Charles C. Thomas. Oxford: Blackwell Scientific Publications. 1956.

This book represents the amplification of a series of lectures given by the author to paediatric house-staff and medical students as a course in paediatric allergy, established at the University of Rochester School of Medicine and Dentistry since 1931. A wide range of problems is covered and the book is reasonably balanced. Almost 100 pages are given to bronchial asthma and just over 100 to the allergic dermatoses and allergy to drugs and vaccines, nearly 50 being devoted to atopic dermatitis. Gastro-intestinal allergy is discussed in 35 pages; the history, examination, and skin-testing in 25 pages; and pollinosis in 18. Other subjects include allergy in early life, the incidence and progression of allergic syndromes in children, psychosomatic aspects of allergic diseases in infancy and childhood, allergy to insect bites and stings, and the prophylaxis of allergic diseases. The chapters are conveniently short, and each is followed by a well-chosen bibliography. The sections describing the differential diagnosis and management of bronchial asthma and the allergic dermatoses are well done and will interest all who have these problems to deal with.

The most difficult section of the book to assess is that dealing with the role of foods as allergens. Dr. Glaser has himself devoted much time to this subject and is an advocate of the importance of foods as allergens: opinion on this, however, is far from unanimous, and it is doubtful whether many in this country would agree with all that he says. With this reservation, the book can be recommended as giving much practical advice on the diagnosis and management of allergic conditions in childhood.

D. A. WILLIAMS.

BRITISH MEDICAL JOURNAL

LONDON

SATURDAY DECEMBER 22 1956

RESPIRATORY TRACT VIRUSES

Respiratory disease continues to be a major cause of morbidity. Recent investigations in the United States¹ have emphasized that so far as the family is concerned "common respiratory disease" accounts for the greater part of respiratory illness, particularly among the younger members of the family. Acute respiratory infections of this sort are apt to be attributed to viruses, particularly if no immediate response to antibiotics is forthcoming, and thoughts turn towards immunization as a method of control. But before this can be attempted the disease to be prevented must be clearly defined and the agent responsible isolated in the laboratory, as has been done for influenza. Virus infections of the respiratory tract are a mixed bunch, and, though progress has been made in distinguishing them clinically and epidemiologically, work in the laboratory, on which the ultimate aetiological diagnosis depends, has usually been hampered by inability to transmit the causative agents to laboratory animals.

As influenza came to be more clearly defined, so did the existence of acute undifferentiated respiratory disease or febrile catarrh become more noticeable.² In 1947, at a time when all attempts at animal transmission were unsuccessful, the U.S. Commission on

Acute Respiratory Disease was able to transmit "acute respiratory disease" to human volunteers by instillation of sterile filtrates from acute cases.³ And it appeared from their studies that both the original and induced disease were immunologically distinct from the severe common cold and primary atypical pneumonia.⁴ With the introduction of tissue culture into virus research there seemed little doubt that new viruses would be recovered from the respiratory tract, and so it has proved to be. The first group of interest are the A.P.C. viruses,⁵ or adenovirus as they are now called.⁶ In 1953 W. P. Rowe and his associates described a virus, the adenoid-degenerating agent, which produced spontaneous degeneration of human tonsils growing in tissue culture,⁷ and within a short time other workers had recovered similar agents in a variety of acute respiratory illnesses.⁸ Despite their different names these viruses are closely related and have a number of common properties which serve to identify them. They grow well in tissue culture, particularly of human origin, and produce characteristic cytological changes visible under the microscope. They are non-pathogenic for laboratory animals, and, though they share a common soluble antigen, many immunological types exist. Serological evidence indicates that infection is widespread and acquired initially at an early age. Studies in Washington, D.C., showed that 50% of infants from 6 months to 1 year had antibody to at least one type, and by the age of 15 antibody to several types was present.⁹ As to the part these viruses play in human disease, more information is needed before their exact role can be defined. Nevertheless, certain alignments of immunological types have been noted. For instance, types 1 and 2 have been found or unmasked more frequently than other types from human tonsils and adenoids.⁸ Type 3 has been found in association with cases of acute pharyngitis and pharyngo-conjunctival fever,⁹ and a type 8 virus from cases of epidemic kerato-conjunctivitis.¹⁰ But the most clear-cut association appears to be between types 4 and 7, and to a less extent type 3, with outbreaks of acute respiratory disease seen in Service recruits.¹¹ In confirmation of this comes a report from J. H. Dingle and others¹² that sera taken from volunteers, and since stored, during the 1947 investigation into acute respiratory disease showed a rise in antibody titre to type 4 adenovirus, whereas cases of severe common cold and atypical pneumonia showed no such rise.

As to preventive measures, the role of adenoviruses in acute respiratory disease of Service recruits seems sufficiently well established for immunization to be tried, and a start has already been made in the United States. R. J. Huebner and others showed that an

inactivated monovalent vaccine (type 3) produced a degree of protection in volunteers to inoculation of live virus swabbed on to the palpebral conjunctiva.¹³ M. R. Hilleman and others selected types 4 and 7 adenoviruses for a similar type of vaccine prepared in monkey-kidney tissue culture.¹⁴ One dose of vaccine given before the onset of acute respiratory illness conferred a remarkable degree of protection. The incidence of illness in 311 vaccinated recruits was 4.8% and 23.8% in a control group of 313 recruits. Furthermore, the degree and rapidity with which protection was afforded with one dose of vaccine suggested that vaccination produced a recall type of response in individuals with at least some previous immunity. J. A. Bell and others gave a similar type of vaccine incorporating types 3, 4, and 7, and were also able to record protection in a trial in U.S. naval recruits.¹⁵

With mounting evidence that the adenoviruses were associated with various respiratory illnesses, it seemed possible they might be concerned in the aetiology of the common cold. There is no evidence yet that this is so. Earlier reports by C. H. Andrewes and his colleagues¹⁶ were hopeful that the virus could be grown in tissue culture of human embryonic lung, but identification of the virus is extremely difficult because no cytological changes are produced, as with the adenoviruses, and human volunteers are still required to test material for virus infectivity. There are many difficulties in interpreting the findings. Only some of the induced colds "take"; resistance from natural causes and acquired immunity have to be considered and are hard to define. Virus propagated in this way may also become so attenuated as to be non-pathogenic to its human host. Finally, it is clear that there are many causes of the non-febrile cold. A. B. Fuchs¹⁷ draws attention to the importance of allergic rhinitis as the cause of symptoms in many cases indistinguishable from the common cold. In a recent investigation, in which live adenovirus was given to volunteers by nasal instillation, J. A. Bell and others¹⁸ found that a number of colds developed both in those receiving live virus and in those receiving virus-free maintenance fluid. All this work goes to emphasize the need for a method of handling the common cold virus or viruses in the laboratory.

Though the original RI-67 strain of virus, now known as adenovirus type 4, was recovered from a case of primary atypical pneumonia, there is no evidence that these viruses are the causative agents of primary atypical pneumonia in which increased cold agglutinins are commonly encountered. A number of viruses from this disease have been described, but interest has mainly centred on one described by

M. D. Eaton and his colleagues.¹⁹ Serial transmission and recognition of this agent was difficult because of its low pathogenicity for the cotton-rats and chick-embryos infected with it. By means of the fluorescent antibody technique, virus antigen has been demonstrated in fertile eggs infected with this virus recovered from cases of atypical pneumonia.²⁰ More recently, reports from the children's hospitals in Toronto and Cincinnati suggest that viruses may also have been isolated from cases of laryngo-tracheo-bronchitis²¹ and from infantile croup.²² There seems little doubt that tissue-culture methods are going to provide the means for further study of respiratory-tract viruses and perhaps a step towards their ultimate prevention.

SPEECH PROBLEMS IN CHILDREN

Speech problems are common in children, but relatively few papers are written about them—perhaps because they are so difficult to write about. Outstanding recent papers were that of Professor D. Court and his associates¹ and the review by J. Eisen-son² of the psychological factors in speech disorders. Elsewhere in this issue of the *Journal* (p. 1455) Dr. C. H. M. Walker and Miss P. R. Languth describe their study of 52 children at the Hospital for Sick Children, Great Ormond Street, in whom speech was delayed or arrested for reasons unassociated with deafness or cerebral palsy. Much support will be found for their principal conclusions, though not all will agree that cases of delayed onset of speech, arrest of speech development, and dyslalia can be grouped together. Neither has it been clearly established that there is a close connexion between the amount of vocalization in infancy (termed by the writers "babbling")—even if there were a means of estimating it—with subsequent speech development in a child with normal hearing. An interesting part of their paper is devoted to psychological factors associated with speech disorders: they found that in 33 of the children there were faults in the environment which could have been operative in causing delay or arrest in speech development. Elsewhere they say, "The large proportion (80%) suffer from arrested development, probably the result of non-specific psychological factors, operating between the age of 1 and 2 years." This is a difficult point to prove. It is fashionable to say that some children are late in learning to

¹ Court, D., Morley, M., Miller, H., and Garside, R. F., *British Medical Journal*, 1955, 2, 463.

² Eisen-son, J., in *The Psychology of Exceptional Children and Youth*, by W. M. Cruikshank, 1956, London.

³ Illingworth, R. S., *British Medical Journal*, 1955, 2, 2.

⁴ Chadsey, R. M., *J. Pediatr.*, 1942, 21, 415.

⁵ Illingworth, R. S., and Birch, L. B., *Arch. Dis. Child.*, 1956, 31, 300.

¹ Dingle, J. H., *Ann. intern. Med.*, 1955, 43, 518.

² Stuart-Harris, C. H., *Influenza*, 1953, London.

³ Commission on Acute Respiratory Disease, *J. clin. Invest.*, 1947, 26, 957.

⁴ ——— *ibid.*, 1947, 26, 974.

⁵ Huebner, R. J., Rowe, W. P., Ward, T. G., Parrott, R. H., and Bell, J. A., *New Engl. J. Med.*, 1954, 251, 1077.

⁶ Enders, J. E., Bell, J. A., Dingle, J. H., Francis, T., Hilleman, M. R., Huebner, R. J., and Payne, A. M. M., *Science*, 1956, 124, 119.

⁷ Rowe, W. P., Huebner, R. J., Gilmore, L. K., Parrott, R. H., and Ward, T. G., *Proc. Soc. exp. Biol. (N.Y.)*, 1953, 84, 570.

⁸ ——— Hartley, J. W., Ward, T. G., and Parrott, R. H., *Amer. J. Hyg.*, 1955, 61, 197.

⁹ Parrott, R. H., Rowe, W. P., Huebner, R. J., Bernton, H. W., and McCullough, N. B., *New Engl. J. Med.*, 1954, 251, 1087.

¹⁰ Jawetz, E., Kimura, S., Nicholas, A. N., Thygeson, P., and Hanna, L., *Science*, 1955, 122, 1190.

¹¹ Berge, T. O., England, B., Mauris, C., Shuey, H. E., and Lennette, E. H., *Amer. J. Hyg.*, 1955, 62, 283.

¹² Dingle, J. H., Ginsberg, H. S., Badger, G. F., Jordan, W. S., and Katz, S., *Trans. Ass. Amer. Phys.*, 1954, 67, 149.

¹³ Huebner, R. J., Bell, J. A., Rowe, W. P., Ward, T. G., Suskind, R. G., Hartley, J. W., and Paffenbarger, R. S., *J. Amer. med. Ass.*, 1955, 159, 986.

¹⁴ Hilleman, M. R., Stallones, R. A., Gould, R. L., Warfield, M. S., and Anderson, S. A., *Proc. Soc. exp. Biol. (N.Y.)*, 1956, 92, 377.

¹⁵ Bell, J. A., Hantover, M. J., Huebner, R. J., and Loosli, C. G., *J. Amer. med. Ass.*, 1956, 161, 1521.

¹⁶ Andrewes, C. H., Chaproniere, D. M., Gompels, A. E. H., Pereira, H. G., and Roden, A. T., *Lancet*, 1953, 2, 546.

¹⁷ Fuchs, A. B., *N.Y. St. J. Med.*, 1956, 56, 2529.

¹⁸ Bell, J. A., Ward, T. G., Huebner, R. J., Rowe, W. P., Suskind, R. G., and Paffenbarger, R. S., *Amer. J. publ. Hlth*, 1956, 46, 1130.

¹⁹ Eaton, M. D., Meiklejohn, G., and van Herick, W., *J. exp. Med.*, 1944, 79, 649.

²⁰ Liu, C., Eaton, M. D., and Heyl, J. T., *Bull. N.Y. Acad. Med.*, 1956, 32, 170.

²¹ Rhodes, A. J., *Ann. intern. Med.*, 1956, 45, 106.

²² Chanock, R. M., *J. exp. Med.*, 1956, 104, 555.

speak because they are jealous of the new baby, or because their parents do not talk to them enough, or because they (or the siblings) do everything for them so that they do not have to bother to speak. There may be no more than a grain of truth in these ideas. Certainly severe emotional deprivation may retard speech—particularly if the child is so badly treated that he hardly ever hears anyone talk—but that must be very rare. There is no evidence for the popular belief that children do not talk because they are “lazy” and because everything is done for them. Many parents have been instructed to refuse to do things for their child unless he speaks properly, and as a result behaviour problems are precipitated, because the child’s lateness in speech was due not to the fact that he would not speak but to the fact that he could not—because his nervous system was not ready for it. Such advice is harmful. As for jealousy, all children are jealous, and it is indeed difficult to prove that lateness in speech is due to jealousy. Most children from homes which are badly mismanaged or having parents who are themselves emotionally disordered speak normally, though one of the mysteries of psychological medicine is the way in which one child will react to insecurity by a tic or bed-wetting while others will react by any of a score or more of other behaviour problems. Some, therefore, might well react by delay in learning to speak, but this must be very rare. The matter is still a controversial one and awaiting the collection of evidence, though no one would doubt that stuttering is often related to insecurity.

The commonest cause of lateness in the development of speech is mental retardation. Most mentally backward children are relatively more retarded in speech (and subsequently in reading) than in other fields of development. Hence the essential step in determining the cause of lateness in speech is an assessment of the child’s mental development, based on the history, the physical examination, and the interpretation of the findings.³ If the child is found to be up to the average in other respects, concentrates well on his toys, and shows a good interest in his surroundings, mental backwardness need not be further considered as a cause of his lateness in speech. It may be noted, in passing, that Einstein caused his parents grave concern because of his notable backwardness in speech at the age of 4. The next step in the diagnosis is the elimination of deafness, partial or complete. Severe deafness may be suggested in infancy by the child’s general indifference to sound, by his lessened vocalization in play or otherwise, and by his screaming in his efforts to express pleasure or annoyance. He may show exaggerated alertness to gesture

and movement. High-frequency deafness is more likely to cause indistinctness of speech, because of the omission of certain high-pitched sounds such as consonants, and particularly the “s” and “f,” which children do not hear in the speech of others. Expert examination is needed to detect this form of weakness.

Most workers will agree with the finding of Walker and Languth that crossed laterality is of little importance in these children. Delay in the establishment of handedness is probably of equally little importance. Tongue-tie never causes delay in the acquisition of speech, and it is a very rare cause of indistinctness of speech, intelligent children learning to compensate for the slight mechanical difficulty.

A related problem to that of retarded speech, but one of less importance, is the occurrence of a lull in the development of speech. A child begins to talk at the usual time and learns to say a few words, and then makes no apparent progress for a period of varying length, often five or six months. He then suddenly makes rapid progress, catching up to the average level in a very short time. These lulls in development have interested many workers, including Gesell. There is no evidence of a psychological cause for them, and they need not occasion anxiety. The child will be found to be progressing normally in other ways, and in particular in his understanding of words, so that he may understand the meaning of scores of words without being able to articulate more than five or six.

All will agree with the emphasis placed by Walker and Languth on the importance of early treatment in dyslalia and stuttering, though no amount of speech therapy can make a child learn to talk until his nervous system is ready for it. It is useless, therefore, to refer a child to a speech therapist because he is a late talker. This does not apply to deafness: the sooner a deaf child is treated the better. Even at the age of 9 months he may be helped by the fitting of a hearing-aid. Speech therapy should begin at the age at which speech is normally learnt—certainly by the first birthday. If, on the other hand, the child is able to talk but his speech is indistinct and remains so, the speech therapist should certainly be asked to help, so long as the child is old enough and has the requisite intelligence. Many children go through a stage of lisping, substituting “th” for “s,” and in nearly all of them this cures itself without treatment. Many other children go through a stage of stuttering, particularly between the age of 3 and 4, but grow out of it provided that the parents show no anxiety about it and make no attempt to treat it. When a speech defect is persistent, however, it should be treated. It is likely that the longer the speech defect is estab-

lished the longer will be the time required for its correction. R. M. Chadsey⁴ went further, writing, “It is criminal negligence to wait for a child to grow out of a defect.” There is some difference of opinion about the age at which treatment should be instituted. This must depend in part on the child’s intelligence: at all events he should be treated for a persistent defect by the time of his fourth birthday, because it is so important that he should speak normally when he starts school and so escape the harm resulting from being teased and ridiculed by other children. Some recommend that treatment, especially for stuttering, should begin somewhere between the child’s third and fourth birthday, but that would probably mean treating many who would right themselves if left alone.

A certain amount of dyslalia may be due to post-nasal obstruction by adenoids, leading to the substitution of the letter “m” for “b”: this may be corrected by surgery. The speech defect may persist for a few weeks after the operation because of habit, but usually it cures itself quickly when the postnasal obstruction is removed. Malocclusion may also cause some dyslalia, and should be corrected by the orthodontist. A cleft palate does not delay the development of speech, except in so far as subnormal intelligence is more often found in these children than in others,⁵ but it does lead to dyslalia until treated by the plastic surgeon and speech therapist.

In all cases of retarded speech or speech defects it is wise to relieve the parents’ anxiety and to stop them causing worry and insecurity in the child by their efforts to make him speak clearly and distinctly, or by teasing and ridiculing him. Perfectionism, over-protection, and excessive discipline should so far as possible be corrected.

ANTIBIOTIC HAZARDS

How dangerous are our antibiotics? A few years ago this question was hardly being asked. Now the literature is full of reports of disasters or disorders following their use. But when we try to estimate how great these dangers are, surprisingly little is known. These and many other problems are discussed in a recent volume of nearly 1,000 pages containing some 250 papers and of three panel discussions on the long-term and prophylactic use of antibiotics, penicillin V, and the true significance and real incidence of reactions following clinical use of antibiotics.¹ There are many ways in which antibiotics may be dangerous—because of their direct toxicity, because they give rise to hypersensitivity

(allergy), because of the development of drug resistance in the patient’s organisms, through use of the wrong or misuse of the right antibiotic, or through use of antagonistic combinations. But many antibiotics are fairly specific not only in their action on micro-organisms but also in their harmful effects on patients, and it may be useful to outline some of the main dangers of the most important antibiotics.

Penicillin is still perhaps the safest of them all, but cases of hypersensitivity ranging from skin rashes to anaphylactic death are being increasingly reported. A report of three deaths from penicillin in Denmark² draws attention to the need to avoid prescribing it for anyone who is known to be sensitive to it. It is stated that penicillin V (phenoxymethyl penicillin), which is suitable for administration by mouth, is about eight times less toxic than penicillin G (benzyl penicillin) and much less likely to give rise to hypersensitivity. Development of drug resistance is not a serious problem with penicillin except for staphylococcal infections. This is rapidly becoming one of the major problems of cross-infection, and was discussed in these columns recently.³

The dangers of streptomycin therapy are rather different. Hypersensitivity reactions may be serious, but the most dangerous sequelae are the well-known damage to the eighth nerve following prolonged treatment and the rapid development of drug resistance which occurs with a wide variety of infections originally susceptible to it. This is particularly common in infections of the urinary tract and in tuberculosis, though combined chemotherapy has greatly reduced its frequency. Of the so-called broad-spectrum antibiotics chloramphenicol has fallen into disrepute because of the presumed association between it and the development of blood dyscrasias. The cause of these has never been clearly established; they may be a special form of hypersensitivity reaction, since cases seem to have occurred most commonly in patients who have had the drug before rather than in those who have had long continuous treatment. But the pendulum has swung back somewhat. Certainly chloramphenicol is a valuable drug, remarkably free from toxicity in other ways and often indispensable not only in typhoid fever but in staphylococcal and other refractory infections. The most conspicuous danger of the tetracycline group of drugs (aureomycin, terramycin, achromycin) is their liability to cause gastro-intestinal disturbance. Usually this is troublesome rather than dangerous, but sometimes fulminating enteritis develops and the patient dies in circulatory collapse. Often in this condition the bowel is found to be heavily infected with *Staphylococcus pyogenes* resistant to terramycin. From the short history in the fulminating cases it seems clear that the patient must have been infected from some outside source with staphylococci which were already drug-resistant, and the problem of eliminating sources of such staphylococci is causing increasing anxiety to surgeons and others.

The dangers of our modern chemotherapy are not confined to antibiotics. Synthetic drugs like the sulphonamides are certainly not blameless—rashes, agranulocytosis, renal failure, drug resistance, are a few of their

¹ *Antibiotics Annual 1955-6*, ed. Welch, H., and Marti-Ibanez, F., New York.
² Andersen, A. H., *ibid.*, p. 814.
³ *British Medical Journal*, 1956, 2, 867.

more important complications. In the treatment of tuberculosis *p*-amino-salicylic acid and isoniazid, besides producing toxic effects, are readily made ineffectual by the development of drug resistance during treatment. Some of the less commonly given antibiotics are so toxic that their use is warranted only in special circumstances—for example, neomycin and cycloserine. As many lives may be lost by the indiscriminate use of antibiotics and other drugs as by failure to use them when they are urgently needed. But it is not easy to assess the risk when there are so many gaps in our knowledge. We need much more information about the frequency of dangerous reactions to penicillin, of fulminating gastro-enteritis following the use of tetracyclines, of blood dyscrasias following chloramphenicol, and of many other hazards of antibiotic therapy. No single individual can collect personally more than a fraction of the experience needed in this field; that is why publications such as the *Antibiotics Annual* fill an urgent need. For only when he is given such information can the clinician hope to steer a sensible course between exuberance and timidity in his prescribing of antibiotics.

PUBLIC HEALTH IN 1955

The general death rate in England and Wales has shown little change since the end of the second world war. After allowance is made for changes in the age and sex structure of the population, it was 80% of the 1938 rate in 1948 and 81% in 1955. But the Chief Medical Officer of the Ministry of Health is able to report that 1955 "had many favourable features, which directly or indirectly contributed to the public health." These included a sunny summer, plenty of food, and work for all.¹ The expectation of life at birth remained the same as in 1954—namely, 68 for boys and 73 for girls. For people aged 65, however, the expectation of life has hardly changed this century, being in 1955 12 for men and 15 for women, only a year or so more than before the first world war. This means that, while many more people are reaching old age, the psalmist's three-score years and ten gave what is still a good estimate of the span of human life.

Man has been so strikingly successful in taming the jungle of disease in the last two decades that few sectors remain where he fails at least to hold his own. Yet there are several where at any rate urban man seems to be losing ground. The incidence of cancer of the lung continues to rise sharply, an increase that remains after allowance is made for changes in the population. It is known to be associated with air pollution and excessive cigarette smoking, and the Chief Medical Officer suggests, in a cautiously worded phrase, that "it would be a good thing if the two main suspects could receive increasing attention." The connexion between lung cancer and these two agents is of a statistical nature, sometimes lightly dismissed as being only statistical. But the connexion between a cholera outbreak in London a hundred years ago and the water delivered from Broad

Street pump was of much the same kind. John Snow noticed that the disease was rife among those citizens who took their water from the pump, rare among those who did not. It was thought advisable to remove the pump's handle, if somewhat belatedly.² Though suffering an attack of cholera depended on being infected by vibrios in the water, whereas to be attacked by cancer of the lung does not necessarily depend on being a smoker or living in a city, the line of reasoning which led to the pump being closed is one that the smoker might consider before dismissing it as only statistical. Prohibition of smoking in cinemas and public transport vehicles is a suggestion put forward by the Chief Medical Officer.

Among the communicable diseases, food-poisoning and Sonne dysentery continue to make headway against all the sanitary and educational measures taken to prevent them. The Chief Medical Officer attributes the rising incidence of food-poisoning to "the increasing practice of communal feeding and the consumption of pre-cooked foods," but it is odd that the exceedingly strenuous efforts made to improve the public health should be so ineffectual in stemming the advance of these microbes. Sonne dysentery, "now the bane of day and residential nurseries," causes much inconvenience and even suffering, yet "efforts to curb its spread have so far been singularly ineffective." Against these, one notable success may be mentioned: deaths from whooping-cough, 88 in 1955, were less than a quarter of what they were only five years previously. The fatality of the disease is now mainly confined to the first year of life, and 25% of the deaths were concentrated on children under 3 months old.

STIFF-MAN SYNDROMES

A curious condition of progressive, fluctuating muscular rigidity and spasm has recently been described³ by F. P. Moersch and H. W. Woltman, of the Mayo Clinic, as the "stiff-man" syndrome. They have observed 14 cases of this type during a 30-year period, 10 in males and 4 in females. Usually the condition began in the fifth decade of life with muscular stiffness and rigidity, gradually increasing in severity and punctuated by intermittent painful spasms. These spasms could be precipitated by noise or by sudden movement; the rigidity and immobility so produced often caused the patient to fall. In 6 cases the muscles of the trunk were first affected, in 4 those of the neck and shoulders, and in 4 those of the limbs. Invariably the condition spread to involve other muscles, but always it affected proximal limb muscles more than the distal. Generally the rigidity gave rise to kyphosis or lordosis and to a characteristic awkward shambling gait with poverty of all voluntary movements. On examination the affected muscles were usually rigid and boardlike, though there was often some fluctuation in severity, while frequent spasms could be evoked by external stimuli or by unduly rapid movement by the patient. Although tendon reflexes were generally brisk, no other

neurological signs could be demonstrated. Numerous biochemical studies, examination of cerebrospinal fluid, and myelography in some cases gave no consistently abnormal findings, but 4 patients were found to secrete reducing substances in the urine though levels of blood sugar were normal. Electromyographic recording from rigid muscles in 5 cases gave a normal pattern of volitional activity, and 2 patients were subjected to muscle biopsy with negative results. Eleven cases were followed up for periods of from two to fifteen years, and during this time there was a steady increase in the severity and extent of the muscular rigidity. Treatment with barbiturates, cortisone, and a variety of antispasmodic and relaxant drugs had no significant effect on the course of the disease or even on the predominant symptoms.

Moersch and Woltman confess that they have no evidence on the nature of this curious disease. They point out that it shows certain resemblances to chronic tetanus, but that the almost invariable sparing of the jaw muscles as well as the duration and progressive nature of the disorder are sufficient to rule out this diagnosis. Because of the fluctuating course and the reducing substances found in the urine of 4 cases the authors suggest that the syndrome may result from a specific metabolic defect. However, it is difficult to see why they exclude torsion spasm (dystonia musculorum deformans) as an explanation for this syndrome. This condition is known in many cases to be due to degenerative changes in the basal ganglia. While it usually gives rise to gross involuntary movements rather than generalized muscular spasms, a so-called myostatic form has been described⁴ which may be of late onset; marked fluctuations in course, even with arrest, may occur, or the condition may simply produce progressive muscular rigidity with alterations in posture.⁵ It therefore seems possible that the "stiff-man" syndrome may be an atypical form of dystonia, but so little is known about the aetiology of dystonia, but so little is known about the aetiology of extrapyramidal syndromes developing in middle and late life that a metabolic cause, as suggested by Moersch and Woltman, cannot be excluded. The biochemical origin of Wilson's progressive lenticular disease has now been amply confirmed, and possibly further cases of the "stiff-man" syndrome will repay thorough biochemical investigation.

CONTRASTS IN MENTAL HEALTH SERVICES

A speaker at the Royal Society of Medicine the other evening offered an interesting if somewhat tendentious explanation of why American reports of the effects of tranquilizers such as reserpine are so much more enthusiastic than experience in British mental hospitals would justify. He put it in terms of differences between the mental hospitals of the two countries. Mental hospitals in the U.S.A. have been much shorter of trained nursing and medical staff than ours, and their psychiatric outlook has been dominated by psycho-analytic ideas, to the relative neglect of physical methods of treatment. In consequence the American chronic mental patient has been in a state of greater neglect,

and the improvement he has shown when someone has taken an interest in him, and even given him a few new tablets, all the greater.

A report from the Department of Mental Hygiene of the State of New York¹ helps to illustrate the differences. In the 20 or so hospitals of the state there are about 95,000 patients with only 1,500 nurses (or 1 per 60 patients) and 12,000 "attendants." The medical staffing is relatively more satisfactory—about one doctor for every 190 patients. British mental hospitals are worried about the lack of trained nurses, but the American plight is evidently much worse. Perhaps linked with this is the apparent necessity for repressive measures which are vanishing from British mental hospitals. The number of voluntary patients is falling annually and was roughly only 6% in the year under review. The photographs of new buildings show great austere blocks with large small-paned windows. All this contrasts with the British aim to have mostly voluntary patients and open wards, to abolish the padded cell and all other methods of restraint, and to have modest-sized hospitals split into separate villas, so that the patients live in small groups like very large families or the "houses" of a public school. The British mental hospital in fact owes a good deal to the British public school—and to the British Army—in the formation of its traditions. Dr. Ernest Jones once told a story of how he was rung up long ago by a medical superintendent who was looking for a new doctor for his staff: "I don't expect him to be interested in psychiatry, of course, but he must be good at cricket."

On the other hand we can have nothing but praise for the fact that nearly half the New York patients now have occupational therapy. This sixfold increase in numbers in the last seven years is partly due to the fact that all staff get two weeks' training in the teaching of "O.T." and it was not left entirely to the occupational therapists, of whom there were as many as 64. Again, an allocation by the state of almost two million dollars for psychiatric research illustrates the difference between the British and American attitudes to scientific medicine. As for the patients themselves, their illnesses seem similar, though alcoholic psychoses, as expected, bulk much larger than in Britain. But New York, too, has a great influx of elderly patients with cerebral arteriosclerosis, and also notes a great diminution in the numbers of cerebral syphilitics (G.P.I.), a decline which was noticeable in 1940 and is nothing to do, therefore, with penicillin. The sort of people who come to a mental hospital will vary according to the public's attitude to mental illness and to the reputation of the hospital, as well as to the existence of alternative asylums like the workhouse. Conditions vary greatly from country to country, and comparisons can be very instructive. But it seems likely that in spite of financial stringency and a preference for practice rather than theory the British mental health services need not fear comparison with any others in the world.

¹ Report of the Ministry of Health for the Year Ended December 31, 1955, Part 2, H.M.S.O. 9s.
² British Medical Journal, 1955, 1, 1329.

³ Moersch, F. P., and Woltman, H. W., *Proc. Mayo Clin.*, 1956, 31, 421.
⁴ Wechsler, I. S., and Brock, S., *Arch. Neurol. Psychiat.* (Chicago), 1922, 8, 538.
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¹ 66th Annual Report of the Department of Mental Hygiene, State of New York. Legislative Document (1955) No. 90, Albany.

ACUTE RESPIRATORY INFECTIONS

A SYMPOSIUM FOR GENERAL PRACTITIONERS

[FROM A SPECIAL CORRESPONDENT]

A highly topical discussion was held at the Institute of Diseases of the Chest on December 4, when an audience of general practitioners gathered to hear a symposium on acute respiratory infections. The speakers were two chest physicians, a bacteriologist, and a general practitioner.

Respiratory Tract Viruses

Dr. NEVILLE OSWALD opened with a review of our knowledge of the viruses that affect the respiratory tract. Although virology was still a very young science, it was of particular importance to the general practitioner, he said, since it had been estimated that 25% of all his work was concerned with these respiratory infections.

Studies on viruses had proceeded in four ways. Transmission to animals was one of the first techniques used. In the early 1930's the common cold was successfully transmitted to chimpanzees, and influenza to swine and ferrets. Antibody tests, using agglutination and complement-fixation procedures, had first been developed against influenza A; but now such tests were available against influenza B and C, Q fever, ornithosis, the adenoviruses, and certain non-specific disorders in which there was a marked rise of cold agglutinins in the blood and in those where a high titre developed against the streptococcus MG. Their exact value was uncertain. Probably a positive result was significant, but a negative result was much less practical help.

Techniques of microscopy were being rapidly developed, and with the electron microscope some of the intracellular activities of the viruses could now be observed. But probably the greatest advance in virology in recent years was the growth of viruses by tissue culture. From the original fertile hens' eggs viruses could now be grown on a variety of media, such as monkeys' kidneys and He La cells (live cells of a carcinoma of the cervix that were originally taken from an American negress named Helen Lane). Respiratory viruses such as the adenoviruses, Cocksackie viruses, Echo viruses, and poliomyelitis viruses could all be grown in this way. The present situation was in a state of flux; new viruses were being isolated, but their identification and significance were taking time to work out. An important practical matter was the possibility of developing vaccines against these viruses, but here again there must, of necessity, be some delay.

Patterns of Lung Involvement

Dr. J. G. SCADDING, dean of the Institute, described the various patterns of lung involvement.

Pneumonias in the course of acute respiratory infections could be caused in a number of different ways. Certain organisms had a special predilection for the lungs—the pneumotropic organisms—and these could be bacterial or viral. Thus acute specific pneumonias could be caused by pneumococci, haemolytic streptococci, *Staphylococcus aureus*, and Friedländer's bacillus; in addition, viruses of the ornithosis group could also cause such infections.

Viruses might also pave the way for secondary bacterial invasion, and in as many as 50% of pneumococcal pneumonias there was a definite preceding history of an acute upper-respiratory infection. Influenza was another example of the association of virus and bacteria. There were two danger periods in influenza so far as lung involvement was concerned—one in the early stages when secondary staphylococcal infection was possible, resulting in a very severe illness; the other danger period was at the fourth or fifth day, when a somewhat less severe pneumonia might follow secondary infection by a variety of bacteria. Measles was another example where a virus infection was associated with secondary bacterial involvement of the lungs. Here the haemolytic streptococcus was the usual invader.

Pure virus pneumonias were rare but possible, as in psittacosis. The position of the unidentified pneumotropic viruses was at present a little confusing.

In addition to these specific pneumonias there was a very large group of lung infections which resulted from a breakdown in the natural defences of the respiratory tract. These infections followed aspiration of infected material into the broncho-pulmonary segments, which might set up diffuse, local, or suppurative reactions. It was this type of infection that probably accounted for many of the acute exacerbations in chronic bronchitis and in children.

The patterns of lung involvement caused in these various ways were confusing in their variety, and this confusion was not diminished by the fact that even with every assistance from the laboratory it was only possible to obtain objective evidence of a specific cause or causes in less than half the cases. Nevertheless, in spite of this confusion, clinical considerations often allowed a reasonable assessment of the general group to which the case belonged, and satisfactory treatment could be based on this assessment.

Limits of Laboratory Aid

Dr. J. R. MAY, as a bacteriologist, gave his views on the help that the laboratory can give in the investigation and management of these infections. Although theoretically the scope for these investigations was extensive, there were certain practical drawbacks, he said, particularly in the delay before some of the results became available and also in the collection of specimens such as blood and sputum.

Bacteriologically, sputum culture and throat swabs were the most useful methods of investigation. A pure or almost pure culture of a pathogenic bacterium from the sputum was highly significant. The most common pathogenic bacteria associated with acute respiratory infections were in pneumonias—pneumococci, *Staphylococcus aureus*, Group A haemolytic streptococci, *Haemophilus influenzae*, and Friedländer's bacillus; in acute and chronic bronchitis the most common organisms were *Haemophilus influenzae* and pneumococci.

Viral studies could still be carried out in only a few centres, and their practical value was considerably limited by the time needed for a positive result. The isolation of viruses could be carried out from throat washings, sputum, or blood in the first two or three days of the infection, the material being sent to the special centre in a sterile container. Of more practical use were serological procedures which estimated the levels of antibodies as a result of the infection, but even the value of these was limited by the fact that it was 10–14 days from the start of the illness before results became available. Two specimens of serum were required, one at the onset of the illness and the other after 10–14 days, a positive diagnosis being made on the demonstration of a fourfold rise in antibody titre. These tests might be used when influenza, Q fever, psittacosis, or other virus infections were suspected.

Problems in Practice

Dr. JOHN FRY spoke as a general practitioner on the practical problems raised by acute respiratory infections. The general practitioner, he said, was really a specialist in the various common respiratory infections, for they were by far and away the most common group of illnesses in our community, accounting for one-third to one-quarter of all his work. In an average-sized practice (2,500) the family doctor must see between 50 and 60 new cases of acute pneumonia and acute bronchitis every year. But in spite of this prevalence many problems still remained. Nomenclature, for one, was still most confusing and vague, probably because it was not based on any sound knowledge of exact aetiology and pathology. Terms such as "bronchitis" and "pneumonia" meant different conditions to different doctors.

Diagnosis in general practice was bound to be based essentially on clinical methods. But, if high standards were to be maintained and advances made, the practitioner must

have unrestricted access to pathological and radiological facilities. Only in this way could he correlate his clinical findings with the more accurate radiological appearances.

In arriving at a diagnosis it was necessary to consider the past history of the patient, particularly the history of chest illness; the general condition and degree of illness; and the local physical signs. Physical signs fell into a number of set patterns, the significance of which was uncertain. There might be a diffuse and bilateral involvement of the broncho-pulmonary tree, with scattered rales and rhonchi (the acute wheezy chest), or the signs might be unilateral and local, in which case a localized area of moist sounds at one or other base was the most usual finding. The classical lobar pneumonia with clinical consolidation—i.e., dullness and bronchial breathing—was an extreme rarity in practice to-day. The most useful investigations were a radiograph of the chest, which could be carried out at home as a domiciliary visit by a consultant, and bacteriological examination of the sputum. Virus investigations were of academic interest, but as yet had little practical value.

With regard to treatment certain principles should be remembered. The vast majority of these cases could be treated adequately at home (over 90%). The patient must always be considered as a whole. No set and rigid routines should be adhered to; instead an elastic outlook should be maintained. "Courses" of antibiotics were unnecessary, for instance; strict bed rest for more than a few days might be harmful in the elderly; and the value of cough medicines was, to say the least, uncertain.

Since the exact aetiology was uncertain, treatment had to be empirical, and thus the rational use of antibiotics was of prime importance. Not all acute respiratory infections required these potent drugs; the proportions requiring them varied with the different clinical groups. Penicillin was still the most useful antibiotic, and should be administered by intramuscular injection when indicated. Long courses were usually unnecessary, satisfactory results being obtained with 3 or 4 daily injections of the longer-acting preparations. Streptomycin and the tetracyclines were often more useful in the management of acute exacerbations in chronic bronchitis.

Discussion

In the subsequent discussion speakers voiced their feeling that oral penicillin was too uncertain in the treatment of the more severe infections, and were doubtful if it was really indicated in the less serious infections. Sulphonamides were noted as still valuable in the treatment of pneumococcal pneumonias—the most common type of bacterial pneumonia. It was agreed that long-term treatment of chronic bronchitis with tetracyclines helped about 20% of chronic bronchitis—namely, those with persistent purulent sputum; but there was a real danger of promoting the development of resistant strains of *Staphylococcus aureus*, and these might be spread into the community at large.

FACIAL INJURIES

Speaking at a clinical meeting at the Institute of Laryngology and Otology on December 7, Mr. CHARLES L. HEANLEY, plastic surgeon to the London Hospital, discussed some of the principles underlying the repair of facial injuries such as lacerations and broken noses. After disclaiming any ability on the part of plastic surgeons to make invisible scars—"No incision can be made without leaving a scar"—he went on to outline some of the ways of reducing them to a minimum.

Cuts on the Face

By attending to certain principles, scars could be made less noticeable, said Mr. Heanley. Incisions should not be made at points such as the prominence of the cheek, where it was known the scar would be bad. The direction of the incision was important. If a perfect circle was drawn

on the skin and the enclosed piece of skin excised the shape of both the raw area and the piece of skin removed would become oval. This was because tension in the skin varied with the direction. Incisions must be made in lines parallel to the direction of greatest tension, along the so-called Lange's lines. These lay chiefly in the flexion and skin creases. On the forehead they were horizontal, except low down in the midline; where they were vertical. On the nose and eyelids they were transverse; but an incision on the nose must never be extended on to the face, or it would web. Around the mouth they were circumoral and in the lines of the nasolabial folds.

Absence of tension was an essential to minimum scarring. If necessary the skin must be undercut widely, at even depth. Sutures should be inserted, the point of the needle travelling away from the cut edge as it entered the undercut, so that when tied they everted the skin. They should be tied loosely, as the tissues would swell. Their object was simply to hold the tissues together in apposition while they healed. Tight stitches would impair the blood supply, at the best leaving stitch marks and at the worst a line of sloughs. Multiple fine stitches meant that each had less pull on it and so caused less necrosis. Finally, stitches should be removed early. The essentials for success were freedom from infection, an ample blood supply, and close coaptation of epithelium. Unfortunately, in excising scars on the face (or pigmented tumours, for that matter) the direction of the excision was predetermined, and this prejudiced the result from the start.

The typical case that came to the surgeon—the person who had fallen off a bicycle on to a tarry road—had a lacerated face and a broken nose. If the cuts were contaminated with tar or bitumen it was disastrous to let them heal without proper cleaning. The girl with a centimetre-square cut on her upper lip which had been allowed to heal with tar in it was badly marked for life. An initial toilet would reduce the deformity more than any subsequent surgery. Wounds impregnated with tar should first be washed with soap and water to remove the gross dirt and grit, and then anaesthetized by rubbing in a topical application of lignocaine and cleaned with a tar solvent, such as oil of eucalyptus, turpentine, or even petrol. If no surface anaesthetic was to hand, a general anaesthetic was justified.

Broken Noses

If the case was seen early while swelling was still minimal ice packs should at once be applied to the damaged nose. As soon as possible afterwards, with a general anaesthetic and an intratracheal tube and pack, the septum and nasal bones should be deliberately restored to position. With comminuted fractures it might be necessary to pack the nose with a B.I.P.P.-impregnated gauze pack, which could be left in place for a week or more. In spite of what was usually taught, this was quite safe provided the risks were remembered. The ideal, then, was to click back into place displaced cartilage and bone before swelling prevented it, and apply a plaster support.

Where the case was seen early but after the initial swelling had occurred the first step was to do all that was possible to reduce the swelling by applying first cold and then heat. Oral cortisone for four days, 25 mg. twice a day, also helped. As soon as the swelling was down reduction of the fracture should be undertaken deliberately, under full anaesthesia as in the early case. The quick snatch without adequate anaesthesia was to be condemned. If lacerations were also present the time to treat them was the day they were inflicted.

In cases seen late, with a malunited fracture, the treatment of nasal obstruction was a necessity and of the deformity desirable. But which was better—to do a sub-mucous resection first, or to correct the airway and the shape of the nose in a single operation? Each case must be treated on its own merits. If the septum was not distorted and had simply been displaced with the nasal bones, it could be straightened at a single operation.

The septum should be detached (cartilage and vomer) from the maxilla below and from the nasal bones above, and, after fracturing posteriorly, placed in position. At the same time the external deformity could be corrected. This was done by mobilizing the frontal nasal processes and the attached nasal bones with saw cuts, as described by Joseph, and, if necessary, removing some bone on the side from which the nose had deviated. In cases where the septum was distorted, being curled on itself, often with spurs, two stages were necessary. A submucous resection, which usually restored the airway, should be done as the first stage, the shape being attended to later. In some cases where the nasal bones had been displaced into the airway, nasal refracture would be required at a later stage to restore the airway.

For saddle noses Mr. Heanley had been using for the last six years a polythene inlay, cut and shaped from a solid block, which was inserted through a vertical columella incision. Children with saddle-nose defects due to trauma or sepsis must be treated in infancy. Unless there was stuffing in the nose to fill it out, it would not grow. In the traumatic type, with nasal obstruction due to septal impaction, the septum must be thinned first. The unfortunate child with a saddle nose who was told to come back for treatment when it was 18 years old presented an impossible problem, as there was too small an area of skin over the nose. Progressively larger inlays were required as the child grew.

Correspondence

Because of heavy pressure on our space, correspondents are asked to keep their letters short.

Cardiac Arrest

SIR,—In your annotation (*Journal*, November 17, p. 1165) you outlined the various methods of resuscitation that are available in the event of sudden "cardiac arrest." There is one particular aspect of this problem that I should like to emphasize—namely, the difficulty in differentiating a heart that is beating with an unrecordable blood pressure from one which is either fibrillating or at a standstill. In all probability most cases pass through a phase of tachycardia, low cardiac output, gross hypotension, and coronary insufficiency before finally the ventricular muscle fibrillates from anoxaemia. The number of cases of sudden onset of cardiac standstill due to vagal over-activity is probably extremely small.

Anaesthetic and surgical procedures still remain one of the commonest causes of "cardiac arrest" in a relatively healthy heart, and, equally important—if energetic steps are taken—they carry the best ultimate prognosis. In a recent report¹ based on anaesthetic mortality the Association of Anaesthetists found that nearly one-fifth of all such deaths could be attributed to the injection of thiopentone sodium. In such a case, soon after the injection the patient is found to be apnoeic, pulseless, without audible heart-sounds, and with an ashen-grey appearance of the skin. The accepted treatment for such a case would be inflation of the lungs with oxygen and cardiac massage. I would like to suggest one modification.

About five years ago noradrenaline was first used in this country as a vasopressor agent and found to be immensely powerful, without the same risks as adrenaline. Its great disadvantage in an emergency was that it had to be given by intravenous infusion, and this was far too time-consuming. However, with the co-operation of the makers, it was possible to provide a small ampoule containing 200 µg. in 2 ml. which was suitable for direct intravenous or intracardiac injection in an emergency. During the past five years these ampoules have been available in the theatres at St. Thomas's Hospital in case of a sudden "cardiac

arrest." There have been three cases in which, following the induction of anaesthesia, there was no clinical evidence of heartbeat, either by palpation or auscultation. Immediate steps were taken to begin cardiac massage, and at the same time 200 µg. of special noradrenaline solution was drawn up into a 2 ml. syringe; $\frac{1}{4}$ – $\frac{1}{2}$ ml. (50–75 µg.) was then injected into a brachial or jugular vein and the contents massaged towards the heart. In each instance a firm pulse-beat was palpable within sixty seconds of the injection, though in one case the surgeon had made the initial incision for cardiac massage, which fortunately proved unnecessary.

The decision to request cardiac massage is always a difficult one, and some anaesthetists may be tempted to delay a little in the hope that the clinical condition will improve. The injection of such a dose of noradrenaline gives an immediate indication of whether the heart is beating or in a state of fibrillation or standstill. I believe the risk of converting a normally beating heart into a fibrillating one is small and insignificant, in comparison with the danger of delayed treatment for the patient. The increased peripheral resistance and consequent rise in the coronary blood-flow, together with the bradycardia, produced by the noradrenaline probably more than compensates for its direct stimulating action on the anoxic myocardium.

The injection of nikethamide or desoxyephedrine in such cases is usually found to be without effect. The former drug has enjoyed many years of grace as the time-honoured remedy in cases of acute surgical emergencies. It is to be found in nearly every emergency tray in operating theatres throughout the country, yet the use of an analeptic to reverse a state of circulatory arrest might be described as a "long shot." Very often it is given with one eye focused on the impending report to the coroner: there are many coroners who still appear to believe this is an essential part of the pre-mortem therapy. Desoxyephedrine has the disadvantage that it sometimes fails to produce a satisfactory pressor response and may on occasion cause a severe increase in heart rate, which suggests that the direct action on the myocardium is greater than that on the peripheral vessels. In conclusion, I would like to recommend that the intravenous injection of $\frac{1}{4}$ – $\frac{1}{2}$ ml. (50–75 µg.) special noradrenaline solution should be included as one of the essential measures in all cases of "cardiac arrest."—I am, etc.,

London, S.E.1.

H. C. CHURCHILL-DAVIDSON.

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Pavlov's Works

SIR,—I was most interested in Dr. Macdonald Critchley's review of Pavlov's works (*Journal*, December 8, p. 1352), and in his account of the development by Russians of a philosophy in relation to Pavlovian teaching. It seems important not to be prejudiced against Pavlov's contributions because we may object to their political exploitation. Thus it may be suggested that, if we have to choose between brain physiology and psychology as a basis for national education, the former is likely to be much the more valuable. Thus the psychologist tends to advocate a somewhat negative attitude on the basis that, if "trauma" is avoided, Nature will do the rest and all will be well. The brain physiologist, on the other hand, says that here is a wonderful machine, the brain, and if you want to make of it something worth while you must adopt a strongly positive attitude towards the development of desirable behaviour patterns. It is easy to see how a philosophy may be built round an energetic approach of this kind, whereas in this regard psychology has little to offer. Indeed, the effect of psychology on education may at times be harmful, as it belittles the value of traditional disciplines which play an important part in character formation.

Pavlov's writings are now almost as much out-of-date as Freud's, but his positive approach to the subject of living seems to be vastly preferable to anything psychology can

offer, if we have to choose between the two. On the other hand, the ideas of brain physiology are greatly assisted by the psychologist's studies concerning the early development in infants of behaviour patterns which may persist throughout life.—I am, etc.,

Oxford.

W. RITCHIE RUSSELL.

Shadow in the Lung

SIR,—Reading the letter of Mr. E. K. Gardner on shadow in the lung (*Journal*, October 27, p. 998), I am reminded of the clinical trap in which we have been victims. In our unit, on the day following admission, patients are screened in the morning before the ward round starts. On three occasions I have seen a shadow in the lateral part of either lung field (which occupied the region to a variable extent) having a clear medial border parallel to the chest wall; the shadow having generalized haziness gave an impression of ? pleural thickening ? pleural effusion. The clinical history, in such patients was fever of sudden onset, occasional cough, pain in chest, and inability to breathe deeply, resembling very much that of acute pleurisy. Because the patients could not breathe deeply due to pain, the air entry on the same side was diminished. On careful inspection of the chest wall, it was found that there was a smooth, warm, tender swelling on the chest wall extending from axillary region to the lower part of the chest, and from the scapular region behind to the mammary region in front. The margins were diffuse and the bulge not very apparent, especially if the patient was well nourished. (In our first patient we had even done pleural tapping, as on the first day the bulge was not very evident and apparent. Needless to say, no fluid was obtained from the pleura, and fortunately the patient did not develop any empyema.) It was the abscess of the chest wall which, on fluoroscopy done before thorough clinical examination, gave the picture of pleurisy.

It will be interesting to note if other clinicians have had similar experience in the past.—I am, etc.,

Bombay.

D. D. VORA.

Acute Respiratory Obstruction

SIR,—About 30 years ago there was a brief enthusiasm for subcutaneous oxygen, and in both medical treatment and resuscitation successful cases were reported. If it is still effective, might not this method be of some help in such cases as that reported by Dr. A. E. W. Gregson and Mr. A. J. Gunning (*Journal*, November 17, p. 1150)?—I am, etc.,

London, N.W.8.

R. J. CLAUSEN.

Glycyrrhetic Acid

SIR,—My letter (*Journal*, November 10, p. 1113) was intended to encourage the publication of controlled trials, large or small, with glycyrrhetic acid. Then, by pooling of results, a firmer opinion could be obtained of the value of this drug.

The present position can be summarized as follows: Glycyrrhetic acid was found to be no better than the base alone by Warin and Evans¹ (19 patients); Bettley² (22 patients); Donaldson and Duthie³ (30 patients); and McCallum⁴ (9 patients). Quentin Evans⁵ got slightly better results with glycyrrhetic acid than with hydrocortisone (13 patients). I found glycyrrhetic acid ineffective when compared with hydrocortisone (15 patients). Warin and Evans also found it less effective (8 patients). Dr. George Wells obtained the same answer in a different way. At the Anglo-French reunion, held after the annual meeting of the British Association of Dermatology last July, he described experiments (to be published shortly) in which he traumatized the skin by applying Scotch tape and stripping it off. The application of hydrocortisone ointment had the effect of markedly suppressing the resultant inflammatory reaction. The application of glycyrrhetic acid had no such action. Drs. Quentin Evans and Colin-Jones⁶ criticize my conclusions because they are based on observations of only

15 patients; but it is not always necessary to observe a large number of patients before deciding on the worth of a remedy. A short controlled pilot trial may indicate a clear yes or no. The same question was asked 15 times. Is glycyrrhetic acid comparable to hydrocortisone in efficiency in lessening this patient's inflammatory skin condition? The answer was 13 to 3 in favour of hydrocortisone for patients improved; and the 3 patients who improved with glycyrrhetic acid had to be balanced against 4 who worsened, giving a net deficit. I interpreted this as a firm no to the pilot trial, not warranting a more extensive trial. A less conclusive result would, of course, have necessitated the observation of more patients in proportion to the conclusiveness of the results.

Drs. Quentin Evans and Colin-Jones also observe that better results were obtained with hydrocortisone in this trial than in the previous more extensive trial of hydrocortisone in which I participated.⁷ That trial was designed to find if hydrocortisone was effective, and, if so, in what conditions. It was pointed out at that time that the trial was of limited value in Besnier's prurigo (22 cases), because the hydrocortisone had to be used sparingly and was only applied to the worst areas. The same remarks apply to infantile eczema (12 cases), concerning which Dr. Colin-Jones queries our results. In the present trial the patients had lesions of limited extent which might usually be expected to respond to hydrocortisone (and to glycyrrhetic acid if equally effective). Dr. Colin-Jones may be correct in his belief that glycyrrhetic acid is "of great value for the subacute and chronic conditions, whereas hydrocortisone excels in the acute case where glycyrrhetic acid is not so effective," but he has not yet demonstrated this in a controlled trial.

The first use of glycyrrhetic acid as a topical anti-inflammatory agent was based on the report of Molhuysen *et al.*⁸ that liquorice had a deoxycortone-like action, but I do not know of any reports suggesting that deoxycortone has an anti-inflammatory action when applied to the skin. It certainly does not follow because liquorice has a deoxycortone-like action that it also has a cortisone-like action or a hydrocortisone-like one. The structural formulae of glycyrrhetic acid and hydrocortisone show considerable differences.—I am, etc.,

London, W.1.

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BRIAN RUSSELL.

SIR,—In response to Dr. Brian Russell's request (*Journal*, November 10, p. 1113) for publication of the experiences of other clinicians using glycyrrhetic acid as a topical agent in the treatment of irritating inflammatory conditions, I am sending the results of a number of cases included in a controlled trial. Each patient served as his own control, and 2% glycyrrhetic acid ("genodex"), the base alone, and 1% hydrocortisone ointment in the same base were used in differing sequences. All the patients were suffering from one or other of the conditions for which Dr. Russell and his colleagues¹ found hydrocortisone to be beneficial, and none had been previously treated with hydrocortisone or glycyrrhetic acid ointments. Results were assessed both subjectively, by means of "record of itching" cards similar to those used by Dr. Russell, and objectively. The results obtained were:

	Greatly Improved	Some Improvement	No Change	Worse
Hydrocortisone	12	6	10	2
Glycyrrhetic acid	1	5	21	4
Base	2	5	19	

Whether this state is curarization in the accepted sense is questionable, in view of the circulatory deterioration and of the unconsciousness that may be found to persist despite elimination of all narcotic agents and correct pulmonary ventilation with oxygen. Again, it may be found that the inadequate improvement produced by initial doses of neo-

stigmine is transient, and subsequent doses may reverse this improvement—a neostigmine-potentiated depression. Experimental work on the blood-brain barrier permeability carried out in the department of anaesthesia, Liverpool University,¹ indicated that minor degrees of potassium depletion might render this barrier incompetent, according to the methods used by Hurst and Davies² in rats. This may indicate a mechanism whereby relaxants can produce persistent apnoeic states by an abnormal central action.

As noted by several of your correspondents on this subject, the use of suxamethonium preceding an anti-depolarizing relaxant was a common feature of all Dr. Hunter's cases. This would seem only another way of emphasizing the important role played by potassium depletion in abnormal responses to curare: the depolarizing relaxants are known to produce a substantial loss of muscle potassium.^{3,4} To cause such a muscle loss in an already depleted patient may well carry him past a dangerous borderline. Thus it would appear potentially hazardous to give curare or gallamine after suxamethonium. The reverse sequence, however, may not be so dangerous, as even subparalytic doses of curare have been found, in dogs, to limit the muscle potassium loss produced by a subsequent dose of suxamethonium.⁵

Although curare may depress blood cholinesterase activity,^{6,7} it is difficult to see that this could be sufficient to reactivate and prolong the action of a small dose of suxamethonium already largely degraded: in all Dr. Hunter's cases breathing had returned after the suxamethonium before the anti-depolarizing relaxant was used. Patients with pre-existing low serum pseudo-cholinesterase levels might be anticipated to show a curare resistance rather than a prolonged paralysis.⁸ Thus does it appear that potassium depletion is the factor to be incriminated in perhaps all these cases. In the diagnosis of such a state the history may be of more value than the blood potassium level. Potassium losses may be so great that treatment will require doses of potassium ordinarily regarded as heroic.

In a case recently seen a man of 51 years had prolonged apnoea after the use of 35 mg. D-tubocurarine and 40 mg. of gallamine with nitrous oxide. A test dose while he was conscious before induction had revealed no relaxant hypersensitivity. He had gangrene of the appendix and caecum of long standing with ileus. Neostigmine had an initial reversal effect, but subsequent doses definitely were depressing, both of his respiration and of his degree of unconsciousness (10 mg. of neostigmine over 1½ hours). The apnoea and the unconsciousness responded dramatically to the rapid intravenous infusion of 250 ml. of normal saline, to which had been added 20 ml. of 20% potassium chloride and 30 ml. of 10% calcium gluconate. Half this volume was given in 15 minutes, with full return of muscle power, breathing, and awakening. The absence of dangerous cardiac depression by potassium in this case may have depended upon the inclusion of a calcium salt, since calcium is known to protect against many of the toxic effects of potassium.^{9,10}—I am, etc.,

Bellville, S. Africa.

P. A. FOSTER.

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Hydrocortisone for Buccal Ulcers

SIR.—The excellent article on ulcerative colitis treated with local hydrocortisone by Dr. S. C. Truelove (*Journal*, December 1, p. 1267) prompts me to record experiences in the past year with similar treatment for the so-called recurrent aphthous ulcers of the buccal-lingual mucosa.

The analogy and obscure aetiology in both conditions cannot be disregarded, as both offer a hypothesis of a psychosomatic disorder, often associated with a history of stress and strain, with possible coexistent corticosteroid

imbalance related to higher centre influences. As in ulcerative colitis, oral cortisone does not benefit these cases of buccal ulcers. However, 2½% hydrocortisone incorporated in an ointment with a broad spectrum antibiotic is effective when applied to the ulcers by direct innunction. Local application of antibiotic alone proved to be ineffectual, but its inclusion was thought necessary as hydrocortisone is a spreading factor and could not be introduced lightly into a cavity with a mixed bacterial flora. The following is an example of one case in a limited series.

A woman, aged 40, gave a history of an anxiety state dating from childhood and recurrent buccal ulcers for the past five years, becoming more frequent and severe in the last year. There was no history of vulval lesions. Her previous treatments were varied, but none limited the recurrence and severity of the condition. Direct innunction with ointment on the ulcerated mucosa was continued six times daily for seven days. After each application the patient was told to hold the saliva in the mouth for as long as possible before swallowing to maintain a reasonable concentration of the hydrocortisone on the ulcerated mucosa for short periods. On the third day the pain and discomfort had subsided, and at the end of seven days the ulcers were in the process of healing. Within the ten days they were hardly visible. One month after initial treatment there was a mild relapse, but this time the ulceration consisted of pin-point lesions and were less painful. A further fourteen days of similar treatment was instituted, and to date there has been no further relapse.

It is not claimed that local hydrocortisone innunction is a cure for these troublesome buccal ulcers, but an important advance in the therapy of immediate alleviation of this painful condition.—I am, etc.,

Liverpool, 16.

S. HILLMAN.

Pyrimethamine Poisoning

SIR.—I have to report the death of a child of 1 year from acute pyrimethamine ("daraprim") poisoning. The child is believed to have swallowed between 25–30 of the tablets from a bottle, and was admitted to hospital about an hour later in a state of generalized convulsions resembling status epilepticus—the fits occurring about every two minutes. Treatment, including, of course, stomach wash-out, was of no avail, and the child died apparently from respiratory failure about seven hours after taking the tablets.

The makers of daraprim tell me that for home use they now supply packets with each tablet separately sealed. It does seem to be vitally important to use this means of packing, in any house where there are young children, for this tasteless but potentially dangerous drug.—I am, etc.,

Kampala, Uganda.

IVOR CHANCE.

Malaria in African Infants

SIR.—The authors of a recent paper on effects of heavy and repeated malarial infections on Gambian infants and children (Drs. I. A. Macgregor, H. M. Gillies, J. H. Walters, A. H. Davies, and F. A. Pearson, *Journal*, September 22, p. 686) deserve sincere congratulations for their comprehensive study of the host-parasite relationship in a holoendemic area of West Africa. Though many of their findings are new, some results reported in the paper are confirmatory of earlier work carried out independently in East Africa and West Africa.

It is perhaps unfortunate that little of the previous work on the African continent was either discussed or quoted by the authors of this paper. It should be pointed out, in justice, that in Kenya Garnham¹ recorded that African infants in holoendemic areas react comparatively mildly to malaria, and, though a number of these children die, the majority recover rapidly and develop a considerable degree of tolerance. General features of malaria immunity in African children, based largely on observations made in Tanganyika, were described by Wilson, Garnham, and Swellengrebel,² who concluded that by the age of 2–3 years the majority of the children jump the parasitic hurdle and establish some *modus vivendi* with *P. falciparum*. In Uganda, Welbourn³ produced a series of weight curves of

infants in relation to malaria infection which are very similar to those recorded by the authors of the report from the Gambia.

In Nigeria, Bruce-Chwatt⁴ investigated for 1½ years a sample of African infants and produced a series of individual weight curves in relation to the first infection with malaria. These curves indicated that, while 65% of the infants showed a more or less marked effect of the infection on their growth and development, in nearly 20% the first encounter with the malaria parasite showed little visible impairment of general health and provided indirect evidence of inherited, transient immunity to malaria.

The results of all these studies have preceded some of the Gambian authors' recent conclusions and at least that about malaria in children from holoendemic areas exerting its main effect in the first two years of life.—I am, etc.,

L. J. BRUCE-CHWATT.

Yaba-Lagos, Nigeria.

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Diesel Fumes

SIR.—Further to the correspondence by Mr. B. T. Commins, Mr. R. E. Waller, and Dr. P. J. Lawther (*Journal*, November 24, p. 1235), I should like to give the reasons why the investigations reported in "Smoke in a London Diesel Bus Garage" (*Journal*, September 29, p. 753) seem to me to be invalid. I intended to imply (*Journal*, November 3, p. 1058) that the conduct of these experiments, though excellent, gave no useful information on the general atmospheric pollution by these fumes for the following reasons: (1) Perfectly adjusted diesel engines (and 10% derated at that) do not emit any benzpyrene. (2) They do not emit any appreciable amount of soot. (3) Under garage movements they would emit CO, CO₂, some nitrous fumes, aldehydes, and probably a little unburnt fuel.

I do not therefore consider it likely that men working in such places are exposed to any undue risk. They are certainly not exposed to high concentrations of the more dangerous exhaust products. Production of these in higher concentrations is dependent upon the degree of maladjustment, power produced, and phase of function. I submit that intake on the road, close behind maladjusted vehicles so operating, may produce very much higher concentrations of soot, aldehydes, nitrous fumes, benzpyrene, and unburnt oil within following vehicles. That this is not an occasional occurrence any main-road motorist well knows.

Mr. Commins is to be congratulated on the most interesting results of his City tests, and these are revealing. One would like to know at what level they were sampled. The CO concentration is a highly variable factor, and one would like to know more about soot content, unburnt fuel, and aldehydes present. I feel confident that the ultimate verdict of research into this subject will substantiate the fact that oil soot plus its concomitant contaminants is an extremely dangerous pathogenic complex.—I am, etc.,

HANDLEY HOWELL.

Bristol, 8.

Pregnancy Sickness

SIR.—Having recently had a first baby and suffered greatly from pregnancy sickness, I wonder if my observations might be of use in suggesting a new field of inquiry to the obstetricians? Till this experience, I regarded these cases, as most doctors seem to, as almost entirely a psychological problem, but my own case has convinced me that it is a question of hormonal imbalance. I had exactly the same sensations of nausea suddenly one morning in the puerperium as I had had early in the pregnancy, when the vomiting was at its worst. To my surprise, I actually did vomit that morning when I got up to wash. On trying to work out the cause, I found the only thing to blame was that I had been given a large dose of oestrogen (stilboestrol, I believe) late

the previous evening and had no food until 14 hours later. No other drugs were being taken. Obviously there is a relationship between the length of time without food and the sudden change of posture such as getting up involves, and this I well knew from attempts to eliminate all possible causes in the pregnancy, but I feel that my experience was conclusive proof that the trigger factor, in some cases at least, is hormonal, not mental.—I am, etc.,

London, N.11.

DOREEN S. BALL.

Apartheid in Blood Transfusion

SIR.—With reference to the correspondence which has recently been appearing in the *Journal* about apartheid in blood transfusion, it may interest your readers to be informed that only a few years ago, after having spent much time in persuading a Kikuyu woman to have a blood transfusion prior to undergoing operation of hysterectomy, I arranged for a trained Jaluo hospital assistant to give a pint of his blood. When he arrived for bleeding he saw the patient and exclaimed, "What, give good Jaluo blood to a Kikuyu woman; not me," and he turned round and walked away and we could not persuade him to change his ideas.

I have found that Hindus will not give blood for Mohammedans nor receive blood from them, and vice versa. I know of Europeans who are horrified at even the idea of being given African blood. During the recent second world war I heard of two Nazi soldiers who refused blood transfusions because they might be given Jewish blood.—I am, etc.,

Nairobi, Kenya.

P. G. PRESTON.

Sampling from the Electoral Roll

SIR.—I am pleased to see that the bias in Mr. P. D. Oldham's sampling method (*Journal*, November 24, p. 1241) has not affected the conclusions reached in his inquiry (*Journal*, October 20, p. 904). However, there are two points in his letter which I must correct, since they might encourage others to use this biased method in more dangerous circumstances. Mr. Oldham suggests that, if the correct method of sampling had been used, twice as many houses would have to be visited to obtain a sample of the same size. This is quite incorrect. The number of houses to be visited will be about the same: it might even be less. And to draw the sample of addresses correctly is so easy. If, instead of visiting the houses of all persons selected at random from the Electoral Roll, he had visited only those where the person selected was the first person listed at that address, he would have got an unbiased sample of houses. (In this way each house has an equal chance of being selected instead of a variable chance.) Thus there is no justification whatever for using the biased method.

My second point concerns "diversification." A sample obtained by taking all persons of a given age group from a correctly chosen sample of houses may be less diversified than a corresponding sample of these individuals taken purely at random, but it is not biased. All that it means is that the tests of significance require modification and that a rather larger sample may be required to do the work of a corresponding simple random sample. The bias in Mr. Oldham's sample has nothing to do with diversification, which is a quite separate and, in his case, a negligible problem. The bias arose because the houses were incorrectly selected.—I am, etc.,

London, W.C.1.

P. G. GRAY.

Enzyme Test for Glycosuria

SIR.—As a diabetic the thing that impresses me most is the speed and simplicity of the test, particularly for the male patient. Although the "clinitest" technique is an improvement on methods requiring some external form of heat, it still necessitates collecting a specimen in a suitable container, measuring out the correct number of drops of urine and water, unscrewing and securely screwing up again the bottle of reagent tablets, and finally, after waiting for

the reaction to take place, rinsing out the test-tube and original container. With the enzyme test I merely touch the flowing stream of urine with the test paper—the reaction occurs at body temperature, surely the best temperature for an enzyme reaction to take place—and the result is generally known for all practical purposes before micturition has been completed. Furthermore, it can be carried out in a lavatory isolated from any wash-basin or similar water supply. It seems a pity that it is not yet available on an E.C.10 form.—I am, etc.,

T. H. GILLISON.

Ilkeston.

Alternative Approach to the Prostate

SIR,—It is amusing to see a coming generation making an immediate muddle of nomenclature over the work left to those of my age by our teachers. Professor Wells writes a book about the Hey operation and it is promptly called the Wells operation. Moreover, the operation which Mr. G. T. Watts describes (*Journal*, December 1, p. 1283) is so little different from Ogier Ward's capsular prostatectomy that it could reasonably bear the same name. A surgical wit once said that the only reason why such or such an operation was called the Smith procedure was because it had been introduced by Jones. But in these three recent prostatectomies the error can still be rectified—Millin, Ward, and Hey, I think.—I am, etc.,

Manchester, 3

OLIVER JELLY.

Itchy Measles

SIR,—With reference to Dr. Eric J. Trimmer's letter (*Journal*, December 1, p. 1299) regarding intense irritation in measles, I have always found that a fairly high proportion of the patients complain of this symptom. I wonder if he found it in children with hot, dry skins, and not nearly so often, if at all, in those with moist skins.—I am, etc.,

Wellingborough.

JOHN T. CORBETT.

Twopenny-halfpenny Advertising

SIR,—As an emigrant pathologist I have been reading with weekly sympathy the letters to your *Supplement* about conditions in the N.H.S. They arouse a sincere anxiety for those of my profession who chose to stay in the land of their birth because their attachments are so strong.

Nevertheless, the querulous complaints of certain of your correspondents about advertising matter gave rise to concern about an acquired atrophy of both their senses of humour and of proportion, a very serious disease of the times, which is considered to be incurable. I may say that in this country we receive most interesting coloured postcards and foreign stamps in a series from a single firm, and I enjoy them immensely. The letter from Dr. Owen McDonagh (*Journal*, November 17, p. 1176) restores the full standing of the British gift for laughing at themselves. I would be glad to exchange with Dr. McDonagh my scenic collection for his young ladies.—I am, etc.,

Miami, Florida, U.S.A.

MAX MILLARD.

Adrenochrome and Adrenolutine

SIR,—Dr. C. Allen in his letter (*Journal*, September 29, p. 767) refers to the hallucinogenic properties of adrenochrome and adrenolutine. Adrenochrome¹ and adrenolutine,² both oxidized derivatives of adrenaline, induce changes in volunteers which bear some resemblance to schizophrenia. Adrenoxine, a substance postulated to be present in deteriorating adrenaline solutions by Heirman,³ has not been isolated or characterized and no study of its psychological properties is possible. However, it has been postulated that it, too, will have psychotomimetic properties.^{4,5} Recently, Leach and Heath⁶ have found that adrenaline is converted in blood into a substance having a peak absorption in the DU spectrophotometer at 395, and that the degree of conversion is greater in schizophrenic blood than in non-schizophrenic blood. We have found⁷ that adrenolutine has

the same peak absorption at 395, and we suggest that there is a conversion of adrenaline to adrenolutine.

Dr. Allen's letter will again bring attention to the importance of physiological factors in psychoses. Certainly the adrenal gland is important, but, as it is not the only source of adrenaline and noradrenaline, even more important is the whole sympathetic nervous system.—I am, etc.,

Saskatoon, Canada

A. HOFFER.

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Facial Palsy

SIR,—The article by Mr. Terence Cawthorne and Dr. D. R. Haynes (*Journal*, November 24, p. 1197) contains so much valuable information about facial palsy and its prognosis that I hesitate to be critical. Nevertheless, their advocacy of surgical treatment for certain cases of Bell's palsy would be strengthened if they could produce a strictly controlled series. They recommend that surgical exposure of the facial nerve in the Fallopian canal should be considered whenever there is total paralysis with loss of electrical conductivity after one month. Since natural recovery from Bell's palsy sometimes begins to be evident only after several weeks, and since electrical activity in the degenerating nerve is often first lost only two or three weeks from the onset, the decision to operate after four weeks seems unduly precipitate.

According to their own figures, 83% of patients with loss of response to faradism show subsequent full or partial recovery of function, and 94% of patients in whom Bell's palsy is complete eventually make either a full or partial recovery. Unfortunately, the degree of recovery after operation is not given in comparable terms, but the results are classified as good in 86 cases, fair in 21 cases, and poor in 3 cases. We may thus assume that recovery was full or partial in 97% of the patients who were treated surgically after one month. Where prognosis is uniformly favourable this group may well include patients who would have recovered spontaneously. On the other hand, if exposure of the nerve leads to regeneration, it must be done early enough to be effective.

The case for surgical decompression of the facial nerve in Bell's palsy has yet to be proved, and, in order to be convincing, it must be supported by a parallel series of control cases. In this condition it is difficult to choose cases which are exactly comparable, and it is of course impossible for a patient to act as his own control. If, however, a group of patients showing complete facial palsy with electrical evidence of nerve degeneration after four weeks (or any other set time) were to be selected, and if alternate patients in this group were treated surgically and non-surgically, it would be interesting to know whether there was any significant difference in their degree of recovery one year later. Possibly Mr. Cawthorne and Dr. Haynes have already made a careful comparison of this sort.—I am, etc.,

London, W.1.

ERIC C. O. JEWESBURY.

SIR,—For the past 29 years patients with this condition have been referred in increasing numbers to our physiotherapy department at the East Suffolk and Ipswich Hospital, and rarely a week passes now without my being called on to see or review several of these cases. In the course of years, considerable experience has been acquired. I have read with interest the paper by Mr. Terence Cawthorne and Dr. D. R. Haynes (*Journal*, November 24, p. 1197), and I agree with many of their observations.

Regarding physiotherapy, these cases may well be grouped into: (1) Simple—that is, where the faradic response is normal at three weeks after the onset; (2) severe—that is, where there is a reaction of degeneration present. In simple cases

it is our practice to apply short-wave therapy daily, accompanied by massage and facial exercises, for a period of two to three weeks. A number of these patients are fully recovered and discharged within this period. On the other hand, it is recorded in the article I have referred to that 6% of cases in this group do not make a full recovery. A certain number of these patients complain of earache, and this generally subsides after a few applications of short-wave therapy. In the opinion not only of myself but of all the physiotherapists who form our team, I can say there is a general feeling that short-wave therapy has accelerated the recovery of these cases and I think has probably avoided the necessity of more severe manifestations in a certain number.

In severe cases, once a reaction of degeneration is established, short-wave therapy is continued on alternate days accompanied by labial galvanism. This may be continued for many weeks, and is usually only terminated when the mouth on the affected side has almost approached normal. I refer to this point below. It is very rare indeed for any cases, however severe, to conclude treatment without having a mouth that is symmetrical at rest.

Some degree of earache is frequently present. This usually responds well to short-wave therapy. Watering of the eye on the affected side is always present and may persist for several weeks. Suitable eye drops are given. In severe cases the position of the angle of the mouth must be carefully watched. In these cases there is always a tendency for this to contract in subsequent months or years, and in certain instances short courses of short-wave therapy combined with massage directed to stretching these muscles is of considerable benefit to these patients. When I review a severe case, before asking the patient to move his mouth I may have to refer to my notes before deciding which was the affected side.

I think it will be seen that the main difference in my views to those of your correspondents is the benefit derived from short-wave therapy. I agree that in many instances the trouble is caused by pressure arising within the Fallopian canal. Those of us who have practised and studied the effects of short-wave therapy in other regions know that, when properly applied, this measure diminishes congestion as well as effectively controlling pyogenic infection, and I am convinced that it is from these effects that the beneficial results are obtained.—I am, etc.,

Ipswich.

C. H. C. DALTON.

Pitfalls in Medicine

SIR,—May I correct the interpretation Dr. Paul Cave (*Journal*, December 1, p. 1299) has given to my remarks (*Journal*, October 27, p. 958) about the value of the barium enema? I neither stated nor implied that this examination was not of the greatest importance in suspected colonic disease—of course it is. I did, however, lay stress on the unwisdom of not carrying out a complete barium-meal examination in the belief that colonic disease is unlikely to be detected thereby. I can assure Dr. A. Robinson Thomas (p. 1298) that this fallacy is held more widely than he thinks.—I am, etc.,

London, W.1.

A. H. DOUTHWAITE.

Making Champions

SIR,—The annotation in your issue of November 24 (p. 1229) raises a topic of much current interest. Your readers may like to know that the Central Council of Physical Recreation, through its medical advisory panel, is working in close co-operation with the British Association of Medicine and Sport, with the aim, among other things, of stimulating interest in the subject of sport and medicine.

At a meeting held recently, attended by representatives of these two bodies and the physical education departments of Manchester and Leeds Universities, it was agreed that there is a lack of liaison between the medical profession, the physical education profession, and sports coaches, and

that, while physical education departments at universities would welcome research workers, few young medical men can be found who are prepared to work in this field. The meeting recommended that a step in the right direction would be the establishment of research scholarships at selected university departments of physical education. It was felt that research might profitably be directed towards: (1) vital statistics of young people—measurements, dimensions, capacity, strength, speed, endurance, etc.; (2) methods of physical education as applied to sports and athletic events; (3) fundamental physiological mechanism in relation to exercise; (4) sports injuries and their treatment.—I am, etc.,

London, W.C.1.

G. A. MCPARTLIN,
Senior Technical Adviser,
Central Council of Physical Recreation.

Toxic Effects of Meprobamate

SIR,—I wish to comment on your annotation entitled "Toxic Effects of Meprobamate" (*Journal*, November 24, p. 1227). You are incorrect in stating that meprobamate is advertised to the public in the United States. Federal law prohibits the sale of this drug without a prescription, and any displays that may have come to your attention were not advertisements but notifications of its availability for filling outstanding prescriptions written during a period of shortage.

I also wish to take exception to your statement that meprobamate has caused "widespread skin reactions." The drug has certainly caused skin rashes, but their incidence appears to be lower than that observed with other widely used drugs. The papers reporting these and noted by you have been written to make the point that a drug even as harmless as meprobamate may occasionally produce a skin rash. Some thirty-odd additional papers reporting on the effectiveness of the drug and its relative freedom from side-effects are not mentioned in your annotation.

Future research will no doubt clarify the differences between the action of sodium amylobarbitone and meprobamate. In the meanwhile, let us remember that barbiturates are the most commonly used suicidal agents both in Great Britain and the United States. Many of these suicides are unintentional, the subject taking additional drug in the confused state resulting from the previous doses. There is no evidence that meprobamate produces confusional states. In addition, all subjects who have tried to commit suicide with meprobamate have been unsuccessful. This would indicate that meprobamate is considerably less toxic than the barbiturates. A good deal of additional evidence has also already been published to show that there are other differences between barbiturates and meprobamate than cost.—I am, etc.,

New Brunswick, N.J., U.S.A.

FRANK M. BERGER,
Medical Director, Wallace Laboratories.

Diagnosis of Early Pregnancy

SIR,—The letter from Dr. T. David Lambert on diagnosis of early pregnancy (*Journal*, November 10, p. 1118) contains a statement which I find surprising: "Leaving aside those several cases seen each year in general practice where one must consider advising a therapeutic abortion, the general practitioner will at any given time in a large practice have anything up to half a dozen cases on his hands of patients who are terribly anxious to know early on whether they are pregnant." As the number of births per annum in the United Kingdom totals some 460,000, and as there are about 20,000 general practitioners, it follows that on an average each general practitioner sees some 23 pregnancies per year.

Now what real medical reasons are there for advising therapeutic abortion? De Lee and Greenhill¹ have this to say: "Therapeutic abortion is rarely indicated and medical therapy has improved so much that few affections justify its performance." They then list the possible indications: (1) Hyperemesis gravidarum: I performed therapeutic abortion for this condition once in 15 years. Probably once too often. (2) Advanced tuberculosis: Since the research of Cohen at Black Notley Sanatorium this has ceased to be

Obituary

Dame EDITH BROWN, D.B.E., M.D., M.R.C.O.G.

Dame Edith Brown, principal emeritus of the Women's Christian Medical College, Ludhiana, Punjab, died at Srinagar, Kashmir, on December 6. She was 92 years of age.

Edith Mary Brown was born on March 24, 1864. From Croydon High School she obtained a scholarship to Girton College, Cambridge, where she took second-class honours in the Natural Sciences Tripos in 1885, only a year or two after women were first admitted to the honours-degree examinations at Cambridge. After leaving Cambridge she became a teacher in the hope that she would be able to save enough money to enable her to become a medical student. Fortunately a wealthy friend, recognizing her potentialities, came to her assistance, and she entered the London School of Medicine for Women, taking the Scottish triple qualification in 1891 and the Brussels M.D. in the same year. Immediately after qualification she went to India as a medical missionary—always her ambition—under the Baptist Zenana Mission, and began work at the Charlotte Hospital, Ludhiana, Punjab. After a year there, during which she learnt Urdu, she was moved to Palwal, also in the Punjab, where she studied another language, Hindi. It was about this time that she began to plan a Christian medical school attached to one of the mission hospitals for the training of suitable Indian girls as medical assistants as well as missionaries. After she had stated her case to the Surgeon-General of India and obtained his approval, she convened a conference of all the women medical missionaries in the Punjab, the North-West Provinces, and Rajputana, and as a result of the decisions then taken the school was established, in 1894, in an old school-house at Ludhiana, with Edith Brown as its first principal. In 1898 a new wing was added, but she was still short of her final objective—a school with a standard of teaching high enough to enable students to qualify for the M.B., B.S. degrees. Ultimately, in 1915, women students were transferred from Government College, Lahore, to Ludhiana, which was then recognized as the Women's Christian Medical College and with which was incorporated the Punjab Medical School for Women. From then on the college was training upwards of 300 women students in the medical, nursing, pharmacy, and maternity schools. In recognition of her public services Edith Brown was awarded the silver Kaisar-i-Hind medal in 1911 and the gold medal in 1922, and in the 1932 Birthday Honours she was appointed D.B.E. She was elected M.R.C.O.G. in 1937.

In November, 1941, 50 years after her arrival in India, Edith Brown relinquished the post of principal of the college and was succeeded by the late Dr. Aileen Pollock in the following year. But she never completely severed



[Hay Wrightson]

an indication. (3) Heart disease: The incidence is about 2% in all pregnancies. Rarely is it an indication for abortion. (4) Kidney disease, with retinitis: Twice in 15 years did I have to procure abortion for that reason. (5) Pernicious anaemia and chorea: I have never seen either condition end in abortion. (6) German measles contracted before the end of the third month: Considered nowadays to be a real reason; nevertheless exceedingly rarely encountered as an obstetric problem. I was twice consulted for that reason, so far as I can remember. (7) Nervous diseases such as multiple sclerosis: Perhaps a reason, but nervous diseases are very rare, and pregnant women with nervous diseases are rarer still. (8) Diseases of the ovum—hyatidiform mole, for example: I think that I treated personally some half a dozen cases in 15 years.

You will notice that De Lee and Greenhill do not even mention mental disease. This may be a reason, but in my own experience it resulted in my having to empty the uterus only three times in 15 years. In conclusion, these are the figures of a busy hospital consultant obstetrician on the staff of some nine hospitals, and carrying out antenatal examinations on some 2,500 patients per annum, apart from cases of difficulty that inevitably are referred. I can conceive of no good reason for "advising a therapeutic abortion" in "those several cases seen each year in general practice," and Dr. Lambert's statement cannot hold water when it is considered beside the true obstetric facts.—I am, etc.,

Praa Sands, Cornwall.

D. G. WILSON CLYNE.

REFERENCE

¹ De Lee, J. B., and Greenhill, J. P., *Principles and Practice of Obstetrics*, 1947, 9th ed., p. 965. Philadelphia.

Directory of Medical Libraries

SIR,—Early in 1957 the medical section of the Library Association intends to publish a *Directory of Medical Libraries in the British Isles*. To collect information for this we have sent questionnaires to all the libraries that we know of, but, as there has been a rapid increase in their numbers in recent years, we may have unwittingly overlooked some of the newest ones. In order that our directory may be as complete as possible, I should be glad to hear from the librarian-in-charge of any medical library that has not received one of our questionnaires. I should also like to ask any librarian who has not yet completed and returned the form to do so at once, as we hope to go to press in January.—I am, etc.,

London, W.1.

G. J. HIPKINS,

Hon. Secretary.

Medical Section of the Library Association.

POINTS FROM LETTERS

Advice from Hospital Doctors

Dr. T. L. C. DALE (Gateshead) writes: For some time now I have noticed a tendency for hospital doctors to give the general practitioner quite unnecessary information and advice in their letters to him. Probably the commonest example of this is to be told that one's patient smokes too much, drinks too much, or weighs too much. Recently I received a letter about a woman with long-standing rheumatoid arthritis. I quote: "I think she should discontinue her physiotherapy now after a prolonged course of treatment, and it will probably be as well to put her on regular doses of aspirin, which has a mild analgesic effect" (my italics). Was there ever a better case of teaching grandma to suck eggs?

Cigarette Filters

Dr. R. THORNE THORNE (Woking) writes: In 1894 I was working as a student in the laboratories of University College, London. At that time the authorities were testing a pipe and cigarette filter, called the "bitor," made of absorbent blotting-paper. They found that the filter absorbed 84% of the products of the tobacco smoke. At the same time, Sir William Ramsay and Lord Rayleigh were working in the science laboratory on the discovery of argon. For over 50 years I used the filters, and in my opinion they improved the taste of the smoke as well as purifying it. They have now ceased to be made, but I believe that there are others obtainable.

her connexion with Ludhiana, even after her retirement to Srinagar, where, living in a house-boat, she continued to work as a missionary. On her retirement from Ludhiana she had been given the title of emeritus principal of the college and hospital, and she remained in constant touch with the staff and old pupils to the end of her life. She lived to see the Charlotte Hospital replaced by the Women's Christian Medical College and Hospital, and, in 1952, to see the launching of an appeal for funds for a new 500-bed hospital, the foundation stone of which was laid by the Indian Minister of Health in 1954, on Edith Brown's 90th birthday. In the previous year the college admitted for the first time fifty students (men and women) to the first year of the M.B., B.S. course.

While Edith Brown had the satisfaction of seeing the gradual realization of her early dream and the transformation of a small mission hospital into a modern hospital and medical school, the older people in Ludhiana still spoke of the buildings as "Miss Brown's Hospital"—a fitting monument to one who never wavered in giving practical expression to her Christian faith.

Miss M. H. PRITCHARD, secretary of the Ludhiana British Fellowship, writes:

Pioneers are people of vision and determination—vision that looks ahead of their generation, and singlemindedness that translates vision into action. Dame Edith Brown was a pioneer.

She first went to India in 1891 with Dr. Ellen Farrer, the first two women doctors sent out by the Baptist Missionary Society, and she soon realized how limited her medical-missionary work would be without trained Indian workers. A few Indian women were studying medicine in the Government colleges, but they were very few. Dr. Brown envisaged a medical school for women, and in 1894 it opened its doors in Ludhiana with four Indian medical students who were Christians and two dispensers, using for clinical work a thirty-bed hospital run by another pioneer, Miss Greenfield. Together these two courageous women worked to build up from small beginnings what is known to-day as the Christian Medical College and Memorial Hospital. Dr. Brown remained principal of the college until 1942, and thereafter became principal emeritus. She served on various outside bodies, being a member of the Punjab University Senate and Medical Faculty, the Punjab State Medical Faculty, the Punjab Medical Council, and the Punjab Nurses' Registration Council. She was a member of the Ludhiana Municipal Council and so was fully in touch with civic activities. Her skill as a surgeon was widely recognized, and much of the college and hospital was built with the fees she received from wealthy patients. There were few Indian States to which she had not at some time been called to attend the women of the ruling houses. Her patients to love her, and one only had to say to strangers in a railway train or anywhere else that one had come from Ludhiana to hear the question, "Do you work in Miss Brown's hospital?"

Dr. Brown was a splendid teacher, and her students through the years marvelled at the simplicity and ease with which she imparted knowledge. She was personally interested in them, and after they qualified took every opportunity while travelling on business or holiday to break journey in towns and villages to see the graduates. She was a champion of the villagers of India, urging that the best medical aid be sent to them. She put forward a suggestion for rural medical units some 20 years ago, by which a doctor, health visitor, and dispenser should live and work in a village; but the project was considered too expensive. She herself, however, staffed and equipped two such centres which served local areas until 1948. One of the first domiciliary midwifery services in India was introduced in Ludhiana.

A tremendous worker, making great demands on her staff, frugal in her living, and careful to see that not an anna was wasted in the work, Dame Edith Brown combined great faith in the God whom she served with complete dedication of her life to the cause of Christian medical education, and in her death at the age of 92 the medical profession loses one of its outstanding members. The Christian Medical College and the new 500-bed hospital now being built in Ludhiana will be her living memorial, and the work of her graduates her greatest honour.

G. W. WATSON, M.D., F.R.C.P.

Professor G. W. Watson, emeritus professor of medicine at the University of Leeds and consulting physician to the General Infirmary, died at his home in Leeds on December 11 after a long illness. He was 79 years of age.

George William Watson was born at Cowling, near Keighley, on August 9, 1877. Philip (afterwards Lord) Snowden, who became a Chancellor of the Exchequer, was born in the same village, and the two remained firm friends until the death of Lord Snowden. George Watson was educated at Keighley Grammar School and at the Yorkshire College, Leeds, to which he won a West Riding county scholarship. Graduating M.B. (London) in 1901, he proceeded to the M.D. in 1903. After qualification he held a series of resident posts at the Leeds General Infirmary and was then appointed medical registrar there. He took the M.R.C.P. in 1905. After holding the post of resident medical officer at the Chelsea Hospital for Women in London, he continued his post-graduate studies at the Middlesex Hospital and in Vienna.

Returning to practice as a physician in Leeds, he was first appointed demonstrator in medicine at the university and then clinical lecturer. In 1912 he joined the staff of the General Infirmary as honorary assistant physician. During the first world war he served in the R.A.M.C., being registrar at the 2nd Northern General Hospital from 1915 to 1918. He was promoted to the brevet rank of lieutenant-colonel in 1917. On his return to civilian practice he became full physician at the General Infirmary in 1919, and five years later was appointed professor of clinical medicine at the University. In 1933 he became professor of medicine. Among other hospitals to which Professor Watson was attached were the St. James's Hospital, Leeds, and the Dewsbury General Infirmary, and he was an honorary physician to the Leeds Public Dispensary.

Professor Watson was a general physician of the old school, interested in medicine in its widest aspects. For many years he worked as honorary physician to the Leeds Tuberculosis Association. His written work was mainly in the form of reports of cases of unusual interest. He contributed such reports to this *Journal* about parenchymatous nephritis and leptospiral jaundice. Elected to the Fellowship of the Royal College of Physicians in 1915, he served for a number of years on the Council of the College, and was an examiner in medicine to the Conjoint Board. He was also a member of the Empire Rheumatism Council. On his retirement in 1938 the title of emeritus professor was conferred on him by the University of Leeds. During the second world war he acted as consultant adviser in medicine in the Emergency Medical Service. He married Miss May Isabel Armstrong Nicholson in 1919, and there were two sons of the marriage.

GEORGE WILKINSON, M.B., F.R.C.S.

Mr. George Wilkinson, consulting surgeon to the Sheffield United Hospitals, died in Sheffield on December 5. He was in his 90th year.

George Wilkinson was born at Kingston-upon-Hull on February 4, 1867. Both his father and his grandfather were doctors. From Hull Grammar School he won a scholarship to Emmanuel College, Cambridge, where he obtained first-class honours in the Natural Sciences Tripos in 1888. He went on to St. Mary's Hospital as a university scholar and qualified in 1890. A year later he graduated M.B., B.Chir., and took the F.R.C.S. in 1894. He first went to Sheffield in 1892 as house-surgeon at Sheffield Royal Hospital, after which he was in general practice for a short time until, in 1898, he was appointed general surgeon to the hospital. In 1894 he began a connexion with Sheffield University and its forerunners which was to last for half a century, and the medical school owed much to his labours. He was demonstrator in practical pathology from 1894 to 1899; lecturer in practical surgery from 1899 to 1909; lecturer in diseases of the ear, nose, and throat from 1909 to 1927; and lecturer in the history of medicine from 1923 to 1945. When the British Medical Association held its Annual Meeting at Sheffield in 1908 he held office as president of the Section of Laryngology, Otology, and Rhinology. Otology always absorbed much of his time. When, in 1909, a special department for diseases of the ear, nose, and throat was set up at the Royal Hospital, Mr. Wilkinson became its first honorary surgeon. During the first world war he was general surgeon to the 3rd Northern Military Hospital at Sheffield, with the rank of major in the R.A.M.C. In 1927 he retired from the active staff of the Sheffield Royal Hospital, but, still abounding in zeal and energy, he initiated and was in charge of a special department at the Derbyshire Royal Hospital, Chesterfield, and he worked there for seven years.

He contributed various articles on his specialty to the *Journal of Laryngology*. The theory of hearing was the subject which interested him most, and in 1924, with A. A. Gray, of Glasgow, he published *The Mechanism of the Cochlea*, in which he made out a case, on physical grounds, in support of the Helmholtz theory of sound perception, basing this work on his studies of the anatomical structure of the cochlea. In 1925, at the International Congress of Otology in Paris, he demonstrated a model, constructed by himself with painstaking care, to support his views. At the age of 85 he published a penetrating review entitled "How We Hear" in the *Journal of Laryngology*.

V. T. writes: George Wilkinson was a pioneer in ear, nose, and throat work in South Yorkshire, and was an outstanding example of the medical man who enhanced the usefulness of this specialty from the time of its separation from general surgery. The undoubted success which he achieved with his cases was due to his sound clinical judgment and to the scrupulous care which he showed in the management of them: no detail was too insignificant to merit his attention. He had the facility of distinguishing the evanescent and fashionable from those advances which were likely to be of permanent value, and, provided he was convinced the latter quality was there, no one would embrace a new approach or idea with more enthusiasm. The duties involved in his hospital appointment were most conscientiously observed, and he was unsparing of himself where the needs of his hospital patients were concerned. The hospital management recognized this in naming after him a ward in a new block. On first acquaintance and to those who did not know him well, Wilkinson might appear an austere figure: he exacted high standards from himself

and expected the same from others. But, the border crossed and acceptance gained, a breadth of kindness, generosity, and human sympathy was uncovered. This was the basis of his character.

In spite of his hospital work and a busy private practice, Wilkinson's interests outside medicine were wide. Of general history and church architecture he had a great knowledge, and it was an experience to converse with him on those subjects. He greatly enjoyed fishing. Walking on the noble hills and moors which surround Sheffield gave him an opportunity to indulge his sensitive appreciation of the countryside. At a time when it was unpopular to be so, he was a champion of the Victorians. Indeed, he showed forth in himself many of the characteristics of that great era. Unobtrusively he exerted a profound influence on those around him. The loss in 1948 of his wife, by whom he had one son and three daughters, and to whom he was devoted, was a severe blow from which he never really recovered. Our sympathy goes out to his family in their loss.

J. I. MILNE, M.B.

Dr. J. I. Milne, who was a well-known general practitioner in Manchester, died at his home on December 9 aged 60 years.

John Irvine Milne was born at Aboyne, in Aberdeenshire, on July 2, 1896. From Robert Gordon's College he went on to study medicine at Aberdeen University, where his prowess in athletics and games won him a notable reputation. His studies were interrupted by the first world war, during which he saw active service as a surgeon probationer in destroyers. Often he would look back on those days of adventure on the high seas with nostalgic pleasure, thankful that he had not been appointed to a large ship with rigid discipline but to a smaller vessel with a greater sense of freedom and comradeship. In 1921, not long after his return to civilian life, he graduated M.B., Ch.B. After a period as house-surgeon, first at the Aberdeen Royal Infirmary and then at Bootle General Hospital, he settled in general practice in an industrial district of Manchester, and for some years he also held an appointment as anaesthetist at the Ancoats Hospital. It was not long before he identified himself with the activities of the British Medical Association to such an extent that he was at first joint honorary secretary of the Manchester Division and then honorary secretary for 25 years, relinquishing that office to become chairman for another eight years, for six of which he was a member of Council for the South Lancashire and East Cheshire Branch, of which he was president in 1953-4. During the second world war he was honorary secretary of the local medical war committee. He was also a member of the local medical committee and later its chairman. Before 1948 he was a member of the Manchester Insurance Committee, and, after the appointed day, of the executive council and its various subcommittees. In addition he was for many years a representative of his Division at Annual Meetings of the B.M.A. Other activities included membership for many years of the Manchester Medico-ethical Society, of which he was president in the year 1948, and vice-presidency of the Manchester and Salford District Nursing Institute. He took an interest, too, in the St. John Ambulance Brigade, being a divisional surgeon. When Dr. Milne gave up the secretaryship of the Division in 1950 he and his wife received a presentation from their many friends in the profession as a mark of appreciation of his services.

C. V. B. writes: We in Manchester are indeed saddened by the death of Dr. J. I. Milne, who for many years gave the greater part of his leisure hours to the service of the profession and the public. As a chairman, he was tolerant, kindly, wise in judgment, and fulfilled his many duties

quietly and without any sign of ostentation. He had an amazing grasp of the complexities inherent in the many regulations which govern professional life and even of our own organization, and would attend meetings and committees well prepared—in fact it was obvious that he had often spent many an hour in quiet preparation for such events. It will thus be seen that his work on our behalf was occupied by far the greater part of his spare time, yet he was widely read, deeply versed in philosophy, and interested in archaeology. In his younger days he loved the countryside of the mountainous regions of Scotland, and often recounted to me the joys of tramps on Dee-side or the Cairngorms. He never quite lost his early love of the sea, and only during his last illness lent me—a mere landlubber—a seafaring narrative to read, as he had enjoyed it so much. Such was the man we mourn—a life of service, for which we are deeply grateful, given unsparingly to his fellow men—and the profession has indeed suffered a grievous loss in his passing. Our deepest sympathy goes out to his wife and two daughters.

Sir LIONEL WHITBY, C.V.O., M.C., M.D., D.Sc.
LL.D., F.R.C.P.

The obituary of Sir Lionel Whitby was printed in the *Journal of December 1* (p. 1306).

Major-General R. E. BARNESLEY writes: May I be permitted to add a very short postscript to the many eloquent tributes which have been paid to the memory of the late Sir Lionel Whitby, as it seems to illustrate yet another facet of his many-sided character? During the war, as D.D.M.S., Southern Command, I was privileged to have many contacts with the blood supply depot at Bristol. Some years ago a leader-writer in *The Times* wrote, "An Army doctor belongs to two professions; if he fails in either he fails in his duty." In these terms Sir Lionel was indeed the complete "Army doctor," for during the war he was always the soldier, and the medical services had no finer commanding officer in the Command. Many distinguished visitors, both military and civilian, came to visit the depot from time to time. They would nearly always stipulate that their visit should not upset the routine of the organization, and many arrived expecting to be ushered into a laboratory and to be greeted by a white-coated professor looking up from his microscope. This would never do for Sir Lionel. In every case he would be there waiting outside his office, together with his staff, immaculately dressed, with his gloves, cane, and glossy Sam-Browne belt. The same high degree of military efficiency was apparent throughout the unit under his command, and, it need scarcely be added, the men and women of all ranks worshipped the ground he trod on.

Dr. ALFRED FESSLER, who held appointments as a venereologist under the Manchester Regional Hospital Board, died suddenly on November 13, eleven days before his sixtieth birthday. Alfred Fessler was born in Austria on November 24, 1896, and graduated M.D. at the University of Vienna in 1922. After holding a number of postgraduate appointments he became assistant at the pathological institute and senior medical officer in the dermatological and V.D. department of the Wilhelmina Hospital, Vienna, where he began to practise as a consultant dermatologist and venereologist in 1933. At the time of the *Anschluss* he was one of the victims of Nazi persecution, but after arrest and trial he escaped to England late in 1938. He then studied at Queen's University, Belfast, and took the M.R.C.S., L.R.C.P. in 1941. An assistantship in general practice followed, and in 1943 he became medical officer of the venereal diseases clinics administered by Lancashire County Council, with dermatological duties in the council's school health and child welfare services. Since 1948 he had worked as venereologist in the Manchester area. His wide interests and broad knowledge in the field of dermatology and venereology were apparent both in his clinical work and in his numerous publications in both German

and English. In the past decade his studies of medical history culled from the Poor Law and other old records of Lancashire in the seventeenth and eighteenth centuries proved both fruitful and interesting and established him as an authority on these matters; at the Royal Society of Medicine he was a welcome speaker in the History of Medicine Section. He had been engaged in writing a book on these historical researches for some time before his death. Dr. Fessler was a prisoner in the first world war, and was fortunate to escape with his life when he fled from Vienna in 1938. He arrived penniless in England, suffered much anxiety before his wife eventually made good her own escape, and he had then to begin his professional life over again. With all these misfortunes behind him it would have been excusable if he had been embittered and dispirited. But this was not the case, and he was kind and pleasant to patients and staff alike. His quiet, rather shy manner tended to conceal his warm and friendly personality, and he was a congenial and loyal colleague. Much sympathy is felt for his widow and son.—S. M. L.

Dr. I. F. THOMSON died at his home at East Finchley, London, on November 19 at the age of 38. Ian Fream Thomson was born on September 5, 1918, at Jammalamadugu, in Madras Presidency, S. India, where his parents, Dr. T. T. Thomson and Mrs. Thomson, were medical missionaries. He was educated at Eltham College and Mill Hill School, from which he went on to St. Bartholomew's Hospital, graduating M.B., B.S. from London University in 1942. From 1943 to 1946 he served in the R.A.M.C., attaining the rank of temporary major. He landed in Normandy shortly after "D" day and had served as a regimental medical officer for less than a week when he was wounded and invalided home. For the excellence of his work during this short time he was mentioned in dispatches in 1945. After demobilization Dr. Thomson worked for a short time at Hammersmith Hospital, and it was there, at the end of 1946, that he first noticed symptoms of the disease with which he was to live for the next 10 years. After an operation and radiotherapy he returned home, and, greatly supported by a devoted family, he improved steadily. By 1950 Ian Thomson was able to join his father in general practice at Islington Medical Centre, and for over three years he took a very full share in the work. During this time he achieved notably good relationships with his patients: his consultations combined a scrupulous medical examination and assessment with a real sense of sympathy and love for the patient. He had a particularly happy touch with children and the aged, and brought to many parents and old people the sense that their doctor was personally concerned in their difficulties. The basis of his whole attitude was a deep Christian faith which had been and was being tested and tried in his own illness. Towards the middle of 1954 his right hand became increasingly weak. He carried on until he could no longer work efficiently. Since then he must have known the outcome of his condition, but he hardly ever referred to himself. He found joy in the company of his wife and daughter and his family and friends, and he was happy to know how his old patients constantly inquired after him and hoped for his return. Ian Thomson epitomized the best in general practice. He had very high medical standards and combined these with a deep concern for the whole man. His work and his influence remain. He was truly "Christ's faithful soldier and servant to his life's end."—P. F. J.

Dr. M. W. WILLIAMS died at his home in Swansea on November 21 at the age of 84. He was in general practice in near-by Morriston for forty-seven years before his retirement nine years ago. Morgan Watkin Williams was born at Cefn-coed-y-cymmer, Breconshire, on July 20, 1872, and was educated at Greenstreets School and at University College, Cardiff. He then entered Glasgow University, and, after graduating M.B., Ch.B. in 1900, held the appointment of resident medical officer at Carmarthen Infirmary before settling in practice at Morriston. While at Glasgow he gained a first-class honours certificate in both the junior and the senior courses in anatomy and gynaecology and the senior

prize in clinical surgery at the Western Infirmary. In addition to the work of his practice Dr. Williams also acted as medical officer to the Post Office and as surgeon to steel and tinplate and other works in the district. He was elected the first chairman of the local medical committee established under the National Insurance Act of 1911 and was chairman of the local insurance committee. During the second world war he was chairman of the Swansea medical board for the examination of Service recruits. As a family doctor he worked, as one of his patients wrote, quietly among the people, never seeking the limelight, content to do good by stealth. "He symbolized the old family doctor in the best tradition. . . . Many have reason to be grateful to this fine gentleman, who always put service before self." He was a countryman at heart, and his chief joys were shooting and fishing: he was never so happy as when casting a fly on the lovely waters of the Cothi at Brechfa or battling with a salmon in the Junction Pool on the Towy at Nantgaredig. To the sorrow of all his many friends his declining years were marred by recurrent bouts of intense suffering. He is survived by a widow and one son, who is a surgeon in Portsmouth. His second son, also a doctor, was killed in an accident in 1946.

The obituary of Dr. C. E. BEVAN, who was murdered by terrorists in Cyprus, was published in the *Journal* of November 17 (p. 1181).

Dr. J. E. O'N. GILLESPIE writes from Cyprus: Charles Bevan was examining a supposed patient, when he was shot through the back of his head and died instantly. This moment dramatized his mode of living—to carry on regardless of what was happening around him. He died at the height of his abilities and died as he would have wished, doing his duty without fear. To many doctors and others who visited Cyprus in happier times the hospitality of Dr. and Mrs. Bevan will be remembered with the greatest pleasure. Dr. Bevan's enthusiasm in entertaining was a part of the enthusiasm he spent on everything he did. He enjoyed life and lived it to the full. He did much to reduce tuberculosis in Cyprus and to refit his patients for return to a normal life. The craftsmanship of the workshops which he had created flowered under his care, and in this, as in everything he did, he lavished care and aimed at perfection. But memories alone, however numerous and happy, do not fill the vacant chair nor light the children's eyes.

A colleague writes: The murder of Dr. Charles Bevan by terrorists in Cyprus must come as a profound shock and cause of grief to numerous colleagues past and present who regarded him with so much admiration and affection. Charles Bevan represented what is best among progressive and intellectual medical men of the present century. His cultured and scholarly background coupled with his enthusiasm for advance and improvement made him an ideal leader in any government medical service. His devotion to the cure of the individual sick and his careful regard for the scientific details of modern medicine could well be emulated to a much greater extent by many medical administrators. Charles Bevan gave freely of his time, his experience, and his knowledge to aid his colleagues as well as his patients. Early in the last war, when substantial forces of the British Army arrived for the defence of Cyprus, many of the troops succumbed to sandfly fever, malaria, and other pyrexial illnesses. The numbers of blood films sent to be examined by those with as yet relatively little experience in the rapid diagnosis of malaria were quite formidable. I well remember Charles Bevan working during the stifling night hours in the blacked-out laboratory on film after film. Thus he gave the inestimable benefit of his knowledge and his time after the end of a day's work loaded by other commitments, always with the brightness, efficiency, and modesty which were such typical features of his whole character. To see his tireless, unrelenting, and highly successful efforts in instituting modern treatment of tuberculosis on the island was indeed a privilege. The high degree

of popularity and affection in which he was held by the people of Cyprus was especially evident. This insensate murder of one so noted for benefiting the Cypriot people stamps the killers as the despicable agents of a small political clique actuated by the basest motives of personal self-aggrandizement. However, when such self-seekers have vanished into merited oblivion, the outcome of Bevan's work and policy for the health of Cyprus will continuously be remembered.

The obituary of Colonel P. S. LELEAN, emeritus professor of public health in the University of Edinburgh, was printed in the *Journal* of November 24 (p. 1243). Mrs. MARGARET PYKE, chairman of the Family Planning Association, writes: As one of those hundreds who, looking back twenty years, do indeed murmur, "Well done and thank you," to Professor Lelean, may I add something to your moving tribute? You refer to his concern with some of the main problems of family life—sex relations and birth control—but it may not be well known that in 1936 he joined the brave small band of medical men, led by Lord Horder, who gave public support to the then infant Birth Control Association, and remained vice-president of the Family Planning Association until his death. I well remember his characteristic reply to my first very tentative approach to him: "Your work is so important that it is I who am gratified to have my name associated with it."

Medical Notes in Parliament

More Money for Hospital Building

For the financial year 1958-9 it is proposed that £20m. shall be spent on capital developments in the hospital service in England and Wales. This was announced by the Minister of Health on December 12. The sum compares with £13m. in the current financial year and £18m. proposed for next year.

Mr. R. H. TURTON stated that hospital boards had already been informed of their individual allocations within the £20m. total for the modernization of mental hospitals, for the replacement of obsolete plant, and for ordinary capital expenditure. In addition, the programme of major building projects announced by his predecessor would be extended. The programme already announced included the first phases of a number of large schemes. He hoped to authorize a further phase of the new Greaves Hall Mental Deficiency Hospital to be begun next year, and further phases of some other projects in 1958-9, including Balderton Mental Deficiency Hospital and the West Wales General Hospital, Glangwili. In that year also some big schemes already announced but not ready to begin earlier were expected to make a start.

As well as this, he was inviting the boards concerned to bring to completion the planning of a number of additional major projects on the assumption that they could be started in 1958-9. These included the first phase of a new hospital at Slough; a new dental hospital at Birmingham; the reconstruction of Hillingdon Hospital; extensions to the St. Helen Hospital, Barnsley, the Orsett branch of the Tilbury and Riverside General Hospital, Poole General Hospital, Bridgend General Hospital, and Lea Castle Mental Deficiency Hospital near Kidderminster; additional hospital facilities at Kettering, extensions to the Luton and Dunstable Hospital, and new out-patient departments at the Royal Northern Hospital, Oldchurch Hospital, Romford, and Selly Oak Hospital, Birmingham. These major projects were additional to the building which would be undertaken by boards from their own share of the funds available for capital expenditure. They were a further stage in the plans to meet the need for major developments in the hospital service, and with the projects already announced constituted a programme of substantial improvements in each hospital region in England and Wales.

Hospital Extensions in Scotland

An increase in the total provision for capital expenditure on hospital building in Scotland was announced by the Secretary of State, Mr. JAMES STUART. The total would be raised from its present level of £2,200,000, he said, to £2,500,000 in 1957-8 and £2,700,000 in 1958-9. From these sums approximately £1,300,000 would be available to regional hospital boards for their ordinary building programmes. Allotments of £350,000 and £300,000 were being made in the year 1957-8 and 1958-9 respectively for the special programme of plant renewal. The balance of the money would be allocated to further the progress of those major building schemes at present under construction and to begin six new major schemes.

At present work is being carried out on eight schemes, the total estimated cost of which is £3,250,000. These schemes are: radiotherapy institute at the Western General Hospital, Edinburgh; neurosurgical unit at the General Hospital, Edinburgh; reconstruction and modernization of Westgreen Mental Hospital, Dundee; extension of Victoria Hospital, Kirkcaldy; new maternity hospital at Bellshill, Lanarkshire; extension of Ladysbridge hospital at Bellshill, Lanarkshire; extension of Hospital for Mental Defectives at Banff; extension of Hospital for Mental Defectives, Dundee; extension of the Royal Scottish National Institution (for mental defectives), Larbert. In 1957-8 it is proposed to start three projects with a total estimated cost of £1,010,000: further extension of the Royal Edinburgh Mental Hospital; new extension of the Royal Glasgow Mental Hospital; reconstruction of the Glasgow Victoria Infirmary. In 1958-9 it is proposed to start three further schemes with a total estimated cost of £920,000. The schemes are: radiotherapy institute in Glasgow; reconstruction and modernization of Westgreen Mental Hospital, Dundee; new maternity hospital in Glasgow.

Half-hearted Thanks

Mr. HENRY BROOKE, Financial Secretary to the Treasury, told Mr. K. ROBINSON (St. Pancras North, Lab.) on December 11 that hospital capital schemes costing less than £60,000 would no longer require individual approval by the Treasury. Mr. ROBINSON said that regional boards would tender half-hearted thanks for the Chancellor having gone half-way to meet the recommendation of the Guillebaud Committee. But why had it not been possible to go the whole way to the committee's recommendation of £100,000? Mr. BROOKE pointed out that £60,000 was double the previous limit, and was also the limit applied to most other civil and defence building paid for by the Exchequer.

Poliomyelitis

Mr. S. P. VIANI (Willesden, West, Lab.) asked the Minister of Health how many cases of paralytic and non-paralytic poliomyelitis at ages 2 to 9 years had been recorded since June 30, 1956, to the latest date available, in children who had one or two doses of poliomyelitis vaccine, and in children who remained unvaccinated, respectively, and in what towns or villages the cases were reported, with the number in each area. Mr. TURTON informed him on December 11 that in the September quarter the corrected numbers of cases of poliomyelitis notified at ages 2 to 9 inclusive were 262 paralytic and 390 non-paralytic. During the same period medical officers of health reported to the Ministry no confirmed case of poliomyelitis among vaccinated children. Three paralytic poliomyelitis among vaccinated children. Three cases of non-paralytic poliomyelitis were reported, 2 in Manchester and 1 in Tooting Urban District.

Hungarian Refugees

Mr. FRANCIS NOEL-BAKER (Swindon, Lab.) asked the Minister of Health on December 10 if he would arrange for all camps accommodating Hungarian refugees to be visited by a mass radiography unit, in view of the danger of the spread of tuberculosis. Mr. TURTON stated that he did not consider that there was any need for such special measures.

INFECTIOUS DISEASES AND VITAL STATISTICS

Summary for British Isles for week ending December 1 (No. 48) and corresponding week 1955.

Figures of cases are for the countries shown and London administrative county. Figures of deaths and births are for the 160 great towns in England and Wales (London included), London administrative county, the 17 principal towns in Scotland, the 10 principal towns in Northern Ireland, and the 14 principal towns in Eire. A blank space denotes disease not notifiable or no return available. The table is based on information supplied by the Registrars-General of England and Wales, Scotland, N. Ireland, and Eire, the Ministry of Health and Local Government of N. Ireland, and the Department of Health of Eire.

CASES in Countries and London	1956					1955				
	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire
Diphtheria ..	7	2	3	0	2	25	0	5	1	12
Dysentery ..	727	94	280	6	1	615	46	149	9	3
Encephalitis, acute	3	0		0		6	0		0	
Enteric fever: Typhoid ..	3	0	0	0		6	2	1	1	1
Paratyphoid ..	1	1	0	0		6	0	7(B)	0	
Food-poisoning ..	191	14	14	0		451	19		2	
Infective enteritis or diarrhoea under 2 years ..				9	35				23	16
Measles* ..	4,514	266	458	170	219	2,757	22	64	17	46
Meningococcal in- fection ..	20	3	19	2		41	6	10	1	
Ophthalmia neonat- orum ..	31	1	8	0	1	24	0	6	0	
Pneumonia† ..	421	21	229	3	1	462	41	289	4	1
Poliomyelitis, acute: Paralytic ..	47	7		3	11	73	14		3	2
Non-paralytic ..	25	8				42	8			
Puerperal fever§ ..	193	24	15	0		215	31	12	1	
Scarlet fever ..	806	65	116	26	33	1,127	83	140	55	45
Tuberculosis: Respiratory ..	608	87	94	21		627	76	112	22	
Non-respiratory ..	68	6	18	4		79	6	16	3	
Whooping-cough ..	2,115	82	410	16	45	1,112	80	92	99	118

DEATHS in Great Towns	1956					1955				
	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire
Diphtheria ..	0	0	0	0	0	1	1	0	0	2
Dysentery ..	0	0	0	0		0	0	1	0	
Encephalitis, acute		0			0		0	0	0	0
Enteric fever ..	1	0	0	0						
Infective enteritis or diarrhoea under 2 years ..	1	0	3	0	2	3	0	2	8	0
Influenza ..	16	2	0	1	0	13	1	2	0	2
Measles ..		0	0	0	1		0	0	0	0
Meningococcal in- fection ..		0	0				0	0		
Pneumonia ..	299	46	23	7	6	259	38	15	0	7
Poliomyelitis, acute	3	1			0	8	2			0
Scarlet fever ..		0	0	0	0		0	0	0	0
Tuberculosis: Respiratory ..	59	8	7	0	9	84	14	12	0	3
Non-respiratory ..		0	2	1	0		0	0	0	0
Whooping-cough ..	0	0	1	0	0	0	0	0	0	0
Deaths 0-1 year ..	244	35	29	5	18	209	25	32	10	5
Deaths (excluding stillbirths) ..	5,913	823	585	127	175	5,578	747	593	100	151
LIVE BIRTHS ..	7,202	1040	923	247	343	6,916	1012	843	221	308
STILLBIRTHS ..	185	18	15			172	19	20		

* Measles not notifiable in Scotland, whence returns are approximate.

† Includes primary and influenzal pneumonia.

§ Includes puerperal pyrexia.

Vital Statistics

Poliomyelitis Vaccination Again

Regular supplies of Salk-type poliomyelitis vaccine are expected to be available from the middle of January, 1957, according to the Ministry of Health. General practitioners as well as local authority medical officers will be able to carry out vaccinations. Vaccination will for some time be confined to the 1½ million children born during 1947-54 who were registered earlier this year but who have not yet been vaccinated, though children who have had one injection should be given priority. Medical officers of health are asked to discuss with representatives of the local medical committee arrangements whereby general practitioners who wish to do so can vaccinate children in their care. General practitioners may decide individually whether they wish to take part in these arrangements; they will be required to send to the local health authority a record of each vaccination, for which a fee of 5s. is payable.

The vaccine is to be stored in a refrigerator at 0-4° C. (32-39° F.), and during use it must not be exposed to temperatures over 20° C. (68° F.).

According to the Ministry no pattern of reaction has emerged which can be associated with use of the vaccine, and it has been remarkably free from reaction. "Such evidence as is available does not support the occurrence of provocation paralysis at the site of inoculation." Intramuscular injection is slightly better than subcutaneous, but the difference is not so great "as to warrant the use of one route to the exclusion of the other." The method of disinfecting syringes advocated is by autoclave or hot-air oven. If they are not available, or if glass-metal syringes are used, sterilization by boiling for not less than five minutes is the method of choice, though it cannot be relied upon to destroy all spores. Alcohol is not recommended, since traces of it may destroy the antigen.

Smallpox vaccination and other types of immunization should not be given within a fortnight of poliomyelitis vaccination, and for B.C.G. or yellow fever the intervening period might well be three to four weeks. No special contraindications are known, but only general ones as for other immunizing procedures, such as illness or constitutional disturbance. Full details of the vaccination programme have been sent to the local authorities.

Infectious Diseases

The largest variations in the notifications of infectious diseases in England and Wales during the week ending December 1 were increases of 460 for measles, from 4,054 to 4,514, 131 for dysentery, from 596 to 727, and 88 for whooping-cough, from 2,027 to 2,115.

The largest increases in the incidence of measles were 135 in Staffordshire, from 138 to 273, 127 in Essex, from 241 to 368, and 64 in Lancashire, from 1,179 to 1,243. The largest rise in the number of notifications of whooping-cough was 48 in Lancashire, from 215 to 263; the largest falls were 41 in Yorkshire West Riding, from 177 to 136, and 33 in London, from 115 to 82. 806 cases of scarlet fever were notified, 9 fewer than in the preceding week, and there were no large fluctuations in the local returns. 7 cases of diphtheria were notified, being 5 more than in the preceding week; 3 of the cases were notified in Birmingham C.B.

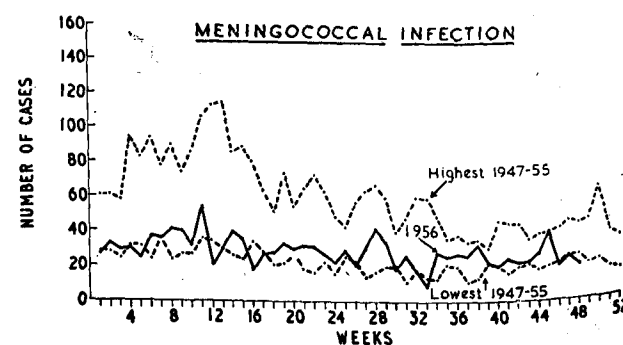
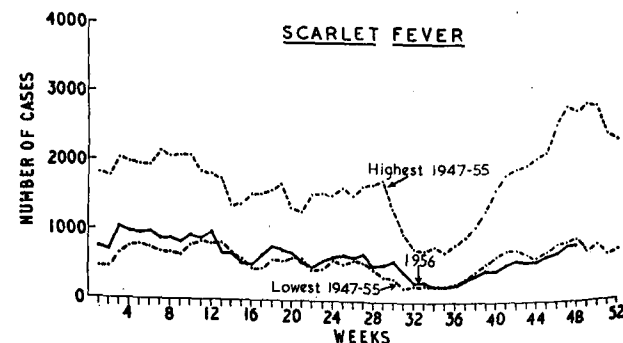
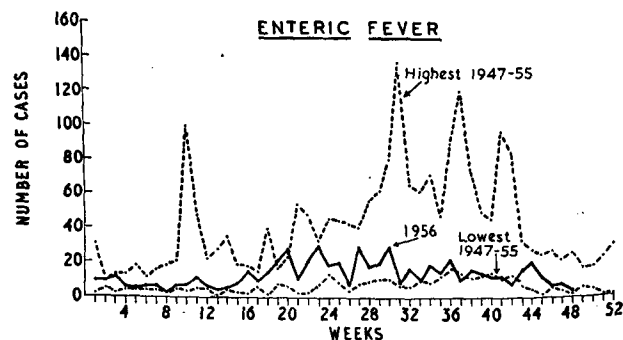
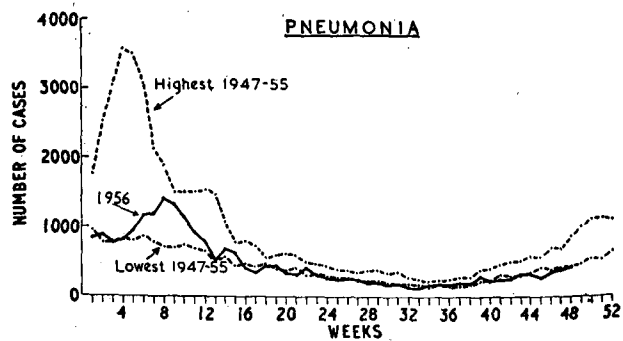
72 cases of acute poliomyelitis were notified, and these were 3 fewer for paralytic and the same for non-paralytic cases as in the preceding week. The largest returns were London 15 (Battersea 3, Chelsea 2, Hackney 2), Lancashire 8 (Liverpool C.B. 2, Oldham C.B. 2, Clitheroe M.B. 2), Middlesex 8 (Ealing M.B. 2, Harrow M.B. 2, Hornsey M.B. 2), Surrey 5, and Sussex 5 (Portsmouth-by-Sea U.D. 2).

The only large new outbreak of dysentery during the week was 42 in Hertfordshire. The chief centres of infection were Yorkshire West Riding 147 (Leeds C.B. 23, Colne Valley U.D. 19, Bradford C.B. 14, Keighley M.B. 14, Meltham U.D. 14, Sheffield C.B. 13, Rotherham R.D. 11,

Huddersfield C.B. 10), London 94 (Islington 40, Hackney 12), Lancashire 64 (Liverpool C.B. 18), Glamorganshire 43 (Aberdare U.D. 34), Surrey 43 (Woking U.D. 14, Farnham U.D. 12), Hertfordshire 42 (Hertford R.D. 41), Warwickshire 40 (Coventry C.B. 16, Birmingham C.B. 13), Essex 33 (Romford M.B. 18), Durham 32 (South Shields C.B. 10), Nottinghamshire 26 (Nottingham C.B. 18), Kent 24 (Chislehurst and Sidcup U.D. 14, Bromley M.B. 10), and Somersetshire 22 (Bath C.B. 14).

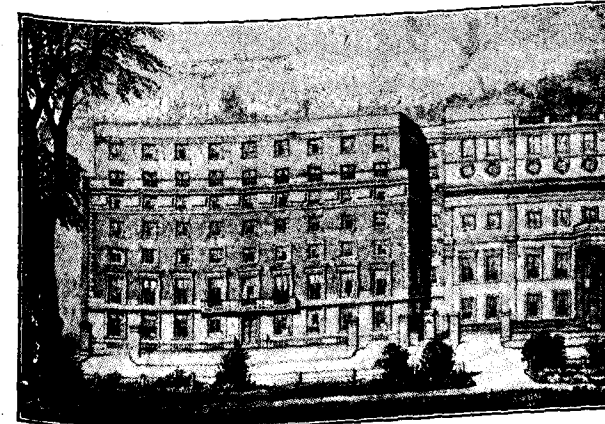
Graphs of Infectious Diseases

The graphs below show the uncorrected numbers of cases of certain diseases notified weekly in England and Wales. Highest and lowest figures reported in each week during the nine years 1947-55 are shown thus -----, the figures for 1956 thus ———. Except for the curves showing notifications in 1956, the graphs were prepared at the Department of Medical Statistics and Epidemiology, London School of Hygiene and Tropical Medicine.



Medical News

Nuffield College of Surgical Sciences.—Next month the residential part of the Nuffield College of Surgical Sciences will be opened to postgraduate students of the Royal College of Surgeons of England and visiting doctors. The accommodation comprises some 80 bedrooms, lounges, a billiard room, and a squash court. The terms are £7 5s. a week, which includes bed, breakfast, and dinner. Inquiries about



residence should be made to Mr. W. F. DAVIS, deputy secretary, Royal College of Surgeons of England, Lincoln's Inn Fields, London, W.C.2 (telephone: HOLborn 3474). The illustration above shows the Nuffield College of Surgical Sciences and a part of the Royal College of Surgeons as seen from Lincoln's Inn Fields. Besides the residential accommodation, the Nuffield College will house on its ground floor the administrative offices of the College of Surgeons and the Institute of Basic Medical Sciences, and on its top floor the College of Surgeons' department of anaesthetics. The official opening of the Nuffield College of Surgical Sciences will be performed by Lord FREYBERG, V.C., on April 5, 1957.

R.C.O.G. Library.—Last month the Royal College of Obstetricians and Gynaecologists put on show its valuable library of early works on obstetrics and gynaecology. To draw attention to the collection and to encourage interested fellows and members to fill some of the gaps in it, the College's consultant librarian, Mr. W. J. BISHOP, has now prepared a short-title *Catalogue of the Library up to 1850*, which the College has published. The nucleus of the library was the large collection bequeathed by the College's founder and first president, Professor WILLIAM BLAIR-BELL. A-though largely composed of modern works, this included a number of early obstetrical items. The historical part of the library was enormously enriched by the Roy Dobbin collection in 1938, since when this part of the library has been gradually built up by gift and purchase. The historical collection now contains some 621 volumes, among them many of the classics of obstetrics and gynaecology. It is the library committee's aim to make this collection as complete as possible within its special field.

British Tuberculosis Association.—At a symposium on the proper use of mass radiography, held in London on November 23, the opening speaker was Professor KARL WEGELIUS, medical director of the Swedish National Mass X-ray Surveys. He is a radiologist, and he discussed some of the technical aspects of the problem. He stressed the value of taking two views, a lateral as well as a postero-anterior. This, he said, would increase the discovery of abnormalities by 16%. He also raised the question of whether both high- and low-voltage pictures might not be needed to detect all abnormal pulmonary shadows. So far as the dual reading of radiographs was concerned, contrary to many, he thought it was probably only necessary during the

period of training. Experiments in his own department suggested that people were inherently either good or poor readers of films. The latter should find other employment. The other speakers at the symposium were Dr. F. A. NASH, director of the S.W. Metropolitan Mass X-ray Unit, and Professor J. W. CROFTON, of Edinburgh.

Rockefeller Aid to Hungarians.—The Rockefeller Foundation has made a first allocation of \$600,000 for the immediate relief of Hungarian scientists, scholars, and artists. Emphasizing that the Foundation did not expect to embark on a programme of general relief, Dr. DEAN RUSK, the president, said that in view of the Foundation's special experience relief would be concentrated "upon those whose intellectual and cultural contributions should be encouraged for the benefit of all." The Foundation will allocate funds to universities receiving Hungarian students and provide fellowships and grants-in-aid for advanced study where needed.—*New York Times*, December 8.

Ipswich and East Suffolk Hospital.—On December 8 Mr. T. M. BLAND, chairman of the hospital management committee, opened a new x-ray department in the Anglesea Road Wing. Except for the reception bureau the unit is an entirely new building, whose cost (about £40,000) has been provided from the "free moneys" of the hospital. The director is Dr. C. H. C. DALTON. The department is designed to serve not only the in-patients of the Anglesea Road Wing but also the greater part of the out-patient and casualty service for the whole area. There are four radiographic rooms communicating with a dark-room, all air-conditioned. Two of the radiographic rooms will have high-voltage transformers to diminish the radiation received by patients in abdominal investigations.

Trade Effluents.—Sir FREDERICK ARMER, chairman of the Board of Control and formerly deputy secretary, Ministry of Health, has been appointed chairman of a subcommittee set up by the Central Advisory Water Committee to inquire into the law dealing with trade effluents. Any person or body wishing to give evidence to the subcommittee should send a memorandum to its secretary, Mr. H. R. POLLITZER, Secretary, Trade Effluent Subcommittee, at the Ministry of Housing and Local Government, Whitehall, S.W.1. The committee has the following terms of reference:

(1) To examine existing legislation and the operation of the common law respecting the disposal from trade premises of liquid effluents (including solids in suspension), not being radioactive effluents; to examine the problems, including financial problems, arising therefrom; to consider whether farm or any other premises should be designated as trade premises for the purposes of disposal of such effluents; and to make recommendations.

(2) To examine the position respecting Section 8 (2) of the Rivers (Prevention of Pollution) Act, 1951 (which requires the consent of the Minister before a River Board may take proceedings under Section 2 or Section 3 of that Act), and to advise whether it is desirable to suggest the extension of the operation of that provision beyond the term of seven years from the passing of the Act and, if so, for what period.

Butterworth Gold Medal.—This award is presented annually to the College of General Practitioners by Messrs. Butterworth and Company, the medical publishers, for an essay by a member or associate of the College on a subject connected with general practice. The subject for next year's essay is "The Science and Art of Prognosis in General Practice." Essays, identified by motto only (with the author's name and address in a sealed envelope) and not exceeding 10,000 words, should be submitted to the chairman of the awards committee, College of General Practitioners, 14, Black Friars Lane, London, E.C.4, not later than September 16, 1957.

Directory of British Research.—The Department of Scientific and Industrial Research's annual directory of scientific research—including medicine and its related sciences—in British universities and university colleges for the 1955-6 session has lately been published (H.M.S.O., price 21s. net). For the first time the volume is printed.

The first 277 pages are occupied by a summary of the research being carried out, with the names of the permanent staff concerned, classified alphabetically by university and department. Then follow a 52-page name index and a 39-page subject index. In addition to information about research in the various medical faculties and schools, details are given about investigations at the Postgraduate Medical School of London, the institutes of the British Postgraduate Medical Federation, the Lister Institute, and the London School of Hygiene and Tropical Medicine. The entries are based on information provided by the various departments to the British Council.

Proctology Award.—The International Academy of Proctology invites applications for its annual \$100 prize and certificate of merit for 1956-7. The award, which is for the best unpublished contribution on proctology or an allied subject, is open to physicians in all countries, whether or not affiliated with the International Academy of Proctology. The Academy reserves the right, however, to publish all entries in its official publication, the *American Journal of Proctology*. Further details may be obtained from the International Academy of Proctology, 147-41, Sanford Avenue, Flushing, New York. The last date for entries is February 1, 1957.

Instrument Design.—The Royal Society recently announced grants of £2,000 and £1,500 made by the R. W. Paul Instrument Fund Committee. This fund exists to support British research workers engaged in the "design, construction, and maintenance of novel, unusual, or much-improved types of physical instruments and apparatus for investigations in pure or applied physical sciences." Details may be obtained from the secretariat of the Royal Society, Burlington House, London, W.1.

Consultant to the Army.—Professor A. W. WOODRUFF, Wellcome professor of clinical tropical medicine at the London School of Hygiene and Tropical Medicine, has been appointed honorary consultant in tropical diseases to the Army at Home. He succeeds Sir NEIL HAMILTON FAIRLEY, F.R.S., who retires under the age limit.

Edinburgh University.—Mr. I. S. KIRKLAND, F.R.C.S.Ed., paediatric surgeon to the Northern Edinburgh hospital group, has been appointed assistant director of the Postgraduate Board for Medicine. Dr. MARY MOSS has been appointed an assistant in the General Practice Teaching Unit, and Dr. F. ALBERT-RECHT lecturer in the department of clinical chemistry.

Dr. J. S. M. Pollock, formerly public health administrator at the W.H.O. regional office for South-east Asia, has been appointed chief of the health division of the United Nations Relief and Works Agency for Palestine Refugees. He graduated at Glasgow.

Dr. Jean M. Mackintosh, of the Birmingham maternity and child welfare department, is to be president of the Section on Health and Welfare of the Family at the Royal Society of Health's annual congress next year.

Dr. L. F. Freed, lecturer in social medicine and psychiatry at Witwatersrand University, has been elected a fellow of the Royal Society of South Africa. He graduated at St. Andrews.

COMING EVENTS

Hospital Coccal Infections.—The Association of Clinical Pathologists is holding a symposium on "Hospital Coccal Infections," January 2, 10 a.m. to 6.15 p.m., at the London School of Hygiene and Tropical Medicine. The meeting is open to anyone interested. Programmes from Dr. J. N. CUMINGS, National Hospital for Nervous Diseases, Queen Square, London, W.C.1. who would like to know the number of those proposing to attend so that tea may be provided.

Training of Microbiologists.—A joint meeting of the Society for Applied Bacteriology and the microbiology group of the Society of Chemical Industry will discuss "Training of Microbiologists," January 9 at 2.15 p.m., at the Beveridge Hall, Senate House, London University. Members of the two societies may take guests. Details from Mr. D. H. F. CLAYSON, 2, Old Field Close, Stanmore, Middlesex.

Sherrington Lecture.—Professor WILDER PENFIELD, O.M., F.R.S., will deliver the Sherrington lecture at Liverpool University (Arts Theatre, Victoria Building) at 5.15 p.m. on January 29. His subject will be "The Cerebral Cortex of Man: An Interpretation of Responses to Electrical Stimulation."

First International Congress of Neurological Sciences.—Those from Britain wishing to attend this congress (Brussels, July 21-28, 1957—see *Journal*, December 8, p. 1380) should apply for further details to Mr. VALENTINE LOGUE, F.R.C.S., Maida Vale Hospital for Nervous Diseases, Maida Vale, London, W.9, and not to the secretary-general of the congress as previously stated.

NEW ISSUES

British Journal of Ophthalmology.—The new issue (Vol. 40, No. 11) is now available. The contents include:

STEREOPSIS AND DEPTH PERCEPTION AFTER TREATMENT FOR CONVERGENT SQUINT. E. J. Naylor, T. E. Shannon, and A. Stanworth.
STANDARD CURVE AND THE PHYSIOLOGICAL LIMITS OF DARK ADAPTATION BY MEANS OF THE GOLDMANN-WEEKERS ADAPTOMETER. P. Dietzle and E. Gordon.
BEHAVIOUR OF PS. PYOCYANEA IN DIFFERENT CONCENTRATIONS OF PENICILLIN. E. G. Millwood and M. Klein.
ANAESTHESIA FOR INTRA-OCULAR SURGERY. J. Kennedy Harper.
STERILIZATION OF INTRA-OCULAR ACRYLIC LENS PROSTHESES WITH ULTRAVIOLET RAYS. C. D. Binkhorst and F. P. Flu.
LYMPHOCTOMA OF THE ORBIT. B. K. Das Gupta, G. C. Sen, and R. K. Basu.
EPIPHORA AND THE BONY NASO-LACRIMAL CANAL. Calbert I. Phillips and Marian George.
PLASMOCYTOMA OF THE ORBIT. John F. Coran.
PROGRESSIVE EXTERNAL OPHTHALMOPLAGIA. F. D. McAuley.
KERATO-CONJUNCTIVITIS IN CEYLON. Lloyd M. Weetikon.
EFFECTS OF CONTACT LENSES ON SHORT-WAVE FIELD DISTRIBUTION. B. O. Scott.
METHOD OF CUTTING LAMELLAR GRAFTS. P. Sivasubramaniam.
METHOD OF REMOVING WOODEN SPLINTERS FROM THE CORNEA. J. Moss.
CERTAIN MODIFICATIONS IN MINOR LACRIMAL INSTRUMENTS. John Foster.
BOOK REVIEW, OBITUARY.

Issued monthly; annual subscription £4 4s.; single copy 8s. 6d.; obtainable from the Publishing Manager, B.M.A. House, Tavistock Square, London, W.C.1.

BIRTHS, MARRIAGES, AND DEATHS

BIRTHS

Gabriel.—On December 6, 1956, in Edinburgh, to Dr. Elspeth (formerly Davie), wife of Dr. Ronald M. Gabriel, 16, Coltbridge Terrace, Edinburgh, a son—Stephen Grant Julian.
Mills.—On November 23, 1956, to Mr. and Mrs. R. B. Mills (Sheila I. Haldane, M.B., Ch.B.), c/o B.P.M., Pladju, Sumatra, Indonesia, a daughter—Alison Sheila.
Palmer.—On November 8, 1956, at Tremayne, Bearsted, Kent, to Patricia (formerly Thould), wife of Dr. D. L. Palmer, a brother for Kevin—Martin Graham.
Price.—On December 1, 1956, at Masjid-i-Sulaiman, Abadan, Iran, to Kate and John Price, a son.

MARRIAGES

Goode-Smeed.—On December 8, 1956, at St. Bartholomew-the-Less, London, E.C.4, Dr. John Howard Goode, of Oaklands, North Holmwood, Dorking, Surrey, to Dr. Inez Mary Patricia Smeed, of 26, Tisbury Road, Hove, Sussex.

DEATHS

Dewar.—On November 25, 1956, in Glasgow, Alice Mary Shirra Dewar, M.B., Ch.B., D.P.H., of 23, Doune Terrace, Glasgow, N.W., formerly of Newport, Mon.
Prat.—On November 23, 1956, François Roger Marie Michel Prat, M.B., B.S., of Victor, New York, U.S.A., formerly of 22, Blythwood Road, Pinner, Middx. aged 29.
Rabey.—On November 19, 1956, at the Royal Sussex County Hospital, Ernest Frank Rabey, M.R.C.S., L.R.C.P., formerly of Manor House, London, N.
Scott.—On November 20, 1956, at the Imber Cross Hotel, Thames Ditton, Surrey, Noel Archibald Scott, M.R.C.S., L.R.C.P.
Thomson.—On November 19, 1956, at his home, 7, Twyford Avenue, London, N., Ian Fream Thomson, M.B., B.S., aged 38.
Waddy.—On November 21, 1956, Sidney Hill Waddy, L.R.C.P.&S.Ed., F.R.F.P.S., of North Lodge, Leicester Road, Branksome Park, Bourne mouth, Hants, late of Huddersfield, Yorks.
Wheeler.—On November 8, 1956, Robert de Courcy Wheeler, M.D., of Monkstown Castle, Dublin.

Any Questions?

We publish below a selection of those questions and answers which seem of general interest. It is regretted that it is not possible to supply answers to all questions submitted.

Pelvic Radiography Late in Pregnancy

Q.—Is there any risk in routine radiographs of the pelvis during the last month of pregnancy? If so, what is the order of the risk, and how does it compare with similar investigations in the first trimester?

A.—The order of the risk resulting from exposure of the pelvis during pregnancy to ionizing radiation depends on the dose given. The Medical Research Council report on *The Hazards to Man of Nuclear and Allied Radiations*¹ states: "There is considerable evidence, both from the case records of patients treated with radiotherapy and from reports published by the Atomic Bomb Casualty Commission, that heavy irradiation of pregnant women can lead to the birth of children who are either abnormal at birth or who later develop in an abnormal way." One abnormality which appears to be associated with such heavy irradiation is the microcephaly. In the same report it is stated: "The evidence from Hiroshima suggests that children irradiated between the twelfth and eighteenth weeks of intrauterine life are more likely to develop microcephaly than children irradiated either before or after this period."

Such abnormalities of the foetus would be caused, however, only by heavy doses of irradiation, much greater than would be delivered in a single radiographic examination, and the risk of foetal abnormality from pelvic radiography is very slight unless repeated examinations are undertaken. The risk of foetal abnormality would be still less if radiographic investigation was confined to the last month of pregnancy. The report quoted above does, however, point out that there is, in addition to the risk to the health of the individual, a risk of genetic damage from exposure of the gonads to any form of irradiation, and recommends that there should be a control of the total dose to the gonads received by the individual from conception to the age of 30 years, the most likely child-bearing period. X-ray examination of the pelvis of a pregnant woman at any stage of pregnancy will give an undesirable gonad dose both to the mother and to the foetus, and for this reason, if radiography is necessary, the technique should be such that the least possible dose is delivered.

REFERENCE

¹ *The Hazards to Man of Nuclear and Allied Radiations*, Medical Research Council, 1956. H.M.S.O., London.

Onychomadesis

Q.—A baby of 1 year lost a fingernail when 2 months old which has never regrown, and it has now lost another on the other hand. No cause is visible; the nails just loosen and drop out. The skin of the finger whose nail was the first to be shed is now continuous over the nail fold. What are the possible causes, prognosis, and treatment?

A.—Temporary, repeated, or permanent loss of nails, without inflammatory or other cause, is a rare congenital abnormality that sometimes is familial. Nothing can be done to avert the condition. The affection seems to be analogous to the falling of hair, and has in fact been reported in severe cases of alopecia areata. In epidermolysis bullosa, another congenital and often familial disease, characterized by blister formation from negligible trauma, falling of nails and their ultimate loss is common. In that condition the loss seems to be determined by trauma to the nail matrix following slight trauma on the nail. However, spontaneous blistering does occur in epidermolysis bullosa,

and also apparently spontaneous loss of nails. It may be that the condition of onychomadesis—loss of nails—is a *forme fruste* of epidermolysis bullosa.

Prostatic Cancer: A Question of Diagnosis

Q.—Four years ago a man of 60 was diagnosed on clinical grounds as having carcinoma of the prostate (he had rectal pain, a firm but not hard nodular prostate, no micturition symptoms, and a serum acid phosphatase level of 3 units). Since then he has had 30 mg. stilboestrol daily. Now, there is still no evidence of secondary deposits and the serum phosphatase is at its previous level, but micturition symptoms have developed and fairly severe congestive heart failure. (1) Is the clinical diagnosis of prostatic cancer still tenable? If it is doubtful, what investigations are indicated? (2) Could the cardiac failure be accounted for solely on the basis of the sodium-retaining properties of the stilboestrol?

A.—The clinical diagnosis of prostatic cancer at an early stage is notoriously difficult, and there would seem to be a reasonable amount of doubt in this particular patient whether that diagnosis is correct. The failure of a serum acid phosphatase level to fall even from 3 units after the amount of stilboestrol that has been taken is a point against the diagnosis of carcinoma. The most useful investigation now would be an examination of a smear after prostatic massage. This must be done by a pathologist who is accustomed to the technique of exfoliative cytology. It would also be as well to take a plain radiograph of the pelvis and lower lumbar spine if this has not already been done.

The cardiac failure may be due in part to the stilboestrol. The dose of stilboestrol should be drastically reduced, say, to 5 mg. daily, and the cardiac failure treated on the usual lines. If the micturition symptoms are obstructive and if they persist after the control of the cardiac failure, surgical treatment of the prostate in one form or another is indicated.

Selenium Poisoning

Q.—What are the clinical features of selenium poisoning, and how should it be treated? What are the main causes of selenium poisoning?

A.—Workers using selenium and selenium compounds may notice a metallic taste, a garlicky odour of the breath and perspiration, and irritation of the nose and throat. Many selenium compounds are acid and cause blistering of the skin, and hydrogen selenide causes intense irritation of the mucous membranes which may last for many days. The garlicky odour of the breath is particularly unpleasant, and men who work with selenium and selenium compounds are often shunned even by their families, so that they become anxious and embarrassed.

Burns, dermatitis, and paronychia have been reported in workers exposed to selenium dioxide in the manufacture of telephone apparatus, and the fingers, teeth, and hair may become stained red. Finely divided selenium dust may cause irritation of the nasal mucous membrane resulting in catarrh, epistaxis, and anosmia. Hunter¹ describes an incident in which men engaged in melting scrap metal were exposed suddenly to high concentrations of selenium fume. This was intensely irritating to the eyes, nose, and throat, and the premises were rapidly evacuated. All the workers exposed noticed the immediate and intense irritation of the eyes, nose, and throat, and an unpleasant, sour, garlic-like odour to the fume; some complained of a severe burning sensation in the nostrils, dryness of the throat, and headache; and all noticed an unpleasant taste in the mouth and an odour of the skin and clothing. All recovered within three days, and there were no sequelae.

Animals grazed on vegetation grown on soils with a high selenium content develop acute or chronic selenium poisoning. The effects of ingestion of selenium compounds by man

have not been fully investigated, but gastro-intestinal symptoms and garlicky breath are found among inhabitants of the highly seleniferous areas of South Dakota and Nebraska.

The treatment of acute poisoning is symptomatic. Ascorbic acid in doses of 10 mg. per kilogram of body weight given daily may remove the garlicky odour from the breath.

The main causes of selenium poisoning are accidental exposure to unusual concentrations of dust, fume, or vapour containing selenium compounds. Selenium is used in the manufacture of the selenium cell and for producing hard durable rubber; it is added to glassware, coloured inks, paints, and plastic. The machining properties of stainless steels and commercial copper are improved by alloying with selenium. Sodium selenate has been recommended for use as an insecticide, but it is an extremely toxic substance and certain plants may concentrate selenium picked up from treated soil.

REFERENCE

¹ Hunter, D., *The Diseases of Occupations*, 1955, p. 434. London.

Occult Blood in the Faeces

Q.—What is the best method for testing for occult blood in the faeces? Is it necessary to restrict the ingestion of meat? What are the fallacies in the usual tests?

A.—The method we have found most satisfactory, because it can be adjusted to the degree of sensitivity needed, is that using *o*-toluidine instead of benzidine. A 4% solution is made in alcohol, which keeps well, particularly in a refrigerator. One part of this is mixed with two parts of 50% glacial acetic acid on the day it is required for use.

To perform the test, four drops of the diluted toluidine solution and one drop of 10 vol.% hydrogen peroxide are placed in a clean test-tube and allowed to stand for one minute to see if the tube is really clean. If there is no colour, then one drop of a faecal suspension is added and the test read in one to two minutes: blue colour is positive, green colours are ignored. The faecal suspension is made by placing a piece of faeces, about the size of a pea, into 5 ml. of water and boiling. This test is rather sensitive, and, if it is desired to reduce the sensitivity so as to avoid getting too many rather meaningless positives, 2% toluidine solution can be used in the initial mixture. This has the added advantage of not crystallizing out in the cold.

With the technique described above, unless a considerable amount of meat has been taken, a positive (blue) test will not be obtained. Similarly, taking iron will not give a false positive. The test can be made more sensitive, and then it is possible to detect the small amount of blood in meat. It must be remembered that a very much more important fallacy is the ingestion of blood from other parts of the alimentary tract, such as the gums and nose, and the use of glassware which is not absolutely clean.

Spanking Children

Q.—What is the current view on corporal punishment for children? It seems very difficult to avoid giving an occasional spanking. Does it do any permanent psychological damage?

A.—Present-day views about corporal punishment vary from total prohibition to the attitude of "It made me what I am." It is indeed difficult to avoid an occasional spanking, and parents, when tried too far, should not feel too guilty about this, provided that it really is occasional: the more one spans, the more one tends to spank. There is no evidence that in moderation it does permanent psychological harm to children. However, spanking should be regarded more as a relief for parental tension than as a useful procedure in bringing up children. Except in a very limited sense—for example, during the actual presence of a parent—it is not a particularly effective deterrent, and like other forms of punishment there is always the risk that if

given in excess it will provoke rather than deter. In the long run more amiable methods show far greater civilizing effects. Parents should not hit their children after adolescence is reached, whatever the provocation. There is always the risk of coming off worse.

NOTES AND COMMENTS

Cheeses for Reducing Diets.—Professor JOHN YUDKIN (London, W.8) writes: In your reply concerning cheeses for reducing diets ("Any Questions?" November 10, p. 1131) you discussed the matter entirely from the point of view of calorie content. This, as you say, depends mostly on their content of fat. May I remind you that there has been considerable work in recent years indicating that it is not only calories which should be considered in reducing diets? In particular, it has been shown that diets with the same number of calories are more effective in reducing when the proportion of fat is high rather than low. In addition to the references in my previous letter in "Notes and Comments" (November 19, 1955, p. 1282), may I refer you also to the paper by Professor A. Kekwick and Dr. G. L. S. Pawan?¹

REFERENCE

¹ Kekwick, A., and Pawan, G. L. S., *Lancet*, 1956, 2, 155.

OUR EXPERT replies: The question was answered in general terms, and not on Professor Yudkin's implied assumption that the amount of cheese eaten would vary inversely with its calorie content. Admittedly the point which he raises would have to be considered if the cheeses were to be rationed according to a pre-decided number of calories. In our answer this restriction was not visualized, and it was stressed that the amount of cheese accepted as an adequate portion would be an important factor. Factors determining the amount eaten, such as taste, might therefore be just as important as the calorie content. It is difficult, therefore, to understand Professor Yudkin's comment that only the calorie content of the cheese was considered.

Spontaneous Cure in Diabetes.—Dr. J. A. CHALMERS (Worcester) writes: With regard to spontaneous cure of diabetes mellitus ("Any Questions?" November 10, p. 1131), your reply makes no reference to the spontaneous remission which may occur in the diabetes which sometimes occurs during pregnancy. We have seen several cases which have been confirmed by sugar tolerance tests and where the pregnancy has been complicated by foetomegaly, toxæmia, etc., which have subsequently shown a complete remission, even in respect of a post-natal sugar-tolerance test. I believe these to be genuine cases of diabetes mellitus and expect the patients to develop the condition within the course of a few years. The effect of the pre-diabetic state on pregnancy is well known, and it is probable that the same factors that produce pregnancy changes may in certain instances produce a manifest diabetes mellitus.

OUR EXPERT replies: It is well known that pregnancy may be associated with the appearance of diabetes which disappears after the pregnancy is over, only to recur in subsequent pregnancies and ultimately become permanent. Dr. Chalmers's observations are therefore in complete agreement with the experience of many others who have worked and written on this subject.

Books of "Any Questions?" and Refresher Course Articles.

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MEMBERS' SUBSCRIPTIONS should be sent to the SECRETARY of the Association. TELEPHONE: EUSTON 4499. TELEGRAMS: *Medisecra, Westcent, London*.

B.M.A. SCOTTISH OFFICE: 7, Drumsheugh Gardens, Edinburgh.

SUPPLEMENT TO THE
BRITISH MEDICAL JOURNAL

LONDON SATURDAY JULY 14 1956

CONTENTS

Annual Representative Meeting, Brighton, 1956	7	"In Brighton Last Week"	52
Representatives at Dinner	51	Conditions of Service of Public Health Medical Officers	53
Representatives' Ladies' Dinner	51	Competition for Medical Films	53
Annual General Meeting	52	Hospitality	53
Extraordinary General Meeting	52	Correspondence	53
Opening of Trade Exhibition	52	Association Notices	54

British Medical Association

ANNUAL REPRESENTATIVE MEETING, BRIGHTON, 1956

The Annual Representative Meeting opened in the Dome, Brighton, Sussex, on Thursday, July 5, and continued on July 6, 7, and 9. The Chair was taken by Dr. I. D. GRANT (Glasgow), who was supported by Dr. T. C. ROUTLEY (President), Dr. E. A. GREGG (Chairman of Council), Sir JOHN MCNEE (Immediate Past President), Mr. L. DOUGAL CALLANDER (Treasurer), and Dr. A. BEAUCHAMP (Deputy Chairman of the Representative Body).

Over 400 representatives from home constituencies attended, and there were about 40 representatives from overseas. In addition members of Council who were not representatives were present, and there were four representatives of the Public Health Service.

More than 350 motions and amendments were on the main agenda, but a number of motions and amendments of similar tenor were grouped and one of them was "starred," so that discussion took place on the "starred" motion.

FIRST DAY

Thursday, July 5

The representatives assembled at 10 a.m. The CHAIRMAN (Dr. Grant), before the usual preliminary business, expressed appreciation of the recent Honours List awards to two of the Association's past presidents. Sir Henry Cohen, who was now to go to the Lords, would contribute to the debates in that Chamber his well-known characteristics of sincerity, wisdom, and statesmanship. The award of a knighthood to Mr. Tudor Thomas would give great satisfaction not only to his colleagues in Wales but to every member of the Association.

The Secretary would be instructed to send messages of good will and congratulations to both.

The CHAIRMAN then extended a warm greeting to Sir Henry Newland, "Grand Old Man of Australia," and the Association's most recent gold medallist.

Sir HENRY NEWLAND extended greetings from the B.M.A. in Australia, which, he said, was going from strength to strength and had, through its negotiations with the Government in the last few years, produced a medical service which was thought by those who had seen it working to be one of the best in the world.

A Protest

The CHAIRMAN OF COUNCIL (Dr. Gregg) entered an energetic protest against the action of the *News Chronicle* in

having distributed at the doors of the meeting a Gallup poll document relating to the National Health Service.

"We take strong exception to the action of the *News Chronicle* in this particular matter," he said. "This document is headed 'British Medical Association Conference, Brighton . . .'; we have nothing to do with it."

The heading gave the impression that in some way the document had been issued by the Association for the information or guidance of representatives, but in fact it was the product of purely private action by the newspaper.

The CHAIRMAN appealed to representatives to be brief in their speeches in order to expedite the business of the conference, there being 359 items on the agenda, as against 296 last year.

PRELIMINARY BUSINESS

Statement by Chairman of Council

The CHAIRMAN OF COUNCIL said he was happy to have the opportunity of saying in the presence of Dr. Routley that those who were privileged to attend the joint meeting in Toronto a year ago would never forget the wonderful kindness of Canada. (Applause.) Every effort would be made to return that kindness when Canadian colleagues joined the Association in Edinburgh in 1959. "We look forward also with the greatest pleasure to the first meeting in New Zealand, to be held in Auckland in 1961," he added. "It is our aim to foster friendly relations with our professional colleagues not only within the Commonwealth but also in foreign lands." Last autumn the Association had the pleasure of entertaining six distinguished doctors from the Soviet Union, and the Council had gratefully accepted an invitation to send six British doctors to the U.S.S.R. in August this year. In the second week of the conference the Association would welcome in Brighton the delegates of twelve foreign medical associations, and Professor L. A. Hulst, of Utrecht, the distinguished delegate of the World Medical Association, of which he was a Past President, was to be present as an observer. (See foot of next page.)

Last year there was an important debate on the threatened prohibition of the use of heroin in medical practice. Later it was discovered that the action proposed by the Government appeared to be illegal. For the subsequent events, which culminated in an important change of Government policy, much credit was due to the Public Relations Officer and his staff. (Applause.) It was to be hoped that nothing

would again be heard of any such plan to restrict the clinical freedom of the medical profession in this country.

In the field of hospital and consultant services new ground had been broken in two important ways. First, there had recently been held at B.M.A. House, under the extremely efficient chairmanship of a Vice-president and former Treasurer, Mr. A. M. A. Moore, the first annual conference of consultants and specialists. Secondly, the Joint Consultants Committee had joined the General Medical Services Committee in presenting a claim to the Government for a long overdue adjustment of the betterment factor for general practitioners and all grades of hospital medical staff in the National Health Service. The Council regarded that joint action as a most encouraging example of co-operation between two major sections of the profession, and, despite the present economic difficulties of the country, no apology was made for supporting the demand that the Government should fulfil its obligations to the profession. The Spens Committees were expressly directed to pay due regard to the desirability of maintaining the proper social and economic status of the medical profession, "and we should be failing in our duty both to ourselves and to posterity if," continued the Chairman of Council, "when the incomes of so many other sections of the community are being adjusted to keep pace with the fall in the value of money, we made no effort to recover the ground that we have lost since our remuneration was adjusted in the light of the Danckwerts Award."

Health Service Problems

Representatives would have observed that many problems which they had discussed in recent years appeared once again in the present agenda—the problem of the general structure of hospital medical staffing, the particular problems of the whole-time hospital officer and the S.H.M.O. and the junior resident, the problem of obstetric beds and other hospital facilities for the general practitioner, the problem of drugs under the National Health Service for private patients. The annual reappearance of those and other matters in the discussions of the Representative Body was evidence both of the imperfections of the Health Service and of the enormous difficulties that were encountered in the first attempts to effect major improvements. A leading article in *The Times* last January stated that, at a first glance, the Report of the Guillebaud Committee might seem to be "a bluebook full of whitewash." Whatever the views of the Guillebaud Committee, it was certainly not the business of the British Medical Association to whitewash the National Health Service. There was no room for complacency, but it would be wrong to adopt an attitude of despondency or defeatism. "We must continue the struggle with all the force at our command in the hope that ultimately we may succeed in moulding the Service nearer to our heart's desire," he continued, and expressed the hope that, despite the many problems that remained unsolved, Representatives would find in the Council's annual report evidence not only of much hard work but also of solid achievement in various spheres. He commended to their special attention the report on remuneration policy and the other important reports contained in the appendices. The Constitution Committee was completing its difficult task, and its recommendations would be submitted to the Representative Body next year. Two other valuable contributions had recently been published in booklet form. The first was the report on "Divine Healing and Co-operation between Doctors and Clergy," and the second was the report on "Cruelty to and Neglect of Children." The importance of the latter report was publicly acknowledged by the Minister of Health on his recent visit to the Conference of Representatives of Local Medical Committees.

The Representative Body had shown a keen interest in the care and treatment of the aged sick, and it had been satisfactory to learn that its recommendations on that subject, and the proposals contained in the Report of the Joint Subcommittee on Geriatrics, had secured the general

approval of the Ministry of Health and would be implemented as far as economic circumstances allowed.

One of the problems of geriatrics was that of providing suitable employment for the elderly. In the agenda of the meeting there was some suggestion that too much employment was being provided for the elderly in the General Medical Council. He did not desire to anticipate the debate on the subject, but it might perhaps be remarked that it was the Representative Meeting last year which decided of its own free will to select for the support of the Association in the General Medical Council election a number of persons who, whatever their mental agility, could hardly hope to be "seeded" for the Centre Court at Wimbledon.

There was much more that could be mentioned if time permitted, but the Chairman of Council said he would only refer to the important advance in relationships with the Press which had resulted from the initiative of that ever-young veteran, Dr. H. G. Dain, in arranging discussions with representatives of Press organizations, with special reference to the publication of news from hospitals. (Applause.)

"Quite naturally and rightly, we are much occupied with medico-political affairs," he concluded, "but do not let us underestimate the value of the immense amount of work that we undertake each year in the scientific and ethical and medico-social spheres. When I hear a member asking in a querulous tone, 'What do I get for my subscription?' I wish that he would give some thought to another question—'What do I give with my subscription?' One of the things he gives is power to the Association not only to promote and safeguard the interests of the doctors of this country but also to play a worthy part in advancing the welfare of the general community. The Council is not ashamed to present to the Representative Body, with all proper modesty, the account of its stewardship during the past session."

Election of President

Dr. GREGG moved on behalf of the Council that Mr. Weldon P. T. Watts, M.S., F.R.C.S., of Newcastle-upon-Tyne, be elected President of the Association for 1957-8.

The motion was carried by acclamation.

Mr. WELDON P. T. WATTS, in response, thanked Representatives for the great honour which they had done him and the North of England in electing him President for 1957. Newcastle, he said, had everything to make a successful meeting from business, scientific, and social angles, and his colleagues in the North would do everything they could to receive the Association with a real Tyneside welcome.

Toronto Meeting

On the motion of Worcester and Bromsgrove the Representative Body placed on record its appreciation of the hospitality extended by the members of the Canadian Medical Association and the Ontario Medical Association on the occasion of the Joint Meeting in 1955.

Dr. BLUNDELL WILLIAMS (Worcester and Bromsgrove) said that one of the members of his constituency had been fortunate enough to be present at the Joint Meeting in Toronto last year, and he could not speak highly enough of the friendliness with which he was greeted and the wonderful hospitality which he received there. The Council had already expressed thanks to Dr. Routley and his colleagues of the Canadian Medical Association, and it was the unanimous opinion of the members of Worcester and Bromsgrove that it would be most appropriate to accord thanks at the Annual Representative Meeting.

The vote of thanks was carried unanimously, with acclamation.

The CHAIRMAN introduced Professor L. A. Hulst, of Utrecht, delegate of the World Medical Association, who had arrived a little earlier than was expected in order to attend a meeting of the Representative Body, and invited him to say a few words.

Professor HULST (Utrecht) brought greetings on behalf of the World Medical Association, and expressed the hope that the annual meeting would be a great success. (Applause.)

Attempted Ban on Heroin

Dr. J. A. MCCALLUM (Westminster and Holborn) moved: That, following the recent attempt by the Government to ban the prescription of heroin, this Meeting affirms, as a matter of principle, its determination to preserve the right of any individual doctor to prescribe what he thinks is in the best interest of his patient.

He said that it was desired to avoid any repetition by any Government in the future, of whatever complexion, of the previous year's disastrous attempt to ban the prescription of heroin.

Among the many statements made and letters written on the subject, he had been struck most by one statement made by a person who advocated the banning of heroin. It was: "Doctors have a fundamental belief that no one should interfere between a man and his patient." That belief was true, and must remain true for the future whatever expediency dictated in other directions.

It was a question of advice which was given to the Government, and the point about advice given to the Government on clinical matters was that it was still only advice. He had never met a committee yet, however distinguished, whose advice on clinical matters he was prepared to accept unless he agreed with it.

During his effort in December Mr. Pringle would have had greater assistance if M.P.s had received letters on the subject from members. There was little doubt that in that way the Public Relations Department would have been helped earlier to get the matter settled.

Smoking in the A.R.M.

At this point the discussion was interrupted by a motion that Standing Order 70 (forbidding smoking in the meeting) be suspended.

Dr. J. O. McDONAGH (Perth) moved an amendment that Standing Order 70 be not suspended to-day. He said that the moving of the suspension of this Standing Order got the meeting every year; so far the meeting had been going for earlier every year; so far the meeting had been going for 40 minutes. There was no doubt that smoking had something to do with disease, and he thought the A.R.M. should show the measure of its concern for the promotion of health by not smoking for one day. *Family Doctor* was a journal of the Association; it took the subject of smoking seriously enough to devote the first three pages of the issue which had been distributed in the meeting to the question of stopping smoking, suggesting that a "ginger group" was needed. What better ginger group could there be than the British Medical Association itself?

Dr. R. COVE-SMITH (Marylebone) thought it was of importance that the British Medical Association should give a lead in this matter, and he asked the delegates to have the courage of their convictions and show the public that they were sufficiently controlled to restrain themselves in the interests of their own health and the health of the public, and to show that they really did practise what they preached regarding smoking.

Dr. L. M. JOHNSTON (Wallasey) said that he had come to the rostrum to speak about heroin, but he would say that smoking was a drug habit, and anyone who smoked was a drug addict. Doctors gave a shocking example to their patients by drugging themselves with tobacco all the time. "I think it is the biggest killer in the business, not only from lung cancer, but coronary thrombosis and bronchitis are undoubtedly brought on by smoking. We are guilty of infamous conduct in a professional respect by smoking."

The CHAIRMAN said that he did not propose to allow a scientific discussion on the pros and cons of smoking. He would put the amendment to the meeting.

Dr. R. P. LISTON (Tunbridge Wells) asked, if the amendment was carried, what the Chairman would regard as a quorum? (Laughter.)

The amendment was put on a show of hands and the result was not clear. It was then put, "Do you wish to have any smoking at all to-day?" but the CHAIRMAN called for a count and announced the result: "I am sorry, you cannot smoke to-day."

CIVIC WELCOME

The MAYOR OF BRIGHTON (Alderman Lewis Cohen), accompanied by the Town Clerk, attended to give a civic welcome to the Association. He said that it was his pleasing duty to welcome to Brighton one of the most important, if not the most important, conferences Brighton was to enjoy during this year. Brighton was highly honoured that the British Medical Association had decided to come to Brighton for its annual meeting.

Brighton was in a peculiar position in welcoming the British Medical Association, because Brighton also claimed a medical degree, but it could be used in ways not permitted to the profession, for Brighton could advertise its efforts on behalf of health. Brighton prided itself in being able to give a measure of health with its air, sunshine, and sea and its recreations.

The Mayor hoped that Brighton hospitality would be unsurpassed. It was very proud that the President this year was a resident of Hove, Brighton's sister town. All appreciated the work which the medical profession did for the country, and he hoped the deliberations this time would go some way towards dealing with the two worst diseases at present affecting mankind, cancer and rheumatism.

The CHAIRMAN, thanking the Mayor for having attended and for his gracious welcome, said all would agree that "Doctor Brighton" had for many years been recognized as one of the country's most effective physicians, particularly when dealing with convalescent cases.

The debate on heroin was then resumed.

Heroin (Debate Continued)

Dr. C. W. WALKER (Cambridge and Huntingdon) thought that all would agree with the second part of the Westminster and Holborn motion, for "to prescribe" formed part of "giving advice." But to say that what was prescribed must be made available was infringing the principle that the patient had a perfect right to accept or refuse what was prescribed. The first part of the motion, however, was wrong. The Government had made no attempt to ban the prescription of heroin; it had merely attempted to ban its production. If a patient refused to follow the advice of his doctor it was the doctor's duty to try to persuade that patient that he was wrong. The Association, having felt that it was right to keep heroin, had therefore been right to go for the Government, and the Government had been only too glad to get out of the situation on a legal technicality; but it had not been wrong in principle for the Government to attempt to ban heroin if it had taken the view that it should be banned, and situations of that sort would arise again. The medical profession had never claimed that everything that was prescribed must be available to the patient. It had often been realized in the old days that patients could not afford something which was good for them.

Dr. P. PHILLIPS (Bristol) said that the ban on manufacturing heroin would immediately create a black market in that commodity—a situation which had arisen in the United States, where addiction to heroin was much more common than in this country. Heroin, too, was one of the easiest things to manufacture "on the side."

The Westminster and Holborn motion was carried.

Dr. R. P. HENDRY (Rugby) moved a resolution of protest in the strongest possible terms against any Government action aimed at curtailing the freedom of a registered medical practitioner to prescribe—under suitable agreed safeguards—whether under the N.H.S. or privately, whatever he thought was best for his patient until and unless there was some absolutely overwhelming reason to the contrary which had been agreed between the profession as a whole and the Minister.

He said that some official form of protest was called for. He thought that the profession should agree to consider any representations that a drug should not be prescribed, which was different from agreeing that it should not be prescribed. In his own view, heroin was a very valuable drug, and he cited the case of a patient who had responded to it, having

failed to respond to 24 other drugs. There were, however, other types of drugs which might be the subject of consideration as a matter of principle.

The Rugby motion was carried.

"Book of Valour"

The CHAIRMAN OF COUNCIL moved that there be instituted a Book of Valour, to be permanently on view at B.M.A. House, in which should be recorded, by decision of the Council, heroic deeds performed by medical practitioners, and that in each case a copy of the record be presented to the practitioner concerned or to the next of kin.

Mr. D. S. PRACY (Nuneaton and Tamworth) moved as an amendment that instead of the presentation of a copy of the record a medal suitably inscribed be presented.

He welcomed the first part of the motion, but thought that the proposal in the second part was unworthy of the Association. He recalled that in 1877 the Association's medal had been instituted for distinguished merit on the part of anyone—not necessarily a member of the Association—who raised conspicuously the character of the profession by extraordinary professional services or scientific merit, or special services to the profession. The first awards for heroic deeds had been in connexion with colliery disasters. It had been awarded on all three grounds from time to time. The last awards for heroism had been in 1915 and 1919, to Major Arthur Martin-Leake and Captain N. G. Chavasse, respectively, both of whom had been awarded the V.C. and Bar. The second part of the motion sought to substitute for a gold medal a piece of paper or parchment of no intrinsic value. The profession's recognition of valour ought to be something obvious and enduring. He did not think that the recipient of a posthumous award would prefer a piece of parchment. He knew of many cases where medals were treasured possessions of the relatives.

Dr. J. H. LANKESTER (Reigate) thought that the whole subject needed further consideration. While all would feel the urge to honour those who had performed acts of bravery, he doubted whether the proposed scheme had been well worked out. Did it apply to military bravery as well as civilian bravery, to wartime as well as peacetime? Would members of all races be eligible and members of the medical profession throughout the whole Commonwealth, he asked, or those who had performed brave acts in scientific research? The greatest difficulty was to decide who should receive the awards, and it seemed at present that the Council would be faced with the invidious task of making that choice.

Dr. J. A. PRIDHAM (Council) opposed the amendment. He said that the Council had taken the view that to have different medals for different subjects would lead to confusion and invidious comparison between one medal and another. The Gold Medal was the Association's supreme honour; he asked that it might be allowed to remain as such. In any case, the existing proposal did not preclude the recipient from being awarded the Gold Medal as well.

Dr. J. B. W. ROWE (Council) asked what Dr. Pracy had meant by "value." A gold medal that was only for show was not of much intrinsic value to the relatives. An illuminated parchment address was much better than any medal could be, because it had no intrinsic value which would attract burglars, but was of sentimental value to the recipients.

The CHAIRMAN OF COUNCIL, opposing the amendment, said that the proposal had been related to certain cases of outstanding valour by doctors in the discharge of their professional work, and there were already two names which it was proposed to inscribe should the motion be accepted. A Book of Valour would seem to be a natural complement to that other book in which were recorded the names of those who had fallen in the war. He did not understand why a piece of vellum with the citation recorded on it and presented to the person most concerned or his relatives should be less treasured than a bit of metal. There was a great deal to be said for giving a special character to a

matter of this sort and not following old-fashioned stereotyped lines. In every one of such cases there was the possibility that the recipient would get recognition of some other sort, such as the George Medal. It was not possible in such matters to avoid the old trouble of people disputing awards and saying that somebody else should also have received recognition. Hundreds of V.C.s were earned for every one awarded.

Mr. PRACY, in reply, said it had been decided in 1877 that the Gold Medal should be awarded by the Council; it could therefore be taken that due consideration would be given to the matter and that the medal was not awarded unworthily. With regard to posthumous awards, the whole point of the amendment had been that a token of something outstanding would be much better if it was of intrinsic value.

The Nuneaton and Tamworth amendment was lost.

Dr. L. B. PALING (South Staffordshire) moved to instruct the Council to include in its Annual Report a tabulated list of resolutions affecting policy adopted by the previous Annual Representative Meeting, including those on which no action had been taken.

The parallel he had in mind was with local authorities, whereby matters were kept on the minutes until they had been disposed or revised.

The CHAIRMAN OF COUNCIL said he did not understand the motion, as there already existed a tabulated list setting out references to particular minutes. The proposed action would involve waste of time and paper. Last year's meeting had unanimously resolved that the Spens Report should remain the basis of all negotiations on remuneration in any branch of the N.H.S. That still remained the Association's policy. The position taken with regard to autonomous bodies was also firmly maintained. These were the only policy resolutions of last year on which the Council had not reported this year. There was nothing more to be said about them.

Dr. PALING, in reply, said that as only two matters were involved there would be no waste of paper. It was those very things on which action had not been taken that it was desirable to keep in mind and readily accessible so that they might be considered if necessary.

The amendment was lost.

The CHAIRMAN OF COUNCIL then moved that the remainder of the Annual and Supplementary Reports of Council under "Preliminary" be approved.

Politics and the National Health Service

Dr. B. HIRSH (Manchester) moved as an amendment "That the action of the Council reported at para. 73 of the Annual Report of Council is gravely unsatisfactory." He drew attention to the resolution carried last year instructing the Council to take such action as would cause the Health Service to be removed from the political arena. The Council stated that it was unable to recommend any satisfactory alternative to the existing arrangements, and this, he submitted, was gravely unsatisfactory. The Council was instructed to take action and all they got was a lot of talk. The suggestion was not impracticable; it worked perfectly well with the B.B.C., and there was no sense in congregating at Brighton at considerable expense to pass resolutions and then be told by Council that it did not agree. The constitutional position was clear: the resolution had not been rescinded and still stood. The handling of resolutions by Council in the past had often caused grave disquiet, and the handling of this particular resolution did not allay this disquiet.

Dr. F. M. RIFKIN (Salford) seconded.

The CHAIRMAN OF COUNCIL suggested that the mover of the amendment had not read the paragraph, which was as follows:

The Council believes that it is impossible to divorce the Health Service, with an annual expenditure in the region of £400m., from Parliamentary control, and, as is the case in other national services—the armed Forces, national insurance, etc.—it must

from time to time be the subject of political controversy. For this reason the Council is unable at present to recommend any satisfactory alternative to the existing arrangement. It considers, however, that the position should be carefully watched and that it rests with the profession to strengthen its position and to take every possible step to prevent the Minister from effecting proposals concerning the Service without adequate consultation with the profession.

That did not say that nothing would ever be done, or that an opportunity might not present itself in which action would be possible, but it did bring the matter to reality. Fortunately with a party system such as obtained in this country there was bound to be some kind of move or action by one or another of the political parties in some way related to a particular service. "We care not which party," and he suggested that nothing more appropriate or helpful could be said in relation to the resolution passed last year than the paragraph he had quoted. If the mover of the amendment could suggest something else he hoped he would do so.

Dr. A. V. RUSSELL (Council) said that the Amending Acts Committee considered this problem at considerable length, but it was realized that at this present moment none of the suggestions which were made were practical. The Amending Acts Committee tried to discover some method of taking the Health Service out of the ambit of party politics. That medicine should be to some extent bedevilled by politics was a bad thing. The Committee was still exercised with this particular position and intended to make every effort to find a solution to the problem, but it was forced, through its chairman, to report to the Council that so far no possible solution had been found. He assured the meeting that the solution would go on trying, but, as the Chairman of Committee had said, where the financing of a service came from Treasury funds there had to be Parliamentary control.

Dr. HIRSH, in reply, said that the replies from the distinguished speakers did not satisfy him. If the Health Service was divorced from politics it need not cost £400m. The Council was given specific instructions; it was not asked to recommend alternatives, and nothing had been done. The Council could have called a conference of the political parties; it could have approached the Prime Minister and the Leader of the Opposition, and it could have adopted publicity and informed the public that the profession was tired of being the football of the two political parties.

The amendment was defeated, and the remainder of the Council's report under "Preliminary" was adopted.

"FAMILY DOCTOR"

Dr. O. C. CARTER (Chairman of the Family Doctor Committee) presented the report under this heading. He said that the publishing industry had passed through a very difficult period in the last twelve months, firstly because of the railway strike and secondly because of the printing strike, and now the credit squeeze which was affecting the revenue from advertisements. Normally a commercial publishing house was content if a brand-new magazine appearing in the early days of *Family Doctor* the Committee was advised that the magazine would never pay if the high ethical standard aimed at was maintained. For the second time, however, he was able to report that *Family Doctor* ended the year with a surplus, this time of £2,561. The circulation continued to rise in steady fashion, which augured well for the future. The increased size had been widely welcomed by readers, advertisers, and retail distributors, and the distribution of the magazine had been further helped by the expansion of the van service. Last year there were eight vans, four in the provinces and four in London; now there were 12, eight in the provinces and four in London, and they were doing very valuable work.

The policy of publicity in various ways had been continued. This year there had been little funds to engage in much publicity, but if publicity was not continued the clock soon began to run down and the effects were felt from

month to month. Next year it would be highly important for *Family Doctor* to engage in bigger publicity than this year. All these activities came out of revenue.

Dr. Carter then referred to the campaign carried on by *Family Doctor* on the fundamentals of nutrition which was trying to develop nutritional teaching at the shop-counter level, where the average woman spent her housekeeping money. There was an effective display at last year's Ideal Home Exhibition which took the form of a street of shops called "Family Doctor Street for Better Living." Articles which were popular in the magazine had been reprinted in the form of pamphlets which were distributed over the whole country, and a series of booklets were being got out on various matters relating to health which would be on sale in September. Articles on common ailments were being published showing that they were often brought about by an individual's way of living and were not cured essentially by medicine or surgery.

Another very encouraging aspect was the growing interest in the magazine by all sections of the community. At the same time, *Family Doctor* had a growing circulation abroad and was read by all kinds of workers in the general health field.

It was perfectly clear that no magazine could ever be the work of one man or one committee. It depended on a continued sense of loyalty and the devoted work of a small highly skilled staff, and in that respect *Family Doctor* was very fortunate.

From the vast number of letters received and expressions of appreciation it was also clear that *Family Doctor* was meeting a long-felt need of the community. Indeed, it had been estimated by experts that the actual readership each month was somewhere about 500,000.

As he had said on previous occasions, the Representative Body were themselves the proprietors of the Association's publications. Not only that, but they were responsible for seeing that *Family Doctor* was faithfully discharging the trust reposed in it to promote and to conduct health education over the widest possible fields and in all directions open to it, and, at the same time, to safeguard and maintain high ethical standards. Dr. Carter said he believed that had been and was being done.

So far as finances were concerned, the Representative Body could be assured that this year, as in the last two years, the intention was to produce the magazine—indeed to improve it—not only at no cost to the Association, but with a small surplus.

Dr. H. H. D. SUTHERLAND (Kensington and Hammersmith) moved that in order to maintain prestige of the B.M.A. and increase the value of *Family Doctor* to the public, more care should be taken to improve the quality of the blocks and general layout of all the material used in the production of the magazine.

He said that there was no doubt that *Family Doctor* was a wonderful production which had given much pleasure and interest to many people up and down the country; the motion was intended as a critical appreciation and was in no way meant to suggest destructive criticism. The quality of the paper, blocks, and layout of the material used in the production of *Family Doctor* still left some considerable need for improvement, so far as competition from other journals was concerned.

Dr. CARTER, in reply, said that he welcomed the motion, provided the words "more care" were deleted, because the most scrupulous care was taken in the production of *Family Doctor*. Two difficulties had been the strikes and the necessary change from flat to rotary press. The Committee and the editor had been dissatisfied with the results, but the matter was well in hand and he assured Representatives that no stone would be left unturned to produce the finest possible magazine. He would accept the motion if the words "more care" were deleted.

Dr. SUTHERLAND said he would be glad to substitute the words "continued care" instead of "more care" if that were agreeable to the meeting.

The Kensington and Hammersmith motion was lost.

new to put forward he thought they should be heard. The Chairman of the Journal Committee would also wish to speak.

Dr. C. P. WALLACE (Guildford) felt that one point which had not been sufficiently emphasized was the importance and value to this country of the freedom of the Press, and it was because the motion before them tended to interfere with and to limit that freedom that most of them were opposed to it. He would add that the freedom of an editor was something even more sacred than the freedom of the Press itself. As Dr. Hale-White had said, they must either find another editor or else leave him free. He had on a previous occasion compared the editor's position to that of the bishop in his diocese, the judge on the bench, and now he would add, the headmaster in a school who is appointed by governors but was left free to exercise his authority as headmaster. Fortunately, on this occasion they had an editor in whom they all had confidence. ("Agreed.") He could not feel that anything that the editor had said would be likely to interfere with the interest that Sir Russell Brain had expressed in the problem of the remuneration of the profession.

Dr. A. M. MAIDEN (Lincoln) said he had been instructed by his Division to speak against the motion, and he would only say one thing—we can surely put up with the Gold-Headed Cane if we have a copper-bottomed editor.

Dr. J. G. M. HAMILTON, chairman of the Journal Committee, said that there were several points put by Mr. Langston which had not been replied to by the speakers. The leader "The Gold-Headed Cane" represented legitimate comment on the current field. Criticism of institutions by the Press and other institutions was one of the most important functions of the Press and was an invaluable characteristic of free societies. The freedom of the medical press was no less precious than the freedom of the general press, and was to be guarded as zealously. Article 46 which was before them on the agenda laid down, of course, that the editor was responsible for all the matter which was printed in the *Journal*, except for announcements and material which he was instructed by the direction of Council to publish. The same Article laid down: "That the Editor shall be appointed by and be subject to the control of the Council." Everybody with any sense realized that the interpretation of the word "control" here must be the financial and disciplinary control of the Council. The editor could not be under the journalistic control of the Council, when in the previous section of the Article it was laid down that he was personally responsible for all that was published. The word "control" meant the ordinary control exercised by an employer over an employed person, and the employer who paid was the one who sacked. The editor, like any other official, like all other persons in the Association, was expected to work, and had done nothing else than work, within the framework of the policy laid down by the Representative Body. That was a positive statement with a negative side, in that the editor, like the other officials, must not advocate a policy which was contrary to that which had been laid down by the Representative Body, and the editor had not done so.

Did this article infringe any policy? The question had been asked, and it has been answered in the obvious "No." The timing of the leader had been criticized and, indeed, there being no case for infringement of policy, it was only upon timing that the criticism could stand. It was held to be inopportune, in that the new-found co-operation between the General Medical Services and the Joint Consultants Committees so heartily acclaimed by all sides, not least, let him remind his audience, in the editorial columns of the *Journal*, was claimed to have been jeopardized. It was said to be wrong to criticize any part or activity of a companion institution. Because a joint remuneration claim was likely all criticism must be silenced in the immediate interests of money—but who made the claim, or was it a threat that co-operation was in jeopardy? The President of the Royal College of Physicians of London, in making a reply to the leader, attacked the British Medical Association on grounds quite unrelated to anything in the

so-called offensive leader. He attacked the British Medical Association not only in the *Journal* but in the *Lancet*. The Association was accused of wishing to take over the whole business of financial negotiation, and it had, it was claimed, jeopardized co-operation.

Divisions up and down the country had called for the British Medical Association to make itself responsible for all financial negotiations. Representatives had sought—not this year yet, but in previous years—to advocate this course, and later on in the agenda there was a motion on the paper for discussion in this general sense. There was evidently a fair volume of opinion amongst members of the British Medical Association in favour of the Association endeavouring to take over the whole job of remuneration negotiation.

This was the accusation of the President of the Royal College of Physicians against the British Medical Association. This was what was claimed to prejudice co-operation. There was no reference to this in the leader under discussion, yet the editor was being censured for it. There was little chance, fortunately, of this co-ordination being broken. The General Medical Services Committee and Joint Consultants Committee, and the respective chairmen, knew perfectly well that the success of the claim was in large measure dependent upon it being a joint one, and who was going to break the co-operation under these circumstances? The threat came from outside; it was not intrinsic in the material published.

"May I ask the meeting's permission to say one or two words on what I regard . . ." (Cries of "No, no," and "Vote"). "I advise the Representative Body to object to this motion wholeheartedly."

Mr. LANGSTON, replying, reiterated that this resolution in the view of those who supported it was in no sense meant as a vote of censure in any way upon the editor of the *Journal*. He thought that it had been largely admitted that the article was published at an inappropriate time, but it went further, it was an attack on one College which had, for the first time since the National Health Service had come into being, joined action with the Association and the other Royal Colleges on the remuneration issue, a policy which Dr. Hamilton himself strongly advocated at the Glasgow meeting. He submitted that such an article might well have led to a dissolution of the recently formed negotiating committee, and it was an article which affected policy. He agreed with Dr. Hamilton that the leading article did lead to the issue being widened and to other issues being drawn in which they, on the side of the British Medical Association, would have hoped would have disappeared; it sharpened the divisions which could exist, and drew attention to them and might have affected in this way general policy. Dr. Langston still asked the meeting to vote for the resolution. The motion was merely asking for the issue to be re-examined and that there should be a careful integration between what was stated in the *British Medical Journal* and the policy of the Association.

In conclusion, he stressed again that many members of the medical profession regarded the *Journal*, as it said on the cover, as the journal of the Association, and the leading articles as expressing the policy and views of the Association and its Council. If there was nothing wrong with that article why did the Council find it necessary to dissociate itself from the article and to publish its dissociation from the article in the columns of the *Journal*?

The motion was defeated by an overwhelming majority.

The Supplement

Dr. L. J. BARFORD (Reigate) moved that the *Supplement* be published in separate form or that it form the centre pages of the *Journal*. He said that it was important that as many members of the Association as possible should know what was in the *Supplement*. A few years ago it was separately bound and issued weekly with the *Journal* and one could carry it about in one's pocket and read it at odd moments. While it was part of the *Journal* it was difficult to tear it out without destroying the *Journal* to some extent. He thought some of the surplus could be used for the purpose.

Dr. E. TOWNSEND (Cornwall) supported the motion in the hope that the question would be rediscussed. His Division had sent forward several suggestions; one was that the *Supplement* should be a different colour, that the edges should be marked in colour, or that the pages should be put in as an inset. The Journal Committee had replied that it would cost money and that it could not be done in the present method of putting the *Journal* together, but he still did not see why the position of the *Supplement* should not be altered.

Mr. A. LAWRENCE ABEL (Marylebone) supported the motion but suggested that the motion should be referred to Council so that the Journal Committee might once more consider it from a sympathetic point of view.

Dr. HAMILTON said that the Journal Committee would not be doing its work if it did not give consideration to these matters from time to time and it would look at this again if the mover referred the matter to Council. Separate stitching of the *Supplement* would cost about £5,500 over and above the present cost, and it would mean almost inevitably that the *Journal* would arrive later than it did now because of the mechanical and human difficulties which would be experienced by the printing works. It would also be offensive journalistically to put the *Supplement* in the centre, as it would divide the editorial pages. The object of the Journal Committee was to produce an article of the highest standards.

Dr. BARFORD said that he had heard arguments about the expense, but he was not convinced by the arguments against putting the *Supplement* into the middle part of the *Journal*. He would accept the suggestion that the matter be referred to Council.

Greetings from Irish Medical Association

A telegram was read from the Secretary of the Irish Medical Association sending all good wishes for a successful and enjoyable meeting.

ASSOCIATION FINANCE

Mr. L. DOUGAL CALLANDER (Treasurer), presenting the Financial Statement for 1955, said that, having practised every economy and particularly by careful budgeting, the Association had experienced a reasonably good financial year in 1955. Subscription income, after allowing for losses and exchange, had been slightly short of £260,000, representing an increase of £7,809 over the previous year. During 1955 the Association had attained its highest membership in its history.

Mr. Callander paid tribute to the excellent work of secretaries and members of executive committees of Divisions in interviewing non-members and members in arrears as a result of his own appeal at the last A.R.M. There were now 5,560 members paying their subscriptions by way of banker's order, which guaranteed a very considerable income on January 1 of each year. He was pleased to report that membership continued to increase.

There had been a slight increase in rents from tenants in B.M.A. House. Interest on investments was up because considerable sums of money had been obtained at the beginning of the year which had not been needed until later. The line had been taken of investing in Treasury Bills for periods of 91 days so that they fell in at various periods with interest of 5 to 5½% without any risk of loss of capital. Last year some £1,700 of income had thus been obtained which the Association had hitherto never had. Total expenditure, he said, had increased from £227,000 in 1954 to £243,000 in 1955. Against this, there had been received from the Government a grant of £10,100 towards the Central Medical Recruitment Committee, while there had been a surplus on the publications of the Association.

He hoped the Representative Body would feel that the past year had been satisfactory, but, turning to the present, he regretted that the picture was changing. At the beginning of the year increased expenditure had been anticipated, the exact amount of which had not been possible to foretell,

but it had been anticipated that there would be a balance of £20,000 to be earmarked for the general reserve at the end of the year and a surplus on publications. The budget had already had to be amended, due to increased printing costs and the prolonged printers' strike, which had affected advertisements, particularly in *Family Doctor*. It was already evident that the surplus on publications would be materially reduced from last year. A few weeks ago the Council had been obliged to meet a quite proper claim by the clerical staff for a cost-of-living bonus, which had cost £8,524, more than absorbing the contingency figure of £5,000. There would be other increases in the remainder of the year which it was not yet possible to assess.

The future promised an estimated surplus of anything from £5,000 to a doubtful £15,000 against last year's £47,000—not enough for an association of the size of the B.M.A. if it were to avoid the unhappy experience of a few years ago. It left the Treasurer with too little surplus to meet the unforeseen or indeed the foreseen rising costs due to inflation. Inflation was still going on, and it was affecting everything at Headquarters. It was his duty as treasurer to sound a serious note of warning. Every item of expenditure would be carefully scrutinized and every step taken to introduce economies where they could be introduced without loss of efficiency. It was quite clear that the Association could not entertain any large item of new expenditure at its present subscription income. While he would be the very last person in the world to recommend an increase of subscriptions, he was obliged to point out that unless it was possible to widen the margin between income and expenditure it might be necessary in the future to take that unpleasant step. The income from subscriptions, rents, and interest on investments was just enough to run the Association in its present form. He trusted that all members would appreciate in all seriousness the existing situation. It would be his own unpleasant duty at the very first meeting of the Council after the A.R.M. to suggest economies that might be made, but he was not prepared to suggest economies which would in any way reduce the efficiency of the Association. There was only one B.M.A., as the Chairman had so often said. To keep it in its present form he feared would require extra money to run it in the way that would be desired by all.

In reply to a question about Dr. Boyd's bequest, he said that he had only ten days ago given instructions for the payment of death duty on a sum of money which would eventually come to the Association, and a statement on the subject would be made at Monday's Council meeting. He assured the meeting that, without any doubt, the original intention of Dr. Boyd with regard to Manchester would be honoured.

Subsistence Allowance

Dr. E. TOWNSEND (Cornwall) moved that, the principle having long been approved as the policy of the Association, the time had arrived when subsistence allowances should become payable to members when attending centrally arranged meetings for which they have been elected.

He said that, while it was proposed to spend money on many social amenities which were much to be desired, such things were not as important as implementing a proposition which had been agreed to in principle as long ago as 1951. Not only must the Association afford to do it; it could not afford not to do it. It was wrong that members who were willing to attend centrally arranged meetings should be prevented from doing so because they could not afford to. The quality of representation would deteriorate in the very near future unless something was done. If necessary, third-class instead of first-class travel might be authorized. He inquired how many members of the Association travelled first-class at any time when not attending B.M.A. meetings.

Dr. O. C. CARTER (Bournemouth) said there had been a breach of faith in the matter of subsistence allowances, the principle having been agreed by Council so long ago. The present income of the Association was £68,000 above the 1951 figure and last year there had been no deficit on the publications. The Representative Body was the custodian

of the Association's money. However desirable certain other activities might be, priority should be given to the claim of Representatives to subsistence allowance, which, averaging £5 per Representative, would cost a little over £2,000 for each meeting.

Dr. W. N. LEAK (Mid-Cheshire) said that, while the inconvenience of the claim was thoroughly realized, it was surely not to the honour of the Association, with its 60,000 members and six-guinea subscription, that it could not afford to pay the expenses of those who served it so well purely in an honorary capacity.

Dr. M. R. SHERIDAN (North Middlesex), supporting the motion, said the democratic foundations of the Association were in danger under the present system. The active members of the Division made up, in great part, the Division's executive committee, but it was not really the active members that went as Representatives to the Representative Body, for they had to be able to afford to leave their practices and pay a locum.

Dr. R. B. L. RIDGE (Enfield and Potters Bar) said that the proposal should be put into effect at once, although he appreciated that the Association would have difficulty in affording it. His Divisional meeting had expressed willingness to accept an increase in subscriptions in order to provide the allowances.

Dr. ST. G. B. D. GRAY (South-West Essex) suggested that the allowance should be one or two guineas per day.

Dr. F. P. RUST (Harrogate) thought it was generally believed that the central body was constantly keeping under its eye the various suggestions that were made. He thought it was possible for Divisions to be properly represented. It cost very little per head in a Division to send a Representative to the meeting, to pay a subsistence allowance, and to pay a locum, if necessary.

The TREASURER agreed that something should be done about the matter, especially in to-day's altered conditions, but was reluctant to commit himself until he had a better idea of what the financial position in the current year would be. He suggested that the meeting should refer the matter to Council, not for it to be deferred until next year but to be dealt with in the early autumn.

Dr. E. TOWNSEND (Cornwall), in reply, said that the Association must put first things first, for its future would depend on having the best representatives available.

The Cornwall motion was carried.

Dr. M. MACLEAN (Inverness) formally moved that consideration be given to reducing the B.M.A. annual subscription to whole-time salaried practitioners in the National Health Service.

The motion was not carried.

ASSOCIATION ESTATES

Mr. DOUGAL CALLANDER presented the report of Council under "Estates," and gave details of the redecorating and alterations which, he said, would improve, among other things, the ventilation and acoustics in the Council Chamber. He also gave details of negotiations with the lessees of the adjoining site in Tavistock Square concerning the installation of a series of windows in the south wall, and referred to the Burton Street site.

The report under "Estates" was approved.

PRIVATE PRACTICE

Dr. A. BROWN, chairman of the Private Practice Committee, moved the report under "Private Practice."

During the last year, he said, efforts had been maintained to get the fees paid to medical men stabilized, and the only matter outstanding was the payment by the Treasury of two guineas to medical officers instead of 25s., for which the Committee had asked. It was also hoped that improvements would be effected so far as the question of the remuneration paid to civilian medical practitioners undertaking work for the Air Force and the Army.

Other matters being dealt with were parking in cities and towns, private beds, and the allowances for medical wit-

nesses appearing in court cases, which had been increased from £5 to six guineas for a full day, and from £2 10s. to three guineas for a half-day.

On the question of drugs for private patients, Dr. Brown said that there had been a very satisfactory interview with the Minister, who had been sympathetic. The members of the delegation used every argument which had been used before in the Representative Body and the Council in support of the claim, and in his view some progress was made. The delegation was informed that the door was not closed, and the Minister went even further and agreed with the principle that private patients had a right to free drugs under the N.H.S.

It was clear from the agreed statement published in the *British Medical Journal* that the Minister had two general principles in mind. The first was the right of the public to choose what service they would take, or whether they would take any at all under the National Health Service, and the other was that the Minister could not interfere with the right of any doctor in his treatment and prescribing for his patients. At the same time, the Minister said that the present was not a very suitable time in which to go forward with an amending Act, which it would mean. To begin with the Minister said it was a highly controversial question which might lead to a great deal of discussion in the House. Secondly, he said that the legislative programme was already heavily overladen and he did not see any immediate prospects of getting an amending Act to the National Health Service Act put before the House. Thirdly, he said it would mean some increase in expenditure. The delegation endeavoured to point out to the Minister that it did not necessarily mean that. Then the Minister said that he thought there were other things requiring to be done in the National Health Service which had higher priority. He did not specify them, so the delegation had no chance of arguing the matter. Finally, the Minister suggested discussions with his officials on how the business of drugs for private patients could be carried out; and the first thing to be discussed, said the Minister, was the size of the problem, the second the estimation of the cost, and the third the administrative procedure.

The Minister also stated that a joint body would have to consider what the effect on the method of calculating the remuneration of general practitioners would be. He had pointed out that any increase in the number of patients receiving service privately instead of under the Service would mean some alteration in the pool. The delegation had agreed and pointed out it would mean a difference in the £2m. allowed for private practice in calculating the moneys already received by doctors. The Minister said that it might go further than that, and that a substantial increase might mean the whole method of calculating the pool would have to be altered, and instead of calculating on the number of doctors in the Service it might have to be calculated on the number of patients in the Service.

It was necessary, in Dr. Brown's view, to exercise great care in considering the problem. "Do not let us rush wildly in deciding what course should be adopted," he said. Accepting the Minister's statement that there was no chance of getting an amending Act on to the Table of the House for some considerable time, there was plenty of time in which to discuss the whole problem, and he suggested to the Representative Body that they should leave it to discussions in the two main committees concerned, to subsequent discussion in the Council, and then ultimately by the Representative Body when a report was made. He urged the Representative Body to accept some of the motions which came later as reaffirmation of a policy which the Association had always followed.

Drugs for Private Patients

Dr. R. GREEN (Brighton and Mid-Sussex) moved:

That the Representative Body notes with satisfaction that a further meeting has been held with the Minister of Health on the question of allowing private patients to obtain drugs, appliances, and dressings through the National Health Pharmaceuti-

cal Service. It again emphasizes the importance it attaches to this matter of principle and urges the Council to continue to seek a successful solution to this long-standing grievance.

He confirmed that the Minister had accepted the views expressed on behalf of the Association and had listened very attentively, and in securing recognition of those facts a definite advance had been made.

It must be recognized that there were some people who had not realized that there was a difference between a White Paper and an Act, and it was not therefore just a question of the proclamation of rights, because they had to be obtained by an Act of Parliament.

Another point about which the Minister was concerned was the control of prescribing and the difficulty of imposing penalties. However, the delegation told the Minister that their view was that it could be surmounted, and the fact that the Minister had suggested that it should be discussed must be regarded as encouraging.

So far as paragraph 4 was concerned, it might well be argued that the acceptance of the principle that private patients were entitled to a right to drugs under the Health Service and its possible implementation by legislation should have no bearing at all on the question of remuneration of Health Service practitioners. It would appear that the Minister considered that the granting of that facility would automatically increase the amount of private practice as a whole. That was an unjustifiable assumption at the present time, for the results were quite unpredictable. It was, of course, regrettable that in something which it was believed should be to the advantage of the medical service and to the benefit of patients it was apparently not possible and to keep away from political considerations. "However, the ultimate settlement of the grievances depends upon ourselves," said Dr. Green. "This year we have been told that the idea is not repugnant to conservative principles. We have had some frank discussions and, what is important, an invitation by the Minister to sit down and talk to Ministry officials and work something out. We have been told also about certain difficulties which we have recognized, and to overcome them will require statesmanship. Do not be put off by anything that is agreed, and let us get on and work it out and do it."

Dr. G. S. R. LITTLE (Greenwich and Deptford) said that his Division's motion supported the motion by Brighton; it deplored the continual refusal of the Minister to supply drugs to private patients. He was not criticizing the Private Practice Committee or the Council, but he felt the Association was being side-tracked by the Minister. He would suggest that they should not be side-tracked by the issue of remuneration or by the question of lack of Parliamentary time. The Government never did find Parliamentary time for something which concerned a minority, and this concerned a minority of people who wished to receive their medical treatment from a private practitioner and whose financial burden was added to by the fact that they had to pay for their drugs. Many people were being deprived of their rights in this respect because they had to pay for their drugs and appliances.

Dr. H. M. GOLDING (Bristol) asked why there had to be an amendment of the Act. He understood that it was a ruling of the first Health Minister that the general medical and pharmaceutical services should be taken as one part of the Act.

Dr. BROWN, Chairman of the Private Practice Committee, replied that not only did the first Minister say so, but the Association's own lawyers said so.

Mr. M. D. THAKORE (Doncaster) asked if this applied to all drugs and appliances or to drugs only.

The CHAIRMAN replied that it applied to drugs and appliances.

Dr. R. HALE-WHITE (Marylebone) said that if this matter continued to drag on it would come to a stop altogether. He was a little distressed to hear the chairman of the Private Practice Committee talking about leaving the matter until next year. It was obvious that the present Minister had

done what his predecessors had done in a more subtle way. He did not want a debate in the House, nor did anyone else. The excuse of a heavy legislative programme had been the excuse for five years. This had nothing to do with priorities in the N.H.S.; it had nothing to do with the N.H.S.—it was private practice. It had nothing to do with remuneration, though that might be a problem which would crop up if a substantial increase was likely. No one could say by how much private practice would increase if this went through; it might increase very little indeed, and there would be no need to worry about the boggy of remuneration of doctors who had no private patients. He thought the matter would be in better perspective if they stopped talking about it as a concession: it was no more a concession than the redemption of any other promise.

Dr. E. C. WARNER (Marylebone) said that Mr. Iain Macleod, when Minister of Health, stated that private practice was part of the National Health Service. He had gone to the trouble of finding out what this would cost, and it was very much lower than the Minister had said—something of the order of £500,000. No one turned a hair at the loss of £30m. on the British Transport Commission and he could not see why they should worry about £500,000. There was a proportion of the public who wanted this, and it was for the Annual Representative Meeting to pass the resolution and support those who wished to have this type of practice.

Dr. A. V. RUSSELL (Council) said that this was purely a reaffirmation of something which had been the policy of the Association since 1948. "Let us go on record as standing up for the rights of our patients."

The motion was carried.

Dr. J. C. A. NORMAN (Bournemouth) moved to instruct the Council to take steps to ensure that any further deputations to the Ministry to secure the right of private patients to obtain drugs and appliances through the N.H.S. should be more closely identified with private practice. He said that this was a corollary to the previous motion. His Division was very exercised by the fact that no member of the recent deputation to the Minister was engaged solely in private practice. It was said that the Minister suggested that a discussion should be held to determine what adjustment should be made in the Central Pool if a number of patients at present on the N.H.S. lists became private patients because they could obtain their drugs on E.C.10. All the members of the deputation were on the N.H.S. list and had private practices as well, and would be divided in their interests. It was not in the province of the General Medical Services Committee to approach the Minister on this matter, but the Private Practice Committee. On any other deputation there should be representatives of people closely identified with private practice. There were nearly 700 doctors in private practice alone, and they should be represented on any deputation.

Dr. A. TALBOT ROGERS, chairman of the General Medical Services Committee, said that it was the Council who decided that it was important that the deputation should represent the Private Practice Committee and the General Medical Services Committee, because nothing could be decided which would not affect practitioners in the National Health Service, the majority of whom had private patients also. It was therefore decided that the deputation should be chosen from the two committees, it being left to the two Chairmen to make the choice. It was hoped that it would be possible to include a doctor who was a private practitioner, but he was not prepared to go as a representative of the General Medical Services Committee although he would have been introduced to the Minister as a private practitioner. If he had done so the deputation would have been stronger. All the arguments which could have been put forward to the Minister were put forward very ably by Dr. Brown and his colleagues; there was nothing left unsaid which could be said.

Dr. Rogers hoped the resolution would not be accepted. A joint meeting of the two committees was to be held to see if the many difficulties could be thrashed out and a scheme acceptable to both put forward. The deputation told the Minister that, so far as the profession was concerned,

there was no reason whatever why drugs should not be supplied to the private patients.

Dr. NORMAN, in reply, said that Dr. Talbot Rogers said he was in favour of the resolution but asked the meeting to reject it. The resolution was a suggestion for strengthening future deputations and would satisfy the people in purely private practice.

The motion was carried.

(Dr. A. Beauchamp, Deputy Chairman, took the chair at this point.)

Dr. J. W. RIDLEY (Cleveland) moved that the fee for reports to Government departments at present standing at 5s. be increased to 1 guinea in conformity with the fee paid by insurance companies for reports without examination, without comment.

Dr. BROWN, while in sympathy with the amendment, said that there was no agreement with life assurance offices that the fee should be £1 1s. Members had been advised that in the opinion of the Committee the fee should be one guinea. The amendment was carried.

Telephone Charges

Dr. J. A. WAKES MILLER (Rugby, with South Warwickshire) moved: That this meeting is amazed at and dismayed by the new and heavy charge for switching telephone calls during temporary absence. If most doctors are to continue to give the 168 hours per week service which was morally though not legally expected, then this particular charge should be either paid directly by the Health Service on presentation of the telephone account or else the charge withdrawn. He said that his Branch had had a fair amount of correspondence on this issue with the Postmaster-General, the executive council, and other interested bodies, and it was hoped that something could be done to obviate them.

Dr. I. M. JONES (Sunderland) hoped that the motion would be turned down. The matter had been gone into in great detail with the Postmaster-General, and from the examination made by the Private Practice Committee certain things became clear. First of all, even the amended charges were below the actual cost of the service. To pay 5s. was not the cheapest way of doing it if a doctor used the service regularly. It would cost at least 5s. to have a sitter-in, but there were cheaper arrangements. To pay £2 a quarter meant that the telephone could be transferred as often as one wished, so that it need not cost more than £8 a year, and this was allowable for income tax. On the other hand, if the telephone was consistently transferred to a specified number an entry could be made in the telephone directory for a small fee. This motion would, in effect, ask the Government to create another subsidy, which he did not think the profession had any right to do. There would be difficulty in distinguishing between this profession and other professions which might say that the telephone was essential to their business.

Dr. J. G. R. CLARKE (South Bedfordshire), while agreeing that it was not right to expect a subsidy to deal with the problem, said that nevertheless the Association was facing an increasing gap, which would not be readily closed, between income and expenditure. It was true that increased expenditure would go towards the tax expenses total, but in ordinary private enterprise a man was in most cases able to pass on an increase in cost fairly rapidly to the consumer—in the case under consideration, the patient—which the medical profession could not do.

Dr. A. B. DAVIES (Walsall and Lichfield) said the increased telephone charges were always heavily subsidized in the doctor's favour. Those assessed on Schedule D—as were most G.P.s—received 100% allowance on all telephone charges. The charges that remained to be paid by all G.P.s in the kingdom were added together and considered in that proportion of the claim for remuneration which went for practice expenses, so that although the individual may not see his money back directly, within two years the whole of the G.P.s did receive back by way of an increase in their practice expenses ratio the whole amount that they had individually and collectively paid on the increased telephone charges.

Dr. A. BROWN said that the telephone service was a national service and the cost per quarterly charge was £2 10s. over the whole country. For a little over 3s. a week, or 6d. a night, a doctor could get his telephone transferred to a partner or neighbour throughout the year. He asked if anyone could think of a cheaper service.

Dr. S. NOY SCOTT (Council) said that "paid directly by the Health Service" could not mean anything but "paid by the Government." He did not see why they should pay for calls which might be private calls. To allow the principle that the Government should pay 100% on any one of the practice expenses was to put another nail in the coffin of the ordinary service and was simply asking for a Government whole-time State service.

The Rugby amendment was lost.

Medical Examination of Elderly Drivers

Dr. F. P. RUST (Harrogate) moved that when the medical examination of elderly drivers was requested by insurance companies it should be carried out by an independent doctor for a similar fee to that for life insurance, and this fee should be payable by the insurance company. He said that the mere form in which such a patient requested a certificate suggested that he expected a favourable report, and, because he was paying for it, it savoured rather of bribery.

Dr. A. BROWN said that the Accident Insurance offices had been approached, and had expressed the view that it was up to the individual who wanted an examination for the purpose of driving his car to get that examination and report at his own expense. The Council would be prepared to have another try, but that had been the attitude of the companies so far.

Dr. R. W. McCONNEL (Buckinghamshire) said that surely the doctor should not run away from his responsibilities. If the suggestion in the motion were adopted, patients might get the impression that some special doctor was required to give an insurance examination and that the general practitioner could not do it. He thought that the ordinary type of certificate should be given by the patient's own doctor.

Dr. RUST, in reply, emphasized that the question of unfitness to drive was an important matter and a half-crown certificate was very easily given without a complete examination.

The Harrogate motion was carried.

Fees for Practitioners Called in by Police

Dr. A. BROWN moved as a recommendation of Council the adoption of the revised scale of fees for payment to practitioners in England and Wales called in by the police. (The scale was published in the Annual Report.)

The recommendation was adopted.

Dr. R. M. WARREN (Southampton) moved strong support of the Council's action in making a claim for increased fees for payment to practitioners called in by the police, and called upon the Council to pursue its claim with the utmost vigour.

This was agreed to without discussion.

Medical Examinations for Life Assurance

Dr. R. P. HENDRY (Rugby, with South Warwickshire) moved that if, after a report on a medical examination for life assurance had been received, further medical evidence was considered necessary by the office's chief medical adviser, then that evidence should be obtained at the office's expense, not at the expense of the patient.

He said that his Branch had taken umbrage at the attitude of insurance offices in requiring a special examination and not being prepared to pay for it.

Dr. A. BROWN said it had been made perfectly clear to the insurance offices that any extra information required, provided the original report had been filled up correctly, should be paid for, and the offices had agreed to pay for such extra information. They had since said that there were a certain number of very low premium policies which could afford a 2-guineas fee but not an extra fee for further

information; if that extra information was not conveyed by the proposer to the company he might find himself being refused insurance, having to pay an increased premium, or be at some other disadvantage. By insisting that the company should pay for this extra information, therefore, the doctors might be penalizing some of their own patients.

Dr. J. B. WRATHALL ROWE (Harrow) said that, as an industrial medical officer in a factory where the staff were x-rayed on entry and at certain other times during the year, he was often asked to supply information regarding the chest x-rays of employees after local practitioners had examined them for private life insurance—a request with which he had always complied. He was now wondering whether that ought to be done, thereby giving those companies free information.

Dr. HENDRY said that to reject the motion was, in effect, expecting the consultants to subsidize insurance branches. It meant that if the companies could not afford to do it they had to beg, borrow, or steal the money from the medical profession to make good the deficiency.

The motion was carried.

Certificates in Respect of Absent Voters

Dr. R. P. HENDRY (Rugby, with South Warwickshire) moved that the medical certificate at present required with an application to be treated as an absent voter was entirely unsatisfactory, and should read: "I certify that in my opinion it is undesirable on medical grounds that this applicant should go in person to the polling booth, and that this state is likely to continue (for . . . months) or (indefinitely)."

He suggested that many practitioners on filling up the certificate referred to in the motion must have committed perjury in the past, and that the wording that he suggested would be more appropriate.

The Rugby motion was carried.

Certificates for Short Illnesses

Dr. T. MOONEY (Cumberland) moved to request the Council to approach industry in general with a view to abolishing the requirement of medical certificates for short illnesses.

Dr. J. C. ARTHUR (Gateshead) opposed the motion, pointing out that there was no definition of a short-time illness. It would be throwing away a legitimate form of remuneration, which was one of the few private forms of remuneration left.

Dr. R. S. V. MARSHALL (South Staffordshire) suggested that there was a debasement of medical certification because of the unnecessary certificates asked for by industry. In his view something could be done locally about the matter.

Dr. J. B. WRATHALL ROWE (Harrow), in opposing the motion, said he had asked the mover what he meant by a "short illness," and the reply was one or two days. Generally speaking, in industry one or two days' absence was allowed without question. (Cries of "No.") Unless there was a sick-pay scheme those two days were covered.

Dr. R. WEBB (East Suffolk), supporting the motion, said that the N.H.S. was never designed to deal with the mass of certification which agreements regarding pay arrangements entailed. The extra work that would be thrown on the Service would be very great, and the treatment of the sick would be rapidly subservient to the consideration of certification.

Dr. R. H. MOORE (North Middlesex) asked whether it was not a fact that certificates for short-term illnesses were really required by companies for audit purposes. They acted as vouchers for payment to men who said they were sick.

Dr. J. S. M. ORD (Glasgow) asked the Representative Body to support the motion and thereby get rid of the nuisance of unnecessary certification.

Dr. A. BROWN said it would be very difficult to get rid of the certificates. "If you are to say that all industry should abolish this demand," he said, "you will have to

start at home, because I understand that the B.M.A. demand from the clerical staff a certificate after an absence of two days."

Dr. T. MOONEY (Cumberland), in reply, said that the point was a simple one. "We have all sampled the pudding and we know what it tastes like," he said.

The motion was carried.

PUBLIC HEALTH

Dr. J. B. TILLEY (chairman of the Public Health Committee) presented the report under "Public Health." He referred to the previous year's decision that steps should be taken by the Association to raise the low level of remuneration in the public health service, and said that the matter had been considered by the Public Health Committee during the year. The view of the Council on the appropriate action to be taken was that an independent committee of inquiry should be set up. It was of interest to report that the last industrial court award had now been implemented by all but eight local authorities out of 1,600 authorities in this country. The Public Health Committee had felt that it could do no other at the moment than move to obtain an increase in remuneration on the grounds of the cost of living since the last award, and agreement was reached in Committee C in April. The figures were accepted with some regret, but as they were related to the increase in the cost of living they did not seem unreasonable. It was made perfectly clear to the Management Side, when the claim was made, that it did not for one moment mean that the public health service accepted the last award of the Industrial Court as being a proper level of remuneration for public health medical officers.

On the question of appeals, there had been 30 successful appeals, and all but one had been implemented by local authorities. That exception was Middlesbrough. Whilst it would appear that the Council so far had done all in its power to get Middlesbrough to implement the appeal, it might be that in the course of the ensuing 12 months Council could give some attention to the possibility of bringing pressure to bear. In that particular instance the Management Side of the Whitley Council concerned had been as helpful as possible.

Turning to appeals machinery elsewhere, he reminded the Representative Body that in Northern Ireland there was no adequate appeals machinery at all, and Council decided that a deputation should wait upon the Ministry in Northern Ireland, after consulting with the Northern Ireland Branch, in order to see what improvements could be made. In view of the special circumstances, it was felt difficult to have a regional appeal in Northern Ireland, but it was hoped that before long appropriate machinery would be available for the men in the hospitals and public health service who had outstanding cases for appeal.

The question was considered of medical officers of health acting as medical referees at crematoria, and in those cases where medical officers of health accepted posts of referees at crematoria they should be entitled to a regrading of their salary.

Dr. Tilley went on to move as a recommendation of Council:

That it be the policy of the Association that no woman doctor should be disqualified from obtaining a public medical appointment or be dismissed from such an appointment simply by reason of marriage.

This was agreed to.

Pure Milk

Mr. A. LAWRENCE ABEL (Marylebone) moved that the meeting would welcome next year a report from the Council on the subject of pure milk for the nation.

Ten years ago, he said, Marylebone took a great interest in the question of clean milk for the nation. It was the duty of the Representative Body to keep an eye on the question of clean milk, and everything that could be done to upgrade dairy stock should be done. "In Marylebone we have been asking ourselves—and we have not got the

answer—whether the Ministry of Agriculture and Fisheries is good enough to supervise cows, cowsheds, udders, and milk," he said. "Do our colleagues, the medical officers of health, get enough ingress into cowsheds to supervise the production of pure milk as they should? What encouragement do good farmers have for producing upgraded herds and producing better milk?" Although there had been some improvement there were too few benefits for the good farmers and too little encouragement. A report from the Council was requested so that the profession could keep an eye on the extremely important subject of national health.

Dr. H. D. CHALKE (Council) said there was a Gilbertian situation in the country at the present time. The inspection of cows and cowsheds was the responsibility of an officer from the Ministry of Agriculture, whilst milk in transit and in shops was the responsibility of the local health authority. The position was absurd. There must be one milk which was satisfactory for the public.

Dr. F. E. GRAHAM-BONNALIE (Exeter) said he did not believe the "dirty milk story." He visited farms very frequently, and the "dirty" farmers had now been put out of business. There were a number of farmers in Devonshire who were not allowed to sell milk any more.

Dr. W. S. PARKER (Public Health Service) disagreed with the previous speaker, and said that, of 2,000 samples of raw milk which came into Brighton from various dairies, one in three was unsatisfactory on the methylene blue test, and one in seven of T.T. samples was unsatisfactory on the same test. There was one inspector at the Ministry of Agriculture and Fisheries for 900 farms which supplied the milk.

The motion was carried.

Annual Leave of Public Health Medical Officers

Dr. S. J. FIRTH (Brighton and Mid-Sussex) moved that the terms and conditions of service of public health medical officers should be reviewed with the object of relating them more closely to those pertaining in the hospital services in regard to annual leave. He said that it appeared to be the practice to relate the amount of annual leave in the National Health Service to the amount of the salary paid in particular grades. Even in the clerical grades the amount of annual leave was based on the amount of earnings. If doctors contributed to the local health services they contributed as doctors, and their remuneration and conditions of service should be kept within the ambit of the Whitley Councils.

Dr. TILLEY said that the Brighton delegate spoke of medical officers of health and counties and county boroughs only, but this should apply to all medical officers in the public health service.

The motion was carried.

Air Pollution

Dr. D. S. ROBERTSON (City of Edinburgh) moved:

That this meeting views with grave concern the continued menace to the health of the people caused by air pollution; welcomes the passage of the Clean Air Bill through Parliament; urges the Government to implement its provisions vigorously; and wishes particularly to impress upon local authorities the urgent need to use to the full the statutory powers given to them to declare smoke-control areas.

He said that he had learnt before coming to Brighton that the death rate in 1954 for bronchitis was 29 per 100,000. In Oldham it was 139 per 100,000, nearly five times as much, and there were other figures which could be quoted to show the difference between chronic bronchitis in places such as Brighton and industrial areas. Medical opinion was becoming more and more firm that this difference was due to atmospheric pollution by smoke. It was remarkable that everyone in the community was careful about the purity of the water they drank, but careless about the purity of the air they breathed into their lungs. Bronchitis was regarded as an everyday commonplace; it was insidi-

ous, inexorable in its course, and inevitable in its results. It was a disease for which little could be done. The introduction of the antibiotics had done very little to reduce the ultimate mortality from chronic bronchitis. Medical opinion was sure that it was the result not of chronic infection but of chronic irritation, and the chief chronic irritation was atmospheric smoke. There was an excellent leader in the *British Medical Journal* of April 21 (p. 906), following a discussion at the Royal Society of Medicine, which finished up with the words, "Abolition of atmospheric pollution may prove to be the most important single factor in bringing this about"—that is, of a substantial fall in the incidence of chronic bronchitis.

There was at present a Clean Air Bill before Parliament. He was not quite sure what stage it had reached, but it was an excellent Bill, provided it was implemented, and one should congratulate the Government on bringing it forward. Too many of these Bills were not mandatory; in this one local authorities might set up smoke-controlled areas and pressure must be brought to bear on them to institute smoke-controlled areas in all large cities. He was told that this would be very expensive, and subsidies would be required to reduce the price of smokeless fuel and furnaces to burn it in, but air pollution was costing the country £150m. per year in the upkeep of buildings, and who could estimate what it cost in terms of ill-health? Edinburgh felt that it was the duty of the Representative Body of the doctors of Great Britain and the Commonwealth to declare that it was the inalienable right of the people of this country to breathe clean air.

Mr. A. LAWRENCE ABEL (Marylebone) emphasized what the last speaker had said. The head of the National Industrial Fuel Efficiency Service said that hot air was costing the nation £35m. a year—that was the mere heating of houses and factories—and the Coal Research Board had shown what a vast amount of heat from coal went up the chimneys, leading to pollution of the atmosphere. Two or three days' fog in London a few years ago caused the deaths of 4,000 more than the average. Clean air was a sound and economic proposition as well as a sound medical one. He hoped the meeting would pass the resolution.

Immigrants with Communicable Diseases

Dr. J. G. FREEMAN HEAL (Willesden) had a motion expressing alarm at the continued influx of immigrants found to be suffering from communicable diseases, and instructing Council to explore the problem with a view to necessary action.

Of the three main types of communicable disease, tuberculosis was the most outstanding and the most readily disseminated. Figures were not yet available to any impressive extent, but a report was being prepared by the Joint Tuberculosis Council which would possibly contain the necessary statistics to crystallize the experience of general practitioners, tuberculosis clinics, and hospitals that cases of tuberculosis were entering the country in far greater numbers than the Ministry of Health was willing to admit. At one clinic in N.W. London, of 78 beds provided for the treatment of pulmonary tuberculosis one-third were permanently occupied by Irish immigrants. There appeared to be no effective statutory power to prevent the entry into the country of persons suffering from active pulmonary tuberculosis. Britain was almost alone in the Commonwealth in not requiring an examination and certificate of fitness from prospective immigrants before leaving the country of origin.

Apart from all other considerations, economic common sense demanded that adequate legislative measures should be taken to prevent the importation of communicable diseases into Britain.

Dr. H. D. CHALKE (Council) said that the Council had gone into the matter and had learned some months ago that the Minister had been advised that there was no problem. The Minister had been given figures which the Council had considered were not sufficiently up to date or wide; they had taken a lot of trouble to get information from all parts

PUBLIC HEALTH

The debate on the section under "Public Health" was resumed.

Tetanus Immunization

Dr. A. M. MAIDEN (Lincoln) moved to urge the Ministry to consider the advisability of encouraging active immunization against tetanus as a public health measure.

Many of the tragic deaths of young children could be avoided, he said, if, through the passing of the resolution, the matter were brought to the notice of the Ministry for the latter to make up their minds and give some guidance. Tetanus among young children was a killing disease, especially in the south, and very often arose from the most trivial injuries. The present treatment was not particularly effective, and it was rather difficult to get accurate statistics, because tetanus was not a notifiable disease. There had been some 200 cases in England and Wales last year, resulting in some 80 deaths. The anti-tetanus serum was not without its dangers—a point which had to be considered by general practitioners and casualty officers when administering it for trivial injuries. Even if it were given for every injury the death rate from the complaint could not be reduced by more than 20%. The solution was to promote the widespread use in infancy of the toxoid which was at present available. It was safe to use and easy to administer in combination with the whooping-cough and diphtheria injections. The immunity lasted from 5 to 10 years, but in some cases there was the possibility of immunization for life.

Dr. W. S. PARKER (Public Health Service) said that, on behalf of the public health service, he endorsed the resolution. Twelve persons died in this country every day from tetanus for every one who was hanging by the neck through judicial execution. If it were possible to divert Parliament for a day in order to deal with social misfits, it ought to be possible to divert the country in order to get tetanus immunization. Tetanus was responsible for fifteen times as many deaths as was diphtheria.

Dr. J. S. M. ORD (Glasgow) opposed the resolution on the grounds that it had come 20 years too late. With the passing of the horse, he said, the dangers of tetanus infection had been to a great extent minimized. (Cries of "No.") Furthermore, it was customary, in the case of street accidents, for the hospital authorities to give the anti-tetanic serum, and if a doctor was in doubt about the effect when a patient had been injured he could get the serum from a chemist. Such immunization was purely voluntary, and he thought it would be better to concentrate on the more important immunizations against diphtheria and poliomyelitis and vaccinations against smallpox.

Dr. MAIDEN, in reply, emphasized that the proposal had world-wide support. Even if the measure were 20 years too late, it was time a move was made.

The Lincoln motion was carried.

Dr. R. P. LISTON (Tunbridge Wells) had a motion deploring the failure of the Ministry of Health to carry out its proper duty of educating the public in everyday matters of health.

His Division decided upon the motion during a meeting at which some of the members deplored the needless time-consuming calls on their services, and continuing demand of their patients to be supplied with a bottle, whatever the reason which might have prompted their attendance at the surgery. It was felt that that attitude towards the service was not entirely the fault of the patients, as they had been led to believe that it was a free service and what they demanded they should receive. The root cause of the trouble was lack of publicity in regard to the true functions of the doctor and the real role which a health and not a disease service should play.

The public required educating on the proper use of the National Health Service, and that education should start in the infant and nursery schools, continuing throughout school life. In 1954-5 £70,000 only was spent by the Government on information services relating to health

of the country, and had had no hesitation in recommending as strongly as possible that there was in fact a very big problem. They had not agreed that there were great difficulties in solving it. It was not only the West Indies who were responsible; there were friends living near this island who were probably more responsible. It was not possible to go to the Dominions or the United States without having an x-ray taken. He hoped representatives would agree that it would be perfectly simple for immigrants to be x-rayed before entering the country. Tuberculosis mortality had fallen rapidly; some hoped that its elimination was just round the corner; but there were now little foci of infection instead of large-scale infection; by a little administrative action those foci could be ringed round and eliminated.

"Our friends from the West Indies have not been inculcated in health habits as we have," he said. "They do not go to the chest clinic when they are told."

Through the courtesy of the Joint Tuberculosis Council the document which they had prepared had been submitted to the General Medical Services Committee, which had wholeheartedly supported everything in it and had asked the Tuberculosis Council if they could in any way reinforce the Association's recommendations and transmit them to the Government. He hoped that the Representative Body would support as strongly as possible the excellent resolution from Willesden.

Dr. J. BALLANTINE (Coventry) said that during 1955 and the first few months of this year there had been 118 instances in which people from Ireland had been found to be suffering from tuberculosis in the Coventry Division. All immigrants ought to have a chest x-ray before leaving, or, preferably, be treated in their own countries. If they had to come to this country, the chest clinic and their own practitioners should have the essential information so that they could help in their future health.

Dr. H. GUY DAIN (Council) said that all representatives, as doctors, would be enthusiastic on the issue and that he would be very surprised if there was anything other than unanimous support for the resolution. Not only doctors but the public should understand the importance of the problem, because all that had so far stood between this resolution and its implementation some time ago had been the ever-open-door policy to immigrants from practically all over the world to this country. So long as the country was prepared to accept refugees from all sorts of places without medical examination, that ever-open-door policy would be maintained. In 1949 the Minister of Health's Advisory Council had suggested that immigrants should be examined for infectious diseases of various sorts, but nothing had ever been done about it. Every Government had taken the view that they were not prepared to undertake the political side of it, which would mean putting some obstruction in the way of refugee immigrants from other countries, while, during the war and until recently, large numbers of immigrants had been needed to increase the labour force of the country.

Dr. J. B. WRATHALL ROWE (Harrow) spoke of the high incidence of a disease popularly known as "worms" among immigrants from tropical countries who were employed as porters in kitchens and restaurants, particularly in the West End, and in some canteens. People responsible for their employment had a duty to make sure that they did not increase this danger.

The Willesden motion was carried.

The meeting rose at 6 p.m.

SECOND DAY

Friday, July 6

The meeting recommenced at 9.30 a.m., with Dr. I. D. GRANT in the chair.

Messages were read from Sir Henry Cohen and Mr. Tudor Thomas acknowledging the congratulations of the meeting on their recent honours.

matters, whereas in the same period over five times that amount was spent on propaganda for national savings.

Dr. H. D. CHALKE (Council) said that, while he agreed with the sentiments of the motion, it should not be accepted in its present form. It was not the Ministry of Health only which was responsible for health education. Hundreds of organizations were involved, and the Association's own *Family Doctor* was becoming a potent source of education in health matters in this country.

Dr. J. B. TILLEY (Council) said that the motion, as at present worded, did not truly reflect the position. Health education was something on its own and should not appear to be bedevilled by the question of saving money. The Council should consider the matter, but in his view the Representative Body should not pass the motion in its present form.

Dr. LISTON, in reply, said that the Association was, it was true, playing a very important part in educating the public in health matters, and was doing the Government's job. He would be prepared to accept any amendment of the wording which would make the motion all-inclusive.

The motion was accepted as a reference to Council.

Health Nurses

Dr. J. S. HAPPEL (Winchester) moved that "health visitors" should be re-entitled "health nurses."

"We think that the name 'health visitor' is a bad one," he said. It sounded too officious and suggestive of a Government snooper or some other official busybody, and the reaction to it was unfavourable. The term "health nurse" was much better, as it described what the person was—a "super nurse," specially trained and specially qualified. People would much more readily accept the advice of a nurse than an official visitor.

Dr. A. G. HERON (Bristol) asked the meeting to reject the motion. It would, he said, be a mistake, particularly as things were at present, to change the title, because these visitors, owing to their training, could not be said to know anything about health. Secondly, in Bristol at all events, they did no nursing; and, thirdly, if they were called "health nurses" it would be an insult to the district nurses.

Dr. R. G. GIBSON (Council) said that a health visitor had been posted to his partnership by way of experiment for six months, and it had been very successful. The nurse was of the greatest help, and in the end was facing more work in one day than she could possibly handle. One snag was, however, that the experiment did not work until the term "visitor" had been got rid of. He hoped that Council would suggest to the Minister that the word "visitor" did put off the average patient and that it should be changed to "nurse."

Dr. N. NELSON (Dundee City) commented on the fact that in Scotland it was necessary to pay for nurses to work in practices, whereas in other parts of Britain it would seem that some practices were subsidized in that connexion.

Dr. J. S. NOBLE (Blyth, with Morpeth) suggested that there had been a slur on health visitors. His experience was that they were excellent. They were completely trained nurses, most efficient, most kind and understanding, and he regretted any slur which might appear to come from the meeting on the great work which those women carried out.

Dr. A. BARKER (Council) said that in his view the health visitor was performing a most valuable service. She was a fully trained nurse and a fully trained midwife.

Dr. I. M. JONES (Sunderland) supported the motion if for no other reason, he said, than the work which the health visitor could do with regard to the geriatric service generally. Old people regarded the health visitor as a nurse, and the resolution put the matter into proper perspective and accorded her a title which was honourable and fitting.

Dr. J. B. TILLEY (Council) said it did not really matter whether the motion was passed or not. The important thing was the remarkable support there had been for the health visitor. The term "health visitor" was statutory at the moment, and there was little likelihood of the term being changed for some time.

Dr. HAPPEL, in reply, said that the public did not like the name and it should be changed. They did not know whether she was a nurse or not, and it ought to be made clear that she was. There was no question of a slur on the visitors.

The Winchester motion was carried.

Dr. A. J. R. F. JOHNSON (East Norfolk) moved that in country districts the duties of health visitors should be combined with those of district nurses, each with smaller areas.

There was, he said, a great shortage of practising midwives all over the country, and the motion was submitted in order to try to create the most efficient service with the number of midwives there were. Most health visitors in his district were also fully qualified midwives, and in the country areas it had been very successful when the district nurse combined her duties with those of the district visitor. Owing to the fact that the district visitors possibly had a little more money and leisure, the district nurses were taking a short course, qualifying, and going into the health nursing service, leaving a shortage of district nurses.

Dr. W. S. PARKER (Public Health Service) said that nothing but good could come of a careful reading of the Working Party Report just issued by the Government, and he would commend it to every member present. He appreciated the problems facing the Norfolk doctors—his last appointment was on the borders of their Division in the Fens. The circumstances of rural areas were not uniform. General practitioners would be able to confirm this in their own practices, and the premature adoption of a rigid scheme tying the hands of the Association in its policy might offer a solution to one part of Norfolk, but it would limit special schemes by local authorities in other parts of the country. He suggested that the proper solution was achieved not by this method but by creating a state of active liaison between the medical officer of health, the health department, the State, and the local general practitioners. He would ask the meeting to reject this as premature; he felt that it was too sweeping.

Dr. F. GRAY (Council) supported the motion. It was thoroughly practical. Just outside the borders of the County Borough of Brighton this was being operated in East Sussex. It was advantageous for everybody concerned; the health visitor's duties tended from time to time to become a little monotonous, and to combine the duties gave her a little wider scope. When she went to a house the people knew that she came to help and were willing to listen to advice from somebody who helped them when they were ill. From the patient's point of view there was still another advantage. The district nurse and health visitor never gave contradictory advice when they were one and the same person. From the doctor's point of view there was an enormous advantage that one person should work with him as a district nurse and know his methods.

Administrators said that it was difficult and could not be done, but if it was going to be good for the district nurse, health visitors, the patients, and the doctors, the convenience of the administrators must take second place. He thought the meeting would say that this was one of the great opportunities of repairing the breaches between the different parts of the service bringing preventive and curative medicine together.

Miss GLADYS M. SANDES (Marylebone) supported the resolution. She had watched with interest the change of the attitude of the members of the Representative Body for the last few years towards health visitors. In one area the combination of these duties had been going on for some time, and she was impressed by the way the county officers had gone ahead with this in spite of officialdom. In the cities there was still the older type of health visitor who had been taught that she must educate the people and that she was not a nurse. One could not expect these women to turn round and change their outlook; they had already been asked to extend their duties to visiting the aged and so on. She thought the combined offices should have the name "health worker" instead of "nurse" or "health visitor." She would, however, plead for flexibility in the interim period; in ten years everything would be amalgamated and

these different types of work would be associated in the same person. That would be the only way to stop the drift from district nursing and midwifery in the homes.

Dr. F. A. BELAM (Guildford) did not think this proposal was possible. The health visitor's work was full-time work in health education. Not only did she tell mothers how to feed their children, but she was able to prevent the break-up of families, by giving proper advice to people who trusted her. She visited old people and did it very well indeed. The health visitor was a trained nurse and certified midwife.

Dr. J. B. TILLEY, chairman of the Public Health Committee, opposed the motion on one ground only—that of uniformity. The Working Party agreed that there should not be compulsory uniformity throughout the country on this matter, but that where it was found best to work the system it should be adopted. The motion should not be adopted as Association policy for universal adoption.

Dr. A. J. R. F. JOHNSON (East Norfolk), in reply, said that Dr. Belam implied that a district nurse was not able to give education to mothers, but this was not so. The district nurse was probably the hardest-worked nurse in the community. (Applause.) He asked the meeting to support the motion.

After asking for a show of hands, the CHAIRMAN called for a count and announced the result as follows: for 134, against 135.

The motion was therefore lost.

CHAIRMAN OF THE REPRESENTATIVE BODY

The SECRETARY announced that there was only one nomination for Chairman of the Representative Body for the next session, Dr. Ian D. Grant, and he was therefore declared elected. (Applause.)

Dr. GRANT thanked the meeting for their continued confidence in him.

Smoking

The suspension of Standing Order 70 was moved and seconded. The CHAIRMAN reminded the meeting that it required a three-quarters majority, and the motion was lost.

An amendment was then announced: "That in the event of Standing Order 70 not being suspended, pipe smokers and cigar smokers be permitted to smoke." This was also put to the meeting amid laughter and was lost.

The Chairman then said he had a request from a delegate to be permitted to smoke his anti-asthmatic cigarettes "prescribed by an N.H.S. doctor," but this also was lost.

Time Limit to Speeches

A motion to cut down the time of speeches to twelve, five, and three minutes was carried.

ORGANIZATION

Dr. I. A. PRIDHAM, chairman of the Organization Committee, presented the sections of the Annual and Supplementary Reports under "Organization." He said that he had a certain amount of pride in introducing this Report because it contained a lot of information and there were few motions or amendments affecting it, which suggested that Branches and Divisions supported it. The Committee regarded itself as the back-room boy of the Association; it did not come into the limelight, but its work affected the Association at every point.

The membership was continuing to rise in spite of a good many adverse circumstances. The only way to compare progress year by year was to take a similar date, and taking the date of July 3 this year with July 3 last year there was an increase of 1,336 in membership, which was satisfactory.

This brought him to the work of the honorary secretaries. Once again it was his duty to ask the Representative Body to pay a tribute to this magnificent band of workers. For the past 124 years there had been a band of men and women ready to sacrifice their time and energies to do this work, and it was partly to them that this increase was due. (Applause.)

The Committee had a subcommittee known as the Newly Qualified Practitioners and Medical Students Subcommittee, to whose work he would draw attention in order that the younger members might become aware of its existence. Under the chairmanship of Dr. W. E. Dornan it did a great deal of work for the young doctor, including watching most carefully the issue of the certificates of satisfactory service after the pre-registration year. In one case where there was a refusal the subcommittee was able effectively to intervene. There was an urge to make this subcommittee more important, and possibly convert it into a main committee of the Association. If this happened he doubted whether it would do better work, but a change of status might bring it more to the fore.

Autonomous Bodies

Dr. PRIDHAM moved as a recommendation of Council:

That the autonomous powers of the General Medical Services Committee and the Central Consultants and Specialists Committee be renewed in respect of the year 1956-7.

That the Representative Body looks to these Committees to ensure that no action be taken by either which may prejudice the interests of another part of the profession without full prior consultation with the appropriate interests, and that their autonomous powers will be used so as to expedite and not delay the work of the Association.

This was carried without comment.

Roll of Fellows

Dr. PRIDHAM moved as a Council recommendation:

That steps be taken to recognize, by the award of a special distinction, distinguished service given by members of the Association to their Division or Branch;

That for this purpose there be established a Roll of Fellows of the British Medical Association, admission to which shall be governed by regulations.

He said that he was very happy to move this item. He wanted the meeting to understand that this was not a sudden brain-wave on the part of any Committee or Council. For a great number of years there had been a move to get something of this sort, and he hoped it would be possible to get it going this year. As there were no motions or amendments upon it he did not feel it necessary to develop any argument, but he would draw attention to the fact that those who did great and valuable work for the Association in the provinces were equally doing it for the Association as a whole, and the Council put forward this suggestion that they should be honoured at the periphery, in the provinces, and centrally. The method of recognition had been debated most carefully, the form of words and so on, and he hoped it would be accepted with unanimity.

The resolution was carried unanimously.

It was next proposed to take steps to amend By-law 85 in order to give more latitude to Branches and Divisions in respect of expenditure of Association funds on social amenities.

Dr. PRIDHAM, in moving this, said the object was to encourage more members to join the Association. No lavish expenditure on such things as cocktail parties was envisaged, but merely the provision of refreshments at meetings such as tea or coffee. Branch secretaries had been found to be extremely economic people who could be relied upon; and, in any event, the expenditure would be subject to scrutiny by the Organization Committee.

Dr. A. P. HICK (Trowbridge) moved, as an amendment, to add the words, "but that, in view of the present high rate of the annual subscription to and the need for economy by the Association, increased expenditure on social amenities should not be incurred under the amended by-law for the time being."

He thought that the provision of tea, coffee, and cakes at meetings would be an extravagant outlay if spread over the whole country.

Dr. R. G. GIBSON (Council), speaking as a member of the Organization Committee, referred to the difficulty which had been experienced of encouraging the younger people

to join the Association. The present rules and regulations hampered honorary secretaries in their efforts to entertain and attract such people. He supported the proposal and said there was no question of it being done without the expenditure being carefully watched. It was the smaller Divisions that were particularly hampered in the matter through having no contingency or entertainment fund.

Dr. R. W. McCONNEL (Buckinghamshire) described the amendment as "shilly-shallying." If the meeting did not want this expenditure they should vote against it. He, however, supported the motion. It would be useful encouragement and only a small amount of money would be involved.

Dr. F. A. BELAM (Guildford) thought it was right that a speaker who was asked to come down from London to give an evening talk should be offered some food.

Dr. PRIDHAM asked the meeting to reject the amendment.

Dr. HICK denied that the object of the amendment was "shilly-shallying." It had been designed merely to bring to the notice of members that such expenditure was proposed to be undertaken at this particular juncture.

The Trowbridge amendment was lost and the Organization Committee's recommendation was carried.

At this point the business was interrupted to take the section under "Overseas."

OVERSEAS

Major-General J. C. A. DOWSE presented the sections of the report of Council under "Overseas."

He first extended a hearty greeting to the overseas representatives, of whom almost a record number were present.

Dealing with Overseas Civil Service matters, he reminded representatives of the Colonial Secretary's statement in Parliament last May outlining two main provisions of the Government's policy regarding the future organization of the Overseas Civil Service: the intention to create a pool of persons with exceptional administrative and professional abilities recruited and employed by the U.K. Government and seconded for service with the Colonial Governments as and when required; secondly, the intention to compile a special list of officers at present serving in the Overseas Civil Service and a special list of those employed by the U.K. Government to be seconded to the Colonial Governments when necessary. It was hoped that these measures would remove the feeling of insecurity affecting members of the Overseas Civil Service, particularly in Nigeria, all of whom would presumably be given the option of transferring to the special list. These arrangements, he said, could be applied to other Colonial territories as well.

There were, however, certain doubts about the efficacy of the new arrangements. Some assurance was required of continued employment, because the introduction of the National Health Service in the U.K. had made it very much more difficult for a doctor returning from long service overseas to obtain medical work—a problem to which the White Paper at the moment provided no solution.

It was gratifying to be able to put before the meeting a slightly more favourable picture of the situation in Cyprus. As a result of the long representations by the Cyprus Branch, the Government there had offered improved salaries for its medical staff which were almost *in toto* acceptable to the Association. It thus appeared that the five-year-old battle with the Cyprus Government was at last to be settled satisfactorily. At the present juncture he had no desire to increase the difficulties of that Government, but they had in the past shown themselves to be peculiarly stubborn in their attitude towards the medical profession, and he expressed the hope that that attitude was on the way to rectification.

He went on to say that the report dealt with a very serious dispute between the Government of Malta and the medical profession there. The small medical profession in Malta had found itself faced with the threatened reorganization of the medical services, on lines which could not commend themselves to the profession, without the doctors themselves having been in any way adequately consulted.

The Malta Branch of the B.M.A. and the Medical Officers' Union had joined forces to offer resistance to the Government's plans. The small body of Maltese doctors had put up a very stout resistance which would evoke the admiration of all. (Applause.) The Association's Malta Branch had appealed to the parent body for help, a very considerable amount of which had been immediately furnished. The Assistant Secretary, Dr. E. Grey-Turner, and the Chairman of the Overseas Committee had flown out on separate occasions; large sums of money had been sent and many other things had been done in an effort to settle the dispute. The Government medical officers had been obliged to take the drastic step of resigning collectively from Government service for nine days and had organized an emergency medical service during that time. An agreement had then been reached giving practically everything for which the doctors had been asking. The main feature of the agreement had been the decision to set up an outside commission nominated from eminent members of the profession and others in the U.K. to examine the Maltese Government medical service and to make recommendations for its future organization. This was a very important achievement. He trusted that the outcome of the Malta controversy would be a lesson to a great many people throughout the British Commonwealth.

"We pride ourselves on being reasonable people with a reasonably high standard of public service," he said, "and we can put up with a good deal; but when we are subjected to conditions which are quite intolerable we had a perfect right—of which the Maltese profession has taken advantage—to take steps to try to rectify the matter in the most efficient way."

He hoped that the situation would be an example to those politicians throughout the world who seemed so anxious to interfere and even work a dictatorship in medical matters.

He concluded with a warm expression of thanks to Dr. Grey-Turner for the enormous amount of work which he had done on so complex a subject.

Greetings from Overseas Representatives

Dr. H. W. HORN (Queensland) conveyed, on behalf of the representatives from Australia, greetings and best wishes for a successful solution to the problems of which he had become so well aware during the meeting. He said that there were many problems common to the U.K. and Australian medical professions, including the subject of remuneration, which was a worry in all national health services.

Dr. J. M. TWHIGG (New Zealand) said it was very gratifying to know that the Council had accepted an invitation to hold the annual meeting in New Zealand in 1961.

Association affairs in New Zealand were working smoothly, and over 90% of the medical practitioners in New Zealand were members.

Dr. V. TABONE (Malta) brought greetings from colleagues in the island. The doctors of Malta, he assured the Representative Body, were in good heart, and, convinced as they were of the goodness of the cause and backed by the magnificent support of the large body of British doctors, they would manage to survive and to keep high the name of the profession as well as its independence.

Dr. P. T. O'FARRELL (Republic of Ireland), in conveying the greetings of the Irish Medical Association to the British Medical Association, wished the parent body a very prosperous future and pleasant meeting.

Rev. Dr. C. W. SILK (Bahamas) brought greetings from the "baby of the Association," the Bahamas, which he held to be a most desirable place of retirement for elderly doctors.

Dr. MARY L. GROVE-WHITE (Malaya) thanked the Association for its kind hospitality and brought cordial greetings from Malaya.

Overseas Bureaux

Dr. H. GUY DAIN, on behalf of the chairman of the Committee of Management of the Empire Medical Advisory Bureau, moved the report under that heading.

He said that every year the activities of the Empire Medical Advisory Bureau increased and became more widely known. The efforts of the Director, Brigadier H. A. Sandiford, were appreciated abroad, and the enthusiasm with which references to the Bureau were received in Canada last year would have heartened all members. The Director, to whom he paid a tribute for his excellent work, was keeping up to date a summary of the courses and diplomas available to people coming for postgraduate training to this country.

Dr. Dain, again on behalf of the chairman of Committee of Management of the International Medical Visitors' Bureau, spoke of the work of the Bureau.

He said that it was part of the work of the same office, and Brigadier Sandiford had established equally friendly relations with foreigners who came to this country and who required assistance.

ORGANIZATION (resumed)

Affiliated Membership

Dr. PRIDHAM moved as a recommendation of Council that affiliated membership of the Association be restricted to those members of an affiliated body temporarily resident in the area in which the affiliated membership would operate.

He explained that the purpose of the motion was to put right an anomaly which was explained in the report, and he urged the Representative Body to support it.

This was agreed.

To remedy an inconsistency in the Articles affecting practitioners whose names had been erased from the *Medical Register* for conduct detrimental to the profession, and had been subsequently restored, an amendment of the relevant Articles was proposed so as to make them apply equally to those who had and had not formerly been members of the Association.

The amendment was agreed to.

Subject to an alteration in one paragraph regarding eligibility for membership, it was agreed that the Articles and By-laws be altered in the manner shown in Appendix VI attached to the Annual Report of Council and that the amendments to the Articles be submitted to an Extraordinary General Meeting.

The remainder of the report under "Organization" was approved.

Quorum at the A.R.M.

Dr. R. P. HENDRY (Rugby, with South Warwickshire) moved that the quorum of the Representative Body should be 50; the present by-law requires one-half of the number of appointed representatives to be present to constitute a quorum.

He said that by-laws were a necessary evil, but the present By-law 50 was rather evil in that it was an old English custom that one just ignored these things and that to raise the matter of a quorum was rather pernicious. The present law set too high a standard and it should be materially reduced. It might be said that 50 was too low a standard, but if 40 out of 640 paid Parliamentarians could constitute a quorum he suggested that 50 out of 450 unpaid philanthropists could constitute a quorum.

Dr. O. C. CARTER (Council) moved as an amendment that in view of the impending report of the Constitution Committee no action should be taken on this motion at this meeting. He said that the motion raised a matter of importance. There was the implication that a Representative Body with only one-ninth of its members present could decide matters of major policy. He hoped the meeting would not come to any decision at this stage.

Dr. R. G. GIBSON (Council) seconded.

Mr. H. H. LANGSTON, chairman of the Constitution Committee, supported the amendment. The Committee had given a lot of thought to this subject and it would be included in the Committee's report in due course.

Dr. J. A. PRIDHAM (Council) hoped the meeting would accept the amendment, and Dr. HENDRY asked leave to withdraw the motion as the matter was *sub judice*, which was agreed to.

CONSTITUTION OF THE ASSOCIATION

Mr. H. H. LANGSTON (chairman of the Constitution Committee) submitted the sections of the reports under this heading.

The Committee, he said, was nearing the completion of its work and had already presented its draft report to the Council, the discussion on which was fully reported in the *Journal*. As the Constitution Committee was set up by the Representative Body with the proviso that no more than 50% of the Committee should be members of Council, the Council had decided that it would be appropriate if the final report of the Constitution Committee be submitted unamended to the Representative Body but accompanied by such comment as Council thought fit to make. In the view of the Council as expressed at the last Council meeting, it appeared that it would probably be necessary for a special Representative Meeting to be held to consider the report of the Constitution Committee. Before such a special Representative Meeting was called the report of the Constitution Committee would be circulated accompanied by Council's comment to all Divisions and ample time would be allowed for full consideration of its recommendations.

The motion was carried.

SCIENCE ACTIVITIES

Mr. J. R. NICHOLSON-LAILEY, chairman of the Science Committee, presented the report under "Science."

The Committee was investigating accidental deaths from coal-gas poisoning by a special subcommittee. The work was not yet finished, but he hoped the report would be available by the next annual meeting. The Committee was also concerned about the increasing problem of drug addiction, and a special subcommittee, which had become an *ad hoc* committee of the Council, had been set up to investigate all the difficult aspects of this problem. It would be some time before there was any report.

Referring to the Library, Mr. Nicholson-Lailey said he did not think the Association realized what a valuable instrument it had in the Library. It was being used increasingly, but it could be used much more than it was. The Library had recently been valued, and if all the books were sold £26,000 would be obtained, and to replace them would cost £63,000. That gave some idea of what a collection it was.

One of the duties of the Science Committee was to organize the examinations for the various Association prizes and to decide the names to be recommended to Council for the awards. These names were announced in the Report, but he would specially mention one or two. The Sir Charles Hastings Clinical Prize competition was open to general practitioners, and the examiners were very impressed with the high standard of the entries. He would also mention the Stewart Prize on Epidemiology, awarded not by competition but on the recommendation of a panel of experts in this field who advised the Association on who they thought had undertaken the most valuable and important work in this field during the year. It spoke highly for general practice that it was decided to recommend that the award be made to Dr. Hope-Simpson, who practised at Cirencester in the south-west of England. He would like to thank all those who gave up their time to the arduous task of examining the entries and making reports.

There had been 140 B.M.A. Lectures given during the year. Every Division was entitled to ask for and have one B.M.A. Lecture during the year. He felt that more use should be made of this concession. At two of the most successful of these lectures which he had attended an informal dinner was given at which the guest speaker was present, and he gave his talk directly after the meal with everybody sitting comfortably. He found that these talks were very well received and there was a large attendance. Doctors were encouraged to bring their wives.

Finally, he would refer to the Sir Charles Hastings Lecture. This was usually given in London, but this year the experi-

ment was tried of holding it in a provincial centre—at Leeds—and it was a resounding success, the lecture being given by Sir Henry Cohen.

New Drugs

Dr. I. P. W. SKINNER (Oxford) moved:

That the profession would welcome some degree of restraint in the use of new drugs whilst therapeutic trials are in progress provided that such trials are supervised by some central body.

He said that in 1938 the Council decided against setting up special machinery, and in 1956 the Council was considering reopening the matter and perhaps the meeting could give a lead. Delay in the availability of new drugs during therapeutic trials was a very different matter from governmental planning of drugs. Both the American Medical Association and the New Zealand Medical Association had bodies to supervise trials. It was nearly 20 years since Council reached a decision, 10 years before the National Health Service came in, and now there were three new factors—first, the great multiplicity of new drugs, secondly, the high cost of many of them, and, thirdly, that as the taxpayer had to pay for them there should be some more modern method of assessment to replace the haphazard individual try-out in general practice or in hospital. Did the general practitioners prescribe these drugs for their Health Service patients or for their private patients, or did the latter get the free sample? He suggested that the matter would be better mooted by the profession rather than applied by governmental or political pressure. A good drug was not likely to be condemned out of hand and some of the useless ones might cease from troubling.

Dr. R. W. MCCONNELL (Buckinghamshire) seconded. The rising cost of drugs in the National Health Service was very serious. If it went on one could see what would happen, and they did not want the Government to bring out lists of drugs which could be used and which not. This was an alternative idea, and it was very important that the profession should supervise the trying of these drugs. If the Council instituted some body which would organize and supervise the control of these trials it should be advertised to the doctors which of the drugs were being tried, and when they had been tried which they should use.

Dr. G. CORMACK (Newcastle-upon-Tyne) hoped the meeting would turn this down. If the Association permitted the establishment of any controlling body to evaluate drugs sooner or later the Government would get its hands on it and everyone knew what would happen then. Politicians could be unscrupulous in these matters. There had been the example of aureomycin, which was available for a long time in countries abroad before it could be obtained here. It was extraordinarily difficult to get at the truth of the matter about drugs; it was not the sort of thing which a committee could sit down and do; and he hoped that the meeting would turn this down.

Dr. A. REZLER (City) also opposed the motion. It would be the beginning of the end of general practice, which was becoming narrower and narrower because of increasing specialization, and to have a restriction on prescribing would be intolerable.

Dr. J. S. M. ORD (Glasgow) said that there was a degree of restraint in the use of new drugs and doctors could exercise this restraint. No doctor would use a drug until he knew that it would be of therapeutic value. He asked the meeting to reject the motion.

Mr. J. R. NICHOLSON-LAILEY said that the Science Committee had considered this question for over a year and had not got very far. It was extremely complicated. Neither the Committee nor the Council would be a party to setting up any body which would control in any way the clinical responsibility of any doctor or specialist. The whole idea of this would be merely to help and give a little advice and save practitioners from wasting their time using unsatisfactory drugs. He would be pleased to accept this as a reference to Council because it would give the necessary authority to go on considering the matter.

Dr. SKINNER, in reply, said that the motion was intended primarily as a reference to Council and to elicit information. Anything of this kind could only be carried through by the Council, which would give all the necessary safeguards.

The motion was accepted as a reference to Council.

Diesel Fumes and Cancer of the Lung

Dr. R. COVE-SMITH (Marylebone) moved that, in view of the possibility that exhaust vapours from road vehicles may cause very serious disease, the Government be requested to secure obedience to the existing law in respect of such fumes until such time as a possibility of medical harm therefrom may be disproved. "We want, if possible, to clear this rather sickening stench from our cities," he said.

The Fuel Research Council were studying the extent of pollution from exhaust in the London streets under different weather conditions and concentrations of vehicles. Diesel engine exhausts could be a serious nuisance, being discharged at low level, and could reduce the field of vision of the traffic behind; they also caused objectionable deposits which were difficult to remove on windows, windscreens, and the glass of street lamps. Diesel smoke was unnecessary and could certainly be reduced if the machines were properly controlled. The present law on the subject was pretty explicit. Drivers who produced excessive smoke could be prosecuted. The local authorities ought to be able to help in enforcing this law.

Mr. A. DICKSON WRIGHT (Marylebone) said the pollution in question was particularly wanton. It was possible to stand in the road and get the full blast of a charabanc exhaust which was the carcinogenic equivalent of perhaps 100 cigarettes. Factory chimneys were difficult to control because interference with them meant interference with industry. Tobacco was a thorny question, for those who did not smoke had to inhale second-hand smoke produced by those who did. He suggested that the motor and oil industries should devote some research to the subject.

The Marylebone motion was slightly amended by Southport, and in the amended form, as follows, was carried:

That in view of the obnoxiousness of exhaust vapours from road vehicles and the possibility that they may cause very serious disease, this meeting considers that it is its duty to request the Government to secure obedience to the existing law in respect of such fumes.

Dr. St. G. B. D. GRAY (South-west Essex) had a lengthy motion noting that the incidence of cancer of the lung had increased, that the increase occurred to a greater extent in urban than in rural areas, that it could not be attributed solely to tobacco smoking, and that exhaust fumes from internal combustion engines, including diesel engines, contained known carcinogens. It went on to call for further research into the possible dangers of fumes from these engines, and requested the Council to recommend to authorities operating transport systems that in urban areas no further replacement of electric passenger vehicles by diesel-engined vehicles occurred until the harmlessness of the latter had been proved.

"If we are not careful we shall have the country flooded with fleets of diesel motors and we will be able to do nothing about it," he said.

Mr. J. R. NICHOLSON-LAILEY reminded the meeting that a similar resolution had been passed last year. The Science Committee and the Council, in making representations to the proper authorities, had been unable to produce scientific evidence that a properly controlled and driven diesel engine was the danger that it had been alleged to be. Much research was being carried out on the subject and there did not seem to be any need to supplement it. The motion was an attempt to suggest that a properly used diesel engine was not a safe thing to use—something of which he doubted whether it would be possible to convince any local authority, Government body, or private company.

The meeting decided to proceed to the next business.

Crash Helmets

Dr. R. WEBB (East Suffolk) moved to press the Ministry of Transport to enforce the use of crash helmets of approved pattern for motor-cyclists.

Miss GLADYS M. SANDES (Marylebone) said that improvements in design were proceeding and a further issue of approved patterns was on the way.

Mr. A. LAWRENCE ABEL (Marylebone), who excited laughter by appearing on the platform wearing a crash helmet and motor-cyclist's coat, said that not more than 25% of motor-cyclists wore crash helmets. Every day four young men between 18 and 28 died in this country from motor-cycle injuries, 93% of which were due to head injuries—1,300 a year. Many of those could have been prevented if a suitable crash helmet had been worn. But it must be of good quality and approved design. Four types of helmet had recently been tested for the B.M.A. by the Road Research Laboratory of the Department of Scientific and Industrial Research, of which only one had been found to meet the test requirements.

Mr. Abel recalled that last year he had gone with a deputation to the Customs and Excise in an effort to get purchase tax taken off crash helmets; after nearly 12 months it had been reduced from 25% to 10%.

Mr. Abel next referred to defective crash helmets sold by H.M. Government as Government surplus stocks. There were at least four different sorts. They were traps, because a young man wearing one of them would think he was safe when in fact he was not, and would take more risks, so that he was worse off than before. There had recently been many instances reported in the Press of the sale of Government surplus goods; this was another one. It was a case of one Government department bulk selling and another of one Government department condemning what was sold as unsafe.

This was the only nation in Europe that had a dent in the graph of the expectation of life between 18 and 28. There was the cost of those 1,300 young lives. There were 17,000 serious injuries, and there were 70,000 lesser injuries. There were 1,800 hospital beds occupied all the year round by those with injuries due to motor-cycle accidents, 50% of which had head injuries. The cost of all that could be saved by the wearing of crash helmets.

"I do not like compulsion any more than you do," he said. But what was the alternative when there were stage-coach roads in a speedway age? It was either to make crash helmets compulsory or to dump all the motor-bikes in the sea and go back to the days of George III. Mr. Abel said he desired to add as a rider to the motion:

That a deputation should go to the appropriate Ministry to protest against the sale of dangerous Government surplus.

This amendment was accepted by East Suffolk.

Dr. J. C. ARTHUR (Gateshead), opposing the motion, asked the meeting to consider how it might strike the ordinary man. For the last 15 years, he said, the populace had been man. Apart from the laws of decency, the population had not been regulated in its wearing apparel before. Again, there was the question of where it would end. What constituted a motor-cycle? A number of old men and women rode power-assisted cycles which could be described as "motor-cycles," and the process would continue until it included push-bikes. He lived on a busy part of the Great North Road and he had dealt with more accidents from push-cycles than from motor-cycles. By all means ensure that crash helmets conformed to a high standard, but their use should not be made absolutely imperative and compulsory.

Dr. WEBB, in reply, asked the meeting not to pay too much attention to that which Dr. Arthur had said. "If you do not like wearing a crash helmet then do not ride a motor-cycle," he said.

The motion by East Suffolk with the rider was carried.

Dorset moved that the postal charges made by the Association library should be abolished as a compensation to members living at a distance from London who were not able often to enjoy the amenities of Headquarters.

Dr. A. G. CHAMBERLAIN, in moving, said that country members seldom visited London and should enjoy the amenity suggested in the motion.

Mr. J. R. NICHOLSON-LAILEY said he was not sure what the mover required. Recently a decision was taken to pay the postage of all library books outside the London postal area, but members were expected to bear the cost of postage in returning them. The concession would now cost the Association something like £1,000 per annum in view of the increased postal charges.

The motion was agreed as a reference to Council.

Mr. J. R. NICHOLSON-LAILEY moved that the remainder of the Annual and Supplementary Reports of Council under "Science" be approved. He drew attention to the fact that the Government's action in removing the subsidy from wheat and flour would result in the white loaf being the only bread available. That was in direct contradiction to the advice the Government received from the committee which considered the matter. The public would get an inferior article for an increased price.

Dr. A. N. MATHIAS (Council) expressed the hope that the Representative Body would support Mr. Nicholson-Lailey in what he had said. It was incomprehensible that the Government should deliberately flaunt the vast mass of professional opinion in this country who felt that the proposed action was wrong.

The motion to approve the remainder of the report under "Science" was carried.

GENERAL MEDICAL SERVICES

Dr. A. TALBOT ROGERS, chairman of the General Medical Services Committee, presented the Annual and Supplementary reports under "General Medical Services."

In asking the Representative Body to receive the report, he said it would probably be agreed that it showed evidence of sustained effort by the Committee during the year—effort which had not been without its reward. That was not surprising when it was remembered that the Committee had been for a part of the time under the acting chairmanship of Dr. S. Wand. It was fortunate that in a changing committee there was a hard core of members who were well versed in all the intricacies of National Health Service law and practice. He acknowledged with gratitude the help he had received from Dr. Wand, Dr. H. G. Dain, and Dr. E. A. Gregg in the work of the Committee.

With regard to the problem of getting drugs for private patients under the Health Service, the matter was still outstanding and would be followed up. It was hoped that it would be possible to report better progress at the next Representative Meeting. The General Medical Services Committee welcomed the opportunity for co-operation in the matter between the two major committees of the Association.

On the question of the joint remuneration claim, Dr. Talbot Rogers said that it was a strong claim but not one in which the Association could be said to be grasping. It set out the extra amount which needed to be added to remuneration if the Spens recommendations were to be fulfilled. It was true that if the claim were worked out as a global sum to be paid out of the Exchequer, it seemed considerable, but that was an index of the restraint which had been shown over the years in not asking earlier for money which had been the right of the profession for a long time. Even if granted to the full it would cost the country less than if the Minister had been able to reply in the affirmative when asked in 1953 and 1954 to implement Spens, in accordance with the changes in the value of money up until then. The claim had now gone in and the Minister's reply was awaited. The Negotiating Committee had been advised that the chance of a successful outcome of the

claim would best be served by awaiting the written observations of the Minister before publishing a detailed account of the claim, and before promoting a discussion upon it in the Representative Body or in the Press.

"I assure you that it is the intention of the Negotiating Committee to give the profession the fullest possible information about the claim and the statistics upon which it is based at the first advisable moment," he concluded.

Remuneration

Dr. H. M. GOLDING (Bristol) moved:

That this meeting welcomes the proposal for a joint approach by the General Medical Services Committee and the Joint Consultants Committee to the Minister on the question of remuneration of members of the profession.

He said that the intention of his motion, and of others which would follow, was to strengthen the strong right arm of the Council. The most important aspect was the historic action of combining the G.M.S. Committee and the Joint Consultants Committee in the approach to the Minister.

Dr. R. P. LISTON (Tunbridge Wells) said his Branch welcomed the joint approach because it felt the overriding consideration to be the obtaining of unity of action within the profession. He regarded the decision as perhaps the most encouraging and fundamental event which had occurred to the profession since 1948, the first concrete, unmistakable sign that, in spite of the many difficulties and interests involved, the profession had at last determined to speak with one voice. The introduction into the deliberations of the medical officers of health was a good augury for the future, for they were the Cinderellas of the profession, dealing as they did with local authorities and not central government. The significance of such action would not be lost on those with whom the profession would have to negotiate. It was necessary for everyone to realize that there were tremendous issues at stake apart from remuneration.

The Bristol motion was carried *nemine contradicente*.

Dr. R. P. HENDRY (Rugby, with South Warwickshire) had a motion wholeheartedly welcoming the joint approach, warmly congratulating those responsible for this unity of action, and expressing the hope that in any such activities in the future the public health services may be fully represented. "We are all doctors; we are all in this together; there is one B.M.A.," he said.

Dr. A. TALBOT ROGERS said the only reason why the claim had not been advanced for all three parts of the profession was that it had been felt that to include the public health side at the moment would jeopardize the obtaining of any improvement at all. The whole basis of the claim was the legal argument that both those in the hospital services and the general practitioners were not being paid what they should be paid under Spens and were going together to their employer, the Ministry of Health.

There had also been some adjustments in public health payments at various times which would not allow of everyone having the same datum line in making the claim. It had therefore been decided, after careful thought, that it would be better to go on with the claim for the two parts of the profession, at the same time keeping the public health doctors informed of what was being done, seeking advice from them about the repercussions that the claim would have on them, and including them in the Negotiating Committee. If success was achieved, it was the intention to do everything possible as a united profession to bring the public health remuneration into line with what the others would then be receiving.

The Rugby motion was carried.

Dr. H. SOUTHWORTH (Blackburn) moved that, in the case of the Government not honouring its financial commitments as laid down in the Spens report and reiterated in the Danckwerts award, strong consideration should be given to a call for mass resignation from the service.

Dr. A. TALBOT ROGERS thought that, however strongly people might feel on the subject, it was unwise to start making threats about resignation. It was better to refer the

matter to the Council to take strong action at the appropriate time should the appropriate time arise.

It was agreed to pass to the next business.

Dr. H. G. St. M. REES (West Suffolk) moved that the period of two years should be the maximum between each adjustment of the contract. The principle, he said, had been accepted by the B.M.A., but he doubted if it had been accepted by the Ministry. While the motion might seem a little premature, it was as well to have some idea of the period at which adjustments might be made. Inflation was a creeping evil which had passed the doctors and had left them behind in the last few years. Had there been periodic adjustments over the past few years, that would not have happened.

Dr. A. TALBOT ROGERS said he did not regard the motion as premature. It was probably true that had the concession referred to been obtainable before there would not now be the necessity for large-scale negotiations. But the Association was guided by experts in statistical work and was satisfied that the claim, delayed as it was, was being presented at the moment when the most authoritative evidence in its favour was available. There had not yet been wholehearted agreement by the Government that the profession was entitled to a periodic review. That was one of the things that it was hoped to win from the claim, and, if obtained, it would be one of the strongest things to be got, of more value than the actual money which the claim itself would bring. To tie the period down to two years might not react entirely to members' advantage. It might not be possible to produce strong enough evidence at the end of a particular two-year period, and there was yet no knowledge of the economic future of the country. It was to be hoped that the inflationary period would end. If there were a fall in prices and an increase in the value of money it would work to the disadvantage of doctors to be tied to a two-year interval.

The West Suffolk motion was lost.

Dr. G. S. R. LITTLE (Greenwich and Deptford) moved to urge that negotiations concerning monthly payments to general practitioners be expedited.

He said that the matter had become more urgent since last year, as there had been a further credit squeeze. There were many doctors in the National Health Service, young and old, who relied entirely on their quarterly payment for their source of income. It was totally unreasonable that they should be asked to go cap-in-hand to their bank managers, and it was totally unnecessary and rather degrading for them to have to go to the executive councils pleading hardship. A monthly payment on account and a quarterly settlement system would keep the bank managers quiet.

Dr. L. J. STOLL (Hampstead) said, amid cries of dissent, that the consultants always got paid monthly. It was unfair that general practitioners who wished to have a little extra money at a particular time should have to pay interest on overdrafts.

Dr. A. SMITH (Lanarkshire) said that consultants could be paid monthly if they so desired. Speaking as a consultant himself, he urged acceptance of the motion.

Dr. ANNIS GILLIE (Council) said that every doctor had a right to be paid monthly and that negotiations to this end should be expedited. However, in view of the amount of work with which executive councils had to cope, the best thing would be to expedite negotiations for monthly payment for those who desired it and leave the normally quarterly cheque system in operation for those who did not desire the monthly basis.

Dr. A. TALBOT ROGERS explained that the matter had been discussed by the G.M.S. Committee last month, when it had been decided to ask that the general practitioners should receive, as a right, a monthly payment which should be part of their quarterly payment, and that at the end of the quarter there should be a settlement of what was remaining during the period.

Dr. LITTLE asked who would pay the bank charges at the end of the quarter.

The motion was carried.

Supplementary Annual Payments

Dr. J. S. NOBLE (Blyth, with Morpeth) moved that to obtain supplementary annual payments the qualification of having been in that practice on March 31, 1953, be altered to include all single-handed small-list practitioners who have a static or increasing list irrespective of the date of entry into the practice.

He said that the regulations were by and large fair and elastic and provided for the elderly or already established practitioner and an adequate appeal system. But there was one point: the small-list practitioner who was appointed to a small list since April 1, 1953, did not receive any supplementary payment. In some areas it might be advisable to encourage additional small lists, but not in over-doctored areas. If it was undesirable to encourage the small list the doctor should not be appointed; if he was appointed it meant that he was required and there was no reason why he should not have a supplementary payment. It was an injustice to suggest that a young man appointed to a vacancy should not be entitled to the same pay as his predecessor. He might even be making less than the man with the initial practice allowance next door.

Dr. A. TALBOT ROGERS said that it was difficult to make a quick decision about this. At the time supplementary payments were set up those responsible were anxious that no injustice should be done to doctors already established, especially those who had been receiving a fixed annual payment. The regulations were carefully watched to see that those doctors did not suffer materially as a result of the new method of payment.

In so far as people who were not then in the scheme were concerned in the new method of distribution, it was hoped to attract doctors to areas where there was a likelihood of their building up a reasonable practice within a reasonable time, and the initial practice allowance was brought in to help them, but it was no part of the scheme to encourage small practices in well-doctored areas if it was not going to prove to be a good proposition.

The speaker had made a case for doctors who had been invited to apply for a practice not so small that it had been decided to disperse it, though he knew that it did not have a large list. The General Medical Services Committee was always willing to look again at a problem like this and see its repercussions. One of the repercussions was that these supplementary payments were not extra money, they all came out of the central pool, and hasty decisions could not be made that every case would be assisted. If the motion was passed as a reference to Council the matter would be studied during the coming session.

Dr. W. E. DORNAN (Council) hoped the meeting would pass this as a reference to Council. Not only was he well aware that there were practices in which supplementary payments were being made at this time coming out of the central pool, but as a result the Ministry had ceased paying an equivalent sum which should have been paid out of the inducement fund. There were practices to which doctors had been appointed since 1953 which could attract an inducement payment from Treasury funds. If this was passed without the General Medical Services having a look at it the Ministry would say that these were cases for a supplementary hardship payment.

Dr. NOBLE said that he would move it as a reference to Council and it was so carried.

Inflation of Lists

Dr. R. REID (Nottinghamshire) had a motion expressing the view that N.H.S. numbers are a less reliable means of establishing identity than dates of birth and should be abolished forthwith, and that the custom of inserting the patient's date of birth on his medical card should be replaced as a matter of medical importance. He said his object was to try to make things simpler and save money for the health services. Blood transfusion centres had found it sufficient identification to state a person's date of birth.

Dr. R. H. MOORE (North Middlesex) said that if this was passed the confusion would be made worse. It was possible to have two people born on the same day with the same name. He suggested that if four figures were added to the date of birth—there were 2,000 babies born every day in England—it would be a positive means of identification for man, woman, and child.

Dr. A. TALBOT ROGERS said that this problem was discussed with the Minister in view of the Guillebaud report recommendation that there should be a fresh method of identification to limit the possibilities of inflation. There were several ways in which this could be done. The G.M.S. Committee was in favour of an alphabetical index; the Executive Councils Association was in favour of one based on the date of birth; there had been suggestions for the extension of the index of the Minister of National Insurance. Discussions were going on with the Ministry, and the Minister had promised to let the Association have his reactions during the coming session. It was hoped that there would be something more to report next time.

Dr. REID, in reply, asked why the establishment of an identity should be made complicated?

The motion was lost.

Reinstatement of Ex-Service Men on Doctors' Lists

Dr. J. B. WRATHALL ROWE (Harrow) moved that it be arranged with the Ministry that the names of men called up for national service be left on the list of their doctor and that the men's records remain in the doctor's care until they change their doctor or move away from the district. He pointed out that the only transaction then necessary would be the deduction of the capitation fee during the two-year period of service, with restoration of the fee at the end of that time. As an industrial medical officer he frequently saw ex-National Service men who had not troubled to rejoin the doctor's list after their national service. The man who was discharged was given a leaflet and an E.C.13 form in order to complete the doctor's list. Few of them went at once to the doctor. Harrow made some inquiries as to what happened when a man was called up, and found that the doctor was requested to send his record to the executive council, who, in turn, sent it to Southport. It was kept there until the man applied to go again on a doctor's list on leaving the Forces, when on the putting into motion of E.C.13 the file was sent back from Southport via the executive council to the doctor. Some 150,000 men were called up and another 150,000 were discharged every year; this meant that 1,200 cards had to be dealt with every day, and probably the full time of seven or eight Civil Servants was occupied in dealing with them.

His Division asked whether the matter could not be dealt with by leaving the man's records with the doctor and deducting the capitation fee for two years.

Dr. R. H. MOORE (North Middlesex) supported the motion. He added that there had been instances of records sent in with important documents which when the file was returned had been lost.

The CHAIRMAN OF COUNCIL said that if there had to be some communication from the executive council it should be of such a character and size that the doctor could fasten it on the outside of the Form of Medical Record for identification purposes.

Dr. ST. G. B. D. GRAY (South-west Essex) said that in many cases when patients returned after being off the list for two or more years the practitioner did not get back the original wallet, which contained important notes about what had happened during the patient's childhood.

Dr. R. S. V. MARSHALL (South Staffordshire) said he hoped that the Representative Body would not pass the motion. It sounded simple, but he foresaw all sorts of complications. The plea by the War Office that they were unable to do anything should not be accepted. The War Office did it during the war and should be capable of doing it now.

Dr. A. TALBOT ROGERS said it would be agreed that a new idea had been explained clearly, and he suggested that the matter should be referred to the Council.

Dr. WRATHALL ROWE, in reply, said that the question of people with temporary residence had been answered. As to the number of people who might be affected, it worked out at about 7½ persons per practice.

The motion was agreed to as a reference to Council.

Dr. A. J. R. F. JOHNSON (East Norfolk) asked the Council to press for the adoption of the Scottish method of filling practice vacancies. The chief difference, he said, was that in England the candidate for the vacancy was interviewed by a committee of the local executive council, short-listed, and then sent up to the Medical Practices Committee, which made the final decision. In Scotland the candidate was selected by the local executive council, and the Medical Practices Committee acted as an appeal tribunal if required.

Dr. J. S. HAPPEL (Winchester) opposed the recommendation, stating that as one who had been interviewed under both systems he preferred the English method.

Dr. A. TALBOT ROGERS said there was no harm in referring the matter to the Council for consideration. Although the Scottish Act was drafted in a similar way to the Act for England and Wales, the Scottish Department of Health had taken certain powers to enable them to fill practice vacancies in that way. They were powers which could be questioned, and the Ministry of Health in England was not prepared to act under those same powers. If there were to be any alteration in the way in which practice vacancies were filled in this country it could be done only by an amending Act, with all its attendant difficulties.

This was agreed to as a reference to Council.

Assistants in General Practice

Dr. F. BOOTH (Mid-Cheshire) had a motion suggesting that, in the model form of agreement for use between principal and assistant, the number of weeks relating to absence and illness on the part of the assistant should be left blank.

It was felt, he said, that the form of agreement between principal and assistant might penalize the assistant. There might be some legal reason for the figure of 14 days and the other time of four weeks, but the assistants felt that those figures should be a matter for private arrangement between the principals and themselves.

Dr. ALISTAIR R. FRENCH (Marylebone), in supporting the motion, said he had had practical experience of difficulties which arose between principal and assistant, and emphasized that there was a danger in the model form of agreement. It was a legal contract and it must always be freely negotiated between the two parties. There was a danger in using the model form that the young man, and even the principal, might think that it was a matter of law. It was not. Both parties must remain absolutely free to negotiate to their mutual satisfaction an agreement to control the relationship between them.

Dr. F. GRAY (Council) said that the assistants in Cheshire appeared to have different views from those of assistants elsewhere. The model form had been closely scrutinized by the Assistants and Young Practitioners Subcommittee of the G.M.S. Committee, and it had taken no exception to it. The model form was one which could be altered, and he would have thought that principals and assistants with an agreement would realize that, while it was a basis, it would in all cases be advisable to get a solicitor's opinion on their particular case. Secondly, the agreement set out to offer something which, on the face of it, was fair to both parties. That was why figures had been put in, and if they were not inserted the Assistants and Young Practitioners Subcommittee would certainly have some strong criticism to make.

Dr. BOOTH, in reply, said he hoped that the meeting understood the importance of representatives giving the views of the assistants when talking about them. The opinions which he had given earlier were those of the assistants. In view of what had been said he suggested that it might be a good thing if the figures were left in as they were, but that a

footnote, if any, should indicate that they were suggested as suitable figures.

The motion was lost.

A motion was moved on behalf of Essex that the meeting, while appreciating the action taken in pursuance of Minute 60 of the A.R.M., 1955, felt that even greater pressure should be brought to bear to get more G.P. obstetric beds as soon as possible.

Dr. A. M. GOLDTHORPE (South-east Essex) said it would appear that out of four divisions only one had any maternity general-practitioner beds. Essex desired to ask the G.M.S. Committee what was the nature of the improvement referred to and how many more beds had in fact been opened up in the time given.

Dr. M. P. K. MENON (North Middlesex) supported the motion. It was evident, he said, that maternity practice was being taken away from the hands of medical practitioners. It had been suggested that nearly all cases had to be dealt with in hospitals.

Dr. A. TALBOT ROGERS said that there was every advantage in passing this motion. He could not answer the Essex question as to what was the improvement in their part of the world, but the figures showed that there was a slight improvement overall in the number of beds available for general practitioners. However, the number of beds was far from satisfactory.

The motion was carried.

Dr. F. LISHMAN (Bishop Auckland) moved to deplore the shortage of maternity beds, which in turn created a shortage of general-practitioner beds. He said that only 40% of cases in his area were confined in hospital because of shortage of beds.

The motion was carried.

Miss GLADYS M. SANDES (Marylebone) moved to reiterate the resolution of last year that, in view of the wide variation in different executive council areas of criteria for admission to the obstetric list, any duly qualified registered medical practitioner who applied to go on the list should be placed on it without further question. She added that in some cases extra experience in the pre-registration period might be advisable in order to supply additional skill. Her Division felt that a properly trained practitioner should be allowed to do obstetrics if he wished, and there should be no invidious distinction against him.

Dr. R. WEBB (East Suffolk) opposed the motion. The average newly registered doctor was not competent to deal with the emergencies which the duties of a general-practitioner obstetrician entailed. He could not be expected to command the respect of experienced midwives who might ask for his help. In midwifery emergencies occurred quickly; the general practitioner should be prepared to give plasma transfusions and he should be more experienced in antenatal care. The two previous resolutions were being endangered if high standards were not exacted in obstetrics—the present standards were too low.

Dr. A. TALBOT ROGERS said that the present resolution confirmed the present policy of the Association. The Minister of Health had set up a new committee to go into the whole question of the provision of maternity services in this country composed of obstetricians, midwives, general practitioners, and lay representatives, one of the general-practitioner representatives being the Deputy Chairman, Dr. Beauchamp. During the course of the coming year it would be the duty of the Association to present its evidence to this very important committee, which might very well shape the whole picture of midwifery in the years to come. Therefore it was important that the meeting should vote on this in such a way as to define an up-to-date policy.

Dr. L. I. FREEMAN (St. Pancras) strongly opposed the motion for three reasons. First, from the national point of view the practice of good midwifery would lead to healthy mothers and babies and encourage mothers to have them at home. Secondly, the B.M.A. was obliged to raise the standard of medical practice, and this resolution would not do this. The Royal College of Obstetricians and

Gynaecologists had fought hard to raise the standard of teaching and practice of obstetrics in this country, and to support this motion would be to defeat that object. ("Why?") He asked if any one of them would be happy to put the women members of their families into the hands of any "duly qualified registered medical practitioner" who applied to go on the obstetric list. He did not feel that such a man was capable of tackling this part of the work.

Dr. J. S. M. ORD (Glasgow) hoped the meeting would support the motion by Marylebone as strongly as possible. While these restrictions remained general practitioners lost patients every day to the hospitals. He could foresee that in ten years there would be a domiciliary midwives' service with a hospital for the consultant cases. The general practitioner would be looking from the corner for the scraps to come his way.

Dr. J. S. NOBLE (Blyth, with Morpeth) absolutely disagreed with the last speaker. The only danger of practitioners losing midwifery was from the lack of standards. To pass this motion while the commission was sitting was most dangerous; it meant that they said that every practitioner was completely competent to conduct any midwifery cases which cropped up, and if such a statement was made the commission would ignore it. There must be standards, and certain people must have a little more experience before they could be allowed to practise midwifery.

Dr. CATHERINE HARROWER (Glasgow) said that in Scotland the selection was made entirely by the doctors, the list was self-selected, and obstetrics in Scotland had always been extremely good. She was sure it would be a good thing if the English list was made on the same lines.

Dr. J. C. ARTHUR (Gateshead) said that when a doctor qualified in medicine he did so in medicine, surgery, and midwifery and gynaecology; surely he was qualified to do midwifery. If not, it was the fault of the teaching. For years there had been a tendency on the part of the obstetricians to take more and more for themselves and leave less and less for the general practitioner, and this was reflected in the teaching of students. However, that did not alter the fundamental principle of the resolution.

Dr. J. G. R. CLARKE (South Bedfordshire) doubted the wisdom of a declaration of policy on the matter. He suggested that it should be treated as a reference to Council.

Dr. ALISTAIR R. FRENCH (Marylebone) said it was not a question of deciding policy; the policy had already been decided at the last A.R.M. During the intern year it was compulsory to do at least six months in surgery and six months in medicine, but midwifery and obstetrics could be taken as an alternative to one of those subjects. Parliament had given to the General Medical Council the duty of deciding what standard of training in medicine, surgery, and obstetrics was required to allow a doctor to practise freely. Why should any body of men sitting in a little local area have the right to say that the standards laid down by the G.M.C. as approved examination standards were wrong? (Applause.)

Dr. C. R. G. BARRINGTON (Bromley) doubted if many doctors obtained extra qualifications in midwifery before starting in practice. It was a great mistake to have a list of extra qualifications and should not be tolerated.

Miss GLADYS M. SANDES (Marylebone) said the intention of the motion was not to reduce the standards of midwifery but merely to support the policy of the Association that the general practitioner who wished to do midwifery could get his name on the obstetrics list. Listening to some of the speeches on the subject she had wondered whether there was a return to the old days when the general practitioner was supposed to be a sort of Sarah Gamp. It was undisputed in some quarters that general practitioners were letting midwifery slip and sending cases to hospital for various reasons. That was one of the reasons why the district cases were being done by midwives and pupil midwives instead of in the teaching hospitals. That was a very retrograde step, for which she feared the general practitioners had themselves to blame.

The Marylebone motion was carried.

Post-mortem Examinations

Dr. A. FULLERTON (Dewsbury) moved that active steps be taken to establish a system whereby the family doctor, having obtained the consent of the next of kin of the deceased, could call in a consultant pathologist to do a post-mortem examination on any of his patients who had died of natural causes and for whom he could issue a death certificate in the usual way.

The motion, he said, was not concerned with cases referred to the coroner, who could order a post-mortem or not as he thought fit, but to those cases where there were circumstances of special interest arising in a case of death from natural causes.

Dr. A. TALBOT ROGERS said that agreement on the matter had been reached with the Ministry in a manner which he thought was likely to meet any such cases in which trouble had occurred.

Dr. R. COVE-SMITH (Marylebone) supported the motion.

Dr. FULLERTON said the matter had been referred to Council before and very little had happened. The body had to be removed from the patient's house to the mortuary. The motion was carried.

It was also agreed, on a motion by York, that transport should be available for the removal of corpses for post-mortem examination at public expense at the request of a general practitioner.

COMPENSATION AND SUPERANNUATION

The order of business was varied to permit of motions under "Compensation and Superannuation" being taken.

Dr. A. N. MATHIAS, chairman of the committee concerned, moved the sections of the report under this heading.

He said that since the last A.R.M. the whole question of the early repayment of compensation, the present inadequacy of the rate of interest thereon, the very narrow scope of the Ministry's definition of "hardship," and other matters had been under consideration. Discussions had been held with officials of the Ministry and all proposals had been met with a blank refusal. This time, if there was to be the slightest hope of success, especially as some of the proposals required legislation, it was felt that the best advice should be available in putting the case and that the approach should be to the Minister himself. Early last session a special committee consisting of senior members of the G.M.S. Committee and of the Superannuation and Compensation Committee had been formed which had decided to retain the services of the same team of advisors that had been employed by the Joint Negotiating Committee. As the remuneration claim had naturally taken priority the preparation of the compensation and superannuation case had been delayed, but Professor Allen had indicated the lines on which he thought the matter should proceed. In equity there was a cast-iron case. He hoped he would later be in a position to report progress in at least some directions.

With regard to the superannuation of part-time clinical assistants, difficulty arose only in those cases where a person held a part-time appointment but no other post in the Health Service, or had had a disqualifying break with, perhaps, even the return of his contributions. The Ministry had said that actuarially it was not possible for such people to enter the scheme on a part-time basis. The matter would be raised again: it involved ministries other than the Ministry of Health.

Regulation 85, giving the Minister absolute power to determine a question arising for decision under the Act in respect of superannuation, had been challenged in the courts last year, and, although there was no doubt that in law such power existed, the remarks made by the judge in the court of first instance had caused the Minister seriously to think whether something resembling the Medical Advisory Committee should not be set up to deal with the matter.

The Ministry had said that it was actuarially impossible for further options to be given eight years after the Health Service had started because some people felt that the conditions under which they had exercised their original option had

changed adversely in their particular case. The provisions of the Finance Bill at present before Parliament implemented to a certain degree the recommendations of the Millard Tucker Committee on Annuities and Retirement Arrangements for Self-Employed Persons. He asked representatives not to effect any new plan in their annuity arrangements until the Bill became law and its very complicated provisions were thoroughly understood and appreciated; neither should they give up or change any of their existing policies.

Advance Payment of Compensation

Dr. G. CORMACK (Newcastle-upon-Tyne) moved:

That the Council should press for payment of compensation adjusted to take into account the fall in the purchasing price of the pound and press for immediate payment; and that until such time as full payment of compensation is made the rate of interest be raised to current levels.

It might seem a commonplace proposition that whatever money was owing to doctors for the capital value of their practices ought to be paid; yet all sorts of excuses for non-payment had been made, some, regrettably, by members of the Representative Body and other members of the Association. Before the N.H.S. had been set up it had been agreed that the capital value of the practices involved was of the order of £66m. Whether or not that had been accurate, doctors should not go back on the agreement, but it represented the value of goods and services in 1947 or 1948, which had since been subject to a steadily depreciating currency. To buy the same amount of goods and services to-day would require perhaps twice as much. Hence the need for the adjustment in the capital value. Depreciation in value was a national problem, but there was no need to be too sympathetic towards those who had created it.

"We are in effect the only important nationalized group which have not received compensation, either in cash or in negotiable securities," he said. Doctors were required to make what was really a compulsory loan to the Government at a very low rate of interest. The fact that they had retained their jobs was not material; many other people in nationalized industries had retained their jobs and had got the money as well.

Dr. D. W. K. BUCHANAN (Dundee City) described the situation as "probably the greatest swindle of all time."

Dr. O. C. CARTER (Bournemouth) said he was concerned with the enormity of the injustice towards those who were in the Service. He asked whether it would be good for the status of medical men and women or for the welfare of medicine if, by the time compensation was paid, the value had dropped so much that it would be necessary for a large number of practitioners to seek help from public assistance.

Dr. A. N. MATHIAS said that all the arguments that had been advanced would be incorporated in the case to be put to the Minister.

The motion was carried unanimously.

Dr. A. COLEMAN (North Glamorgan and Brecknock) moved to request the Council to press for the payment of compensation moneys, or alternatively that it should be possible to convert compensation moneys into any other Government stocks.

He said that his Division desired to provide the possibility of half a loaf should it not be possible to obtain a full loaf. If the portion remaining of the global sum were to be converted into suitable stocks, such as Exchequer stocks, then with the capital appreciation which would fall to such stocks there would at least be some possibility of offsetting the grave decrease in capital values.

Dr. A. N. MATHIAS expressed the hope that the Representative Body would pass the motion unanimously.

The motion was carried unanimously.

Dr. LESLIE W. JONES (North-west Wales) moved that in cases of proved hardship doctors should be allowed to draw out their compensation money.

He quoted the experience of one member of his Division whose income had dropped by £1,500 per annum. Under

the present regulations he was debarred from making an application for compensation, and it was urged that there was every reason for the payment of compensation now.

Dr. A. N. MATHIAS said that pressure would be exerted for a wide broadening of the definition of "hardship."

The motion was carried.

Dr. J. W. RIDLEY (Cleveland) moved to ask the Council to review the superannuation and pensions schemes, with special reference to the responsibilities of the young practitioner with less than ten years' service.

He said that the young practitioner who qualified after a course lasting six years was then required to do one year in hospital before registration, during which time he paid the normal 6% superannuation on his salary. That was followed by two years' National Service, during which time he had the option of continuing to pay superannuation at the same rate as in his hospital job. That was normally followed by further hospital appointments. If he should become permanently incapacitated through accident or injury sustained in the discharge of his duties or by disease contracted because of exposure to it in the course of duty, he would be entitled to an injury pension. The important point in that connexion was that with the accident pension there was no qualifying period. If on the other hand a young practitioner of less than 10 years' standing was permanently incapacitated by injury or disease not contracted in the course of his job, then his only entitlement was the return of his 6% contributions plus compound interest. It was at a time when the young man was unable financially adequately to cover himself by insurance, and it was a matter of concern.

Dr. A. N. MATHIAS accepted the motion as a reference to Council. The working of the scheme and its funds had to be reviewed every seven years by statute, and they were at present being reviewed by the Government Actuary. When the results of the first seven years' working were known and possibly surpluses known, the Association would be in a strong position to make representations to see whether it was possible to get the benefits increased.

The motion was carried.

Dr. J. S. NOBLE (Blyth, with Morpeth) moved that the present ruling whereby women practitioners may draw widows' pensions in respect of their husbands but hospital officers may not is unfortunate and should be retrospectively altered forthwith.

"What sort of Treasury is this we have when they withhold from us our rightful moneys and then they snatch from the hands of our widows the paltry crumbs which they are entitled to?" he asked. He urged the meeting to pass the motion and press for an alteration in the ruling immediately.

Dr. ANNIS GILLIE (Paddington), in supporting the motion, said that it should be known that the proposer's wife was actually in full-time hospital salaried service, and if some catastrophe overtook him she would not be able to enjoy her husband's pension.

Dr. A. N. MATHIAS agreed that there was an anomaly and said he was grateful to Morpeth for having pointed it out. The motion was carried.

Dr. J. C. ARTHUR (Gateshead) moved that full pension benefits should be available to practitioners who wished to retire after 20 years' service, even if they had not reached the age of 60 years.

When the scheme was started in 1948, he said, the average doctor's age was in the forties. He did not contemplate putting in much more than 20 to 25 years' service anyway, but now the young man coming in might be faced with doing something like 35 years' service before he got pension rights. That represented a fairly "long sentence" in the National Health Service.

Dr. A. N. MATHIAS said that the question was based solely on actuarial considerations, and if the meeting were agreeable it could be looked at again and a report made next year.

The motion was carried as a reference to Council.

GENERAL MEDICAL SERVICES (resumed)

Fees for Maternity Medical Services

Dr. J. J. COSGROVE (Londonderry, with North-east Ulster) moved that the Association press for an increase in the fees payable to general practitioners in the maternity medical service.

He pointed out that the maternity fees had remained the same since 1948. The position was that a man in practice who did a considerable amount of midwifery was at a disadvantage as opposed to the man who did not. He received an inferior rate for the job.

Dr. A. TALBOT ROGERS said that the Representative Body ought first to consider where the money came from. It was not, of course, a question of asking the Government to provide extra money for the general medical services of the country. Whatever was paid for maternity services came as a first charge on the pool. He was doubtful whether the present was the best time to do it in view of the imminent general review of the way in which maternity services were provided.

The motion was lost.

Service Committees and Tribunal Regulations

Dr. R. S. V. MARSHALL (South Staffordshire) moved that amendments to Service Committee regulations should include:

- (1) The requirement that a précis of the evidence given by each witness be prepared and signed by the witness;
- (2) Proceedings against a doctor should only be in respect of a breach of the regulations, and the doctor be notified in advance of the inquiry of the regulation of which he was alleged to be in breach.

There were two other conditions laid down in the original resolution, but they required suspension of standing orders, which the meeting did not concede.

There seemed to be some difficulty as to whether the actual précis was in fact a correct record of the evidence which was given. It was suggested that if witnesses signed a précis of the evidence there would be some record, and there would not be the feeling of dissatisfaction.

Dr. ROBERT FORBES (Council) expressed the hope that the Representative Body would hesitate a long time before giving approval to the motion in its present form. "Those giving approval to the motion in its present form. 'Those of us who have seen these medical services committees in operation over a period of years are satisfied that the procedure that is being followed—and it will be improved—is a reasonable procedure which does not stand in need of further modification,'" he concluded.

Dr. ALISTAIR R. FRENCH (Marylebone) confirmed what Dr. Forbes had said. So far as point (2) was concerned, it was a fact that the executive council must inform a doctor charged with a breach of his terms of service specifically what particular paragraph of his terms of service it was that he was alleged to have broken.

Dr. H. GUY DAIN (Council) said that the suggestion under (1) was impracticable. At a meeting of the Medical Services Committee a shorthand note was taken and was available afterwards for reference, and it would be impossible to prepare a précis at that time. It would have to be circulated and agreed by the doctor and the patient. It would be of no advantage to the Service to do something which would be impracticable. With regard to (2), there was no question of regulations being broken. It was a question of terms of service, which was quite different.

Dr. B. HIRSH (Manchester) said there were many aspects of the resolution which he strongly supported. Medical services tribunals were examples of amateur justice at its worst. They followed no rules of evidence, and no man should be brought up before a tribunal unless he had committed a specific offence against the regulations which should be clearly stated. Those amateur tribunals were something which was repugnant to the whole conception of jurisprudence. On the one side—the doctor—there were duties and

no rights, and on the other side there were rights and no duties. It was contrary to the basic conception of justice in England.

Dr. MARSHALL, in reply, said that he had never seen full shorthand notes taken at an inquiry, as Dr. Dain had asserted. He was also informed that the notes would not be available.

The motion was carried.

Practice Accommodation

Dr. P. PHILLIPS (Bristol) moved to ask the Council to inquire into the unsatisfactory position in certain local authority areas with regard to tenancy terms for houses and surgeries rented by general practitioners on new housing estates. He said that it was an essential social need that practitioners should be able to obtain houses on the new housing estates. In his area the question of the doctors' accommodation was taken up with the local authorities and after some time the type of doctors' houses was agreed to. Three doctors' houses had been built and were now occupied and three doctors' surgeries were in occupation. The building was proceeding rapidly, but the complaint he made was in connexion with the terms offered to practitioners. The model plans were approved at a rental of approximately £328 per annum, but the increased cost of labour and materials had raised the cost of building to £6,000, and the Ministry of Health insisted that they must be let at an economic rent, and £400 barely covered it. At no stage would the doctor be permitted to buy the house; he was on a yearly tenancy with six months' notice on either side, so that he had no security of tenure; nor was it at all certain that his successor would be allowed to occupy the premises, either the house or the surgery.

Dr. A. TALBOT ROGERS said that this was an item which had been under the special consideration of the G.M.S. Committee through a subcommittee which had been examining the question of accommodation for doctors. A large number of problems had been discovered of different types and kinds. Information was coming in from executive councils and it was part of their intention in the new areas to try to find ways and means in which help could be given. The type of thing which the speaker from Bristol had outlined was the kind of information which was needed.

Dr. A. G. HERON (Bristol) supported what Dr. Phillips had said. The local authorities would not allow the houses to be purchased and the doctor was saddled with this £400 outgoing for the rest of his life. It was a terrible burden on the young doctor. Working and living on these estates was an arduous and lonely business for a doctor and his wife and children. He asked Council to find some means of ensuring security of tenure to these doctors working on the new estates.

The motion was carried.

DEPUTY CHAIRMAN, 1956-7

It was announced at this point that Dr. A. Beauchamp, of Birmingham, had been returned unopposed as Deputy Chairman of the Representative Body for the coming session.

The CHAIRMAN having announced that the meeting would have to sit until 6.45 p.m., a motion to suspend Standing Order 70 was accepted and carried with acclamation.

Employment of General Practitioners in Hospitals

Dr. A. A. VICKERS (Worcester and Bromsgrove) moved that there be an interim increase in remuneration of general practitioners doing sessional work in hospitals pending any final reorganization of hospital staff gradings following the Strachan proposals. He said that the 1954 award did not take into account general practitioners doing sessional work in hospital. The Strachan Report might be under discussion for years, and that was an unreasonable time for general practitioners in hospitals to have to wait.

Dr. A. V. RUSSELL (Council) supported the motion by Worcester and Bromsgrove. He hoped that in the negotia-

The meeting rose at 6.58 p.m.

THIRD DAY

Saturday, July 7

The Representative Meeting reassembled at 10 a.m., with Dr. I. GRANT in the chair.

GENERAL MEDICAL SERVICES

The debate was resumed on the sections of the report under General Medical Services.

National Insurance Contributions

Dr. R. P. HENDRY (Rugby, with South Warwickshire) made a motion which described as "noxious" the present practice of requiring a full week's National Insurance contribution for any portion of a week for which a person, not otherwise exempt, was certified. It contributed materially, said the mover, to some fantastic figures, such as those for final certificates received at National Insurance offices, Rugby, during the four weeks ending October 1 last. The figures showed that the day on which patients would be fit to return to work would be Monday in 250 cases, Tuesday in 57, Wednesday in 27, Thursday in 22, Friday in 17, and Saturday in 13. The motion went on to instruct Council to reopen the matter with the Ministry in the light of these figures, with a suggestion that persons certified fit to resume work on a Monday or Tuesday pay the full contribution, on Wednesday or Thursday half the normal rate, and on Friday, Saturday, or Sunday be exempt for that week.

Dr. I. M. JONES (Council) said that the motion sounded reasonable, but was in fact quite impracticable on several counts. First of all, the Ministry's contention that it was not feasible on actuarial grounds was quite correct. If the motion were implemented it would result in the insurance moneys of the Government being depleted to the tune of an average of about one week's contribution for each absence of ten days. Actuarially that would be little different from increasing sickness benefit by about 8s. a week.

Dr. R. H. MOORE (North Middlesex) said it was not the Ministry of National Insurance which was at fault. It was spread around various organizations and individuals—sick clubs, employers who had a fixed staff week, and the understanding foreman who told the employee not to return to work until he was thoroughly well.

Dr. HENDRY, in reply, pointed out that, if an employee returned to work on the Friday and did not make any contribution for that week, he did not get his 12s. 9d. or whatever benefit he happened to be drawing for those two days, so there was a saving on those days. He did not agree that it would increase by 8s. a week the amount of benefit. It was true that many firms started their working week on other days than a Monday, but the National Insurance week as such started on a Monday.

The motion was lost.

Supplementary Ophthalmic Services

Dr. R. B. L. RIDGE (Enfield and Potters Bar) asked the meeting to express the opinion that the grounds for altering the validity of Form O.S.C.1 were insufficient to justify the proposed change. There was, he said, confusion as to the proper use of Form O.S.C.1. At the same time, the big demand for forms at the outset of the Service tended to reduce the issue of the forms to a mere formality, a practice which had continued ever since. While the form might have some potential value, in everyday practice it was largely regarded as a formality and, as such, was of no value. It was proposed that the form should be required not only for the first eye test but for every subsequent test as well.

Dr. C. WATNEY ROE (Chelsea and Fulham) opposed the recommendation. Speaking as an ophthalmic practitioner, he said it was necessary to convince members that their services were more valuable than those of sight-testing opticians.

Dr. R. W. McCONNEL (Buckinghamshire) urged the meeting to reject the recommendation. Every practitioner, he said, should be able to decide whether a patient should be

sent to a consultant at hospital or to an optician. That was the value of Form O.S.C.1.

Dr. R. H. MOORE (North Middlesex) gave an instance of a patient who delayed consulting him because he had been to an eye centre, assuming that the centre knew more than the practitioner. He pleaded that doctors should be allowed to do their job thoroughly.

Dr. A. TALBOT ROGERS said that the matter had been considered, and he expressed the hope that the amendment would not be passed.

Dr. RIDGE, in reply, said that the decision taken on the amendment would affect every general practitioner every working day of his life. It was an example of the way in which wool had been pulled over the eyes of the Committee and the Council. The proposal would not in practice, however right in theory, achieve its objective. It called in question the integrity of the opticians, and it was not in keeping with the dignity of the Association to do this or to have an ulterior motive for a clinical proposition.

The Enfield and Potters Bar amendment was lost.

Economy in Prescribing

Dr. R. S. V. MARSHALL (South Staffordshire) moved that in order to assist practitioners to know the cost of drugs random selection of E.C.10 forms issued by them should be returned to them as soon as the Pricing Bureau had completed its work.

Most of the difficulties about the cost of prescribing were due to the fact that the doctor did not know what the cost of the prescriptions was.

Dr. ST. G. B. D. GRAY (South-west Essex) supported the motion.

Dr. A. TALBOT ROGERS commended the idea as something worth looking into. He asked that it be referred to Council.

The motion was carried as a reference to Council.

Dr. ST. G. B. D. GRAY (South-west Essex) had a motion suggesting that it was impossible for doctors to co-operate fully in the medicine economy drive because most advertisements do not state the price of drugs advertised. All medical advertisements to the profession should give an indication of the basic cost.

He said that most doctors had little idea of what the various drugs cost.

Dr. A. TALBOT ROGERS thought that the position was improving. Over the last five years there had been an increasing tendency in advertisements to provide references to the cost of the drugs.

Dr. R. H. MOORE (North Middlesex) thought that the manufacturers could help by standardizing the size of their advertisements in loose-leaf form so that they could be looked up easily and the price list more easily consulted.

The motion was carried.

Dr. A. REZLER (City) moved that the present method of penalizing doctors whose prescribing costs are above the areal average would result in a progressive deterioration in therapeutics and a fear in the N.H.S. patient that he might not receive adequate treatment for his illness.

He said his Branch felt that there was a point of principle at stake. At the present time doctors had not freedom of action in prescribing, which caused anxiety in the profession. The Cohen Committee had concluded that, generally speaking, it was undesirable to interfere with prescribing, though they had still set out some ways of doing so. Since then the matter had got worse. Not many doctors had had money deducted so far, but a great many had been subject to investigation and had been intimidated in an effort to force the profession to toe the party line. The present method of stifling doctors with higher than average costs endangered the maintenance of good therapeutic standards and was a mischievous substitute for the proper solution, for it would lead to standardized prescribing—in which case, why not go the whole hog and have the standardized doctor?

There was some anxiety among local medical committees that increased latitude in prescribing would give licence to

the scallywag. There had so far been inadequate study of the general-practitioner prescribing, and it was not the first time that the profession had had to look to non-medical experts to put the medical house in order. There were many factors which would repay further study. Because, over some years, the average prescription cost in Scotland had been about a shilling more than in England and Wales, was it right to suggest that the Scots were just throwing the money around?

Dr. B. HIRSH (Manchester) asked the meeting to reject the motion, on the ground that it contained a number of dangerous fallacies. The prescription of fancy and expensive drugs was not synonymous with good therapeutics, and the doctor who prescribed them let down his colleagues in the neighbourhood. The present drug bill was running at the rate of £52 million a year, for which figure there was little justification. The acceptance of the motion was to bring the cost still higher. Not only should the doctor who prescribed fancy and expensive drugs be penalized; there should be a bonus for the doctor whose prescription costs were well below the area average.

Dr. B. BURNS (Sheffield) said that, the populace of the country having been incited to become drug addicts, the doctor was now to be pilloried for prescribing what he had advised the patient to ask for. To penalize the doctor was merely a matter of the convenience of the executive council, thus perpetuating injustice. He thought that the whole trend of the service should be revised, particularly on the question of excessive prescribing.

Dr. N. NELSON (Dundee City) quoted figures showing that drug costs in Dundee were low.

Dr. R. H. MOORE (North Middlesex) said that regard should be had to the standard of a doctor's work and the results that he obtained. At present the doctor who did his work properly was penalized.

Dr. F. GRAY (Council) reminded the meeting that prescribing costs were sent out first of all for information, and every doctor should be glad to receive it. He denied that there was any penalizing of doctors because their costs were above average, but admitted that certain cases were picked out for investigation where a doctor was costing more money than others. The matter was then investigated by the local medical committee. The matter could be taken to referees if there was any dispute. No doctor could be "convicted" by the Ministry unless it were proved that there had been unnecessary cost.

"We have a responsibility to our patients, to our profession, and to the State that we prescribe reasonably," he said. "We have all the remedies in our own hands."

He asked the meeting to throw out what he described as "this inaccurately worded motion."

Dr. REZLER, replying to the debate, said it was interesting that doctors seemed always to refer to overprescribing done by other doctors but never by themselves. They seemed to feel that there must always be blacklegging somewhere—never mind if the whole profession suffered. He expressed surprise that Dundee's costs were so low and wondered what they were actually cheating on.

The City motion was lost.

Dr. W. B. ADAM (Tunbridge Wells) moved that, until such time as the pricing average figures are reliable, it is a waste of time and money sending R.M.O.s to interview general practitioners on this matter.

Dr. H. B. MUIR (Fife) said there was a common misconception that the high cost of prescribing was due to the prescribing of expensive drugs; the real cause was the frequency of prescribing.

Dr. A. TALBOT ROGERS said that such figures were things that doctors themselves asked for so that they might become aware of their own prescribing habits. R.M.O. visits had been carried out even before the area averages had been instituted, when a series of outstandingly expensive drugs had been found to have been prescribed. The initial visit was quite informal, often in the nature of a suggestion that some prescriptions might have been unnecessary and that the doctor might alter his prescribing habits without detriment

to his patients. It was only some six months or so later, when another check was made, that he got a further visit; if he had not by then done anything to improve the position he might be reported to his colleagues on the local medical committee, and it was then for them to decide whether or not a penalty should be suggested in his case. He thought there were pretty good safeguards and that not many were deterred from prescribing what they thought was right by the thought of area averages. Even in the past, before the days of area averages, considerable savings had often been effected as a result of R.M.O.s' visits. In some cases as much as £1,000 a year had been saved without any appreciable detriment to the doctor's method of practice in that way.

Loans for Provision of Surgery Accommodation

Dr. E. I. GARRATT (Dudley) moved that the Minister be pressed to increase the scope of interest-free loans for the provision of new surgery accommodation, to include all practitioners, either in single practice or in partnership, where such application is endorsed by the local medical committee and the executive council. He said that his Division was anxious to widen the scope for the issue of interest-free loans for the building of new surgery premises. They were aware that the idea of interest-free loans first came into being as a condition of the Danckwerts award in order to encourage the formation of group practices, but five, six, or seven doctors practising together was not always a feasible or desirable proposition. Owing to the credit squeeze it was not easy to get loans from banks, and many young doctors were finding it difficult to establish themselves in practice and find suitable accommodation. The Group Practice Loans Committee had laid down the minimum standards which it considered should apply to surgeries, but his Division was anxious that a young man starting off in practice should be able to begin under the best conditions; a measure of this nature would encourage these high standards.

Dr. A. BROWN (chairman, Private Practice Committee), speaking as a member of the Group Practice Loan Committee, said that the establishment of this fund was a condition of the acceptance of the Danckwerts award, which provided that £100,000 was to be put aside to enable the formation of group practices. The Group Practice Loans Committee consisted partly of doctors and partly of lay officials who had to be satisfied that a group practice did exist and that it would be served by an interest-free loan before this was granted. The scheme had been running for four years, and there would be no money left for any other purpose unless more money was taken out of the Pool. He thought it would be advisable not to accept this motion.

Dr. GARRATT asked if it could be accepted as a reference to Council, and this was agreed to.

Insurance Benefit During Part-time Employment

Dr. R. W. McCONNEL, on behalf of Reading, moved to ask for discussions with the Government departments concerned as to whether National Insurance benefit, even at a reduced rate, could be payable for a limited time during part-time employment preliminary to resumption of full-time. It was felt that this would facilitate the gradual return to full-time work which is desirable after certain illnesses. All doctors had patients who could not go back to full-time work after long illness and they stayed away in order that their benefit should continue. It would be an economy if they were able to go back on part-time work and were paid partly by the employers and partly by the Government. Many of these patients would benefit by doing a little work.

Dr. H. ALEXANDER (Council) said that the motion was a very important one. It was bound up with the wider problem of rehabilitation. Some two years ago a special committee was set up to prepare a memorandum of evidence for submission to the interdepartmental committee on the rehabilitation and resettlement of disabled persons (the

Piercy Committee); this was published and was a valuable contribution to the subject. The Committee drew attention to the fact that the general practitioner had the choice of only two things for the patient—that he was fit for work or was unfit for work. It dealt with the question of admission to industrial rehabilitation units for which the patient must have a certificate, and it was suggested that a certificate of partial fitness might be introduced so that the patient would get into the unit more quickly. The reaction of the Piercy Committee to that remained to be seen.

The purpose of the Reading motion was even more precisely urged in a memorandum by the British Council for Rehabilitation. It was pointed out that recovery from sickness or injury was gradual and could not accurately be forecast when the period of incapacity ended or the period of fitness started. The scheme provided for the full co-operation of the doctor, the patient, and the employer for an earlier return to work. This was considered by the Rehabilitation Committee and approved. No doubt there would be administrative difficulties, but anything which would encourage the convalescents in industry to co-operate in their own rehabilitation must be worthy of serious consideration.

The motion was carried.

Appliances

Dr. I. M. JONES (Sunderland) moved that Council be asked to consider the practicability of permitting general practitioners to prescribe on Form E.C.10 replacements of those appliances which were at present available only through the hospital service. He was concerned with the group of appliances which were prescribable originally by consultants. Some were now permitted to general practitioners on E.C.10. A typical anomaly was that a general practitioner could prescribe the replacement of an appliance for suprapubic transitional hernia, but he could not prescribe for the replacement of an appliance for epigastric transitional hernia. These anomalies caused unnecessary references to consultants. He asked that Council should review these regulations with a view to eliminating these anomalies.

Dr. A. TALBOT ROGERS thought Council might do this, but he hoped a list of the type of appliances could be supplied. The Ministry could not be expected to agree to a wholesale permission, especially when it was borne in mind that many of the appliances ordered were for a specific period to deal with a transient condition.

Mr. H. H. LANGSTON (Council) said that this concession if granted would bring relief to many orthopaedic surgeons and it would save time, but he did not think it could be applied in the wholesale way the motion suggested. The present was an opportune time to raise this issue because, whereas appliances had been supplied through the Ministry direct, now this would have to be done through management committees.

The motion was carried.

Dr. A. M. MAIDEN (Lincoln) asked the meeting to agree that oxygen, blood, and other therapeutic substances required by a general practitioner in an emergency should be conveyed to the patient at the public expense, and without charge to the doctor. He said that there appeared to be no fund out of which the transport of oxygen, blood, and therapeutic substances could be conveyed to a patient's house in an emergency. In a case of post-partum haemorrhage blood wanted quickly was sometimes brought to the house by ambulance. When oxygen was needed it was the duty of the patient to arrange the transport, which was not always easy in a country district in the middle of the night. In his Division hitherto these things had been paid for by the executive council and an application made to the Ministry to pass it: it had done so, stating that the item must be shown as a bad debt in the audited accounts. In the last two years, however, the Ministry had not allowed any of these payments to be made, and the health committee of the Lincoln County Council had informed the profession

that it would send the bill to the doctor. That had been done in two cases recently. Some method should be evolved whereby the doctor should not be penalized.

Dr. A. TALBOT ROGERS said that this would be taken up again with the Ministry. Previously the Ministry had said that there was no fund out of which such payments would be met, and payment depended on the good will of the county council.

The motion was carried as a reference to Council.

National Insurance Certificates

Dr. J. S. NOBLE (Blyth, with Morpeth) moved that practitioners should at their discretion be permitted to issue first or any subsequent National Insurance certificates for a period of up to four weeks. If this motion were accepted it would save the time of the patients, that of the other patients, and of the doctor. It might be said that there would be some abuse, but the Ministry had enough R.M.O.s to deal with cases of that kind.

Dr. A. TALBOT ROGERS said that the Conference of Local Medical Committees passed a similar resolution and the matter would be taken up with the appropriate authorities in the coming session.

The motion was carried.

Dr. NOBLE further moved that the Ministry of National Insurance be empowered to issue copies of National Insurance certificates on request from the patient. He said that it would be a considerable saving in work if the Ministry issued these certificates instead of the doctors.

Dr. W. B. PEMBERTON (Camberwell) said that after the 1948 Act income from private practice fell to nothing except the small amount one received for issuing private certificates. This meeting had shown in no undecided fashion that incomes should be raised, and he asked that this motion should not be passed.

Dr. G. CORMACK (Newcastle-upon-Tyne) thought this would create a thoroughly bad precedent. Clerks should not be permitted to issue certificates for anything they thought fit.

Dr. R. COVE-SMITH (Marylebone) also opposed the motion, which was defeated.

Medical Practices Committee Certificates

Dr. J. S. MOFFAT (Cumberland) moved that the meeting recommend that section 35 (9) of the National Health Service Act, 1946, be more clearly defined, so that, just as the granting of a certificate of valuation protected the practitioner at law, the refusal of such a certificate should legally imply that the law had been broken. The motion went on further to recommend that the Medical Practices Committee should be answerable at law for failure to carry out their statutory duties.

Dr. Moffat gave an account of a case in which a difficult situation arose from the fact that section 35 of the Act provided that doctors in possession of certificates of valuation were protected and those who had been refused were not protected. A doctor to whom a certificate had been refused might not know where he stood until he found himself in the criminal court. His Division submitted that a practitioner who could prove that the valuation certificate was refused to him should equally be protected at law, and the Medical Practices Committee should be answerable at law for failure to carry out their statutory duty.

Dr. W. E. DORNAN (Medical Practices Committee) said that, although the facts had been accurately stated, the section laid down that the certificate was valid only in respect of a proposed transaction. The unfortunate doctor in question had entered into his transaction and completed it by signing his agreement to purchase the house before he went to the Medical Practices Committee for a certificate, and in those circumstances the Committee was unable to issue a valid certificate. (Cries of "Why?") "Because the section of the Act lays it down quite clearly that the certificate is only valid in respect of a proposed transaction

and not a transaction which has been completed. The terms of the Act are quite explicit on that."

He said the Committee was anxious to be helpful and went to the valuation department at Somerset House for their opinion. If a satisfactory answer was given by the valuation department a letter could have been sent to the doctor enabling him to satisfy the building society that the transaction was not one which could be questioned. If the motion was passed it would put on a doctor charged the onus of proving his innocence instead of it being on the prosecution to prove his guilt once the certificate had been refused to the doctor.

Dr. J. A. PRIDHAM (Council), reinforcing Dr. Dornan, said he hoped the last thing the meeting would wish was for the Medical Practices Committee to have the power asked for, which would alter the whole aspect of the certificates. Representatives would be fastening a chain on themselves if they passed the motion, and would be asking the Committee to take over the powers of the courts and the public prosecutor. He asked the meeting not to be misled by one unfortunate case.

Dr. H. GUY DAIN (Council) suggested that the motion should be accepted as a reference back to Council.

The motion was carried as a reference to Council.

R.M.O. Examinations

Dr. W. MORGAN EVANS (South Middlesex) moved that in the opinion of the meeting the local National Insurance officer should be required, three weekdays before sending Form R.M.3D to a patient, to notify in writing the practitioner in charge of the case.

Dr. A. TALBOT ROGERS suggested that the motion should be referred to the Council, which would do its best to carry it out.

Dr. EVANS said it was a straightforward issue and that the meeting should be able to say yea or nay to it.

The motion was carried.

National Health Service and Foreign Nationals

Dr. A. W. HENDERSON (Oxford) moved that access to the National Health Service should not be available to foreigners on holiday in this country except in the case of nationals of countries with which there are reciprocal arrangements.

He said the motion was not intended to apply to foreigners who were resident in Britain for a long period or were studying, but to visitors for a few weeks, many of whom were abusing the Service by getting free treatment, including dentures and spectacles.

Dr. H. G. DOWLER (Gloucestershire) said it distressed him to find Oxford putting forward such a motion. One realized that there were abuses, but surely one should err on the side of giving the benefit of the doubt. (Cries of "No.")

Dr. J. S. M. ORD (Glasgow) expressed the hope that the meeting would turn the motion down. It was against the whole spirit of the Act, and affected those people visiting this country who were suddenly taken ill or who were involved in an accident for which they were in no way to blame.

Dr. L. ZEITLINE (Paddington) expressed surprise that such a large city as Oxford should have tabled such a minute and unworthy resolution. He urged the meeting to put down the motion on two grounds: the first was that it was against the general principle that the National Health Service was open to all foreigners, and, secondly, the number of "temporary residents" constituted a substantial part of the practitioner's income in certain cases.

Dr. R. H. MOORE (North Middlesex) asked the meeting to turn the motion down.

Mr. H. H. LANGSTON (Winchester), speaking in support of the motion, recounted how some 18 months ago six American ladies were taken into Southampton Hospital with fractured femurs due to a rough crossing of the Atlantic. It was felt that one of them, after an eight-weeks stay in the hospital, was fit enough to go home, but she said she could not afford the treatment in the United States, and at the end of 14 weeks she flew back to San Francisco.

Dr. C. W. WALKER (Cambridge and Huntingdon) said that the motion from Oxford was thoroughly mean. "Why should we not offer hospitality, poor and ill equipped as we are?" he asked. "Is it not a matter of pride that we should be allowed to offer hospitality to those who come here?"

Dr. C. R. G. BARRINGTON (Bromley) said that many friends on the Continent had expressed to him surprise that foreigners should be allowed free treatment when in Britain. It was an absurdity which had gone far enough.

Dr. A. TALBOT ROGERS, in reply to a question, said that the amount which was spent on the free treatment was much less than was generally thought, and an effort would be made to obtain the figures. The small amount which had been spent had been one of the best advertisements for this country in spreading good will outside Britain. It was not true that a patient could come from another country deliberately to have treatment here. A practitioner was entitled to refuse to treat any person whom he believed had come deliberately to have glasses or teeth. The service was legal only for those people who fell ill when in Britain.

Dr. HENDERSON, in reply, maintained that in many instances it was difficult to refuse treatment to those persons who demanded it.

The Oxford motion was lost by 135 for and 155 against.

MEDICAL ETHICS

Indirect Methods of Advertising

Dr. ROBERT FORBES, chairman of the Ethical Committee, presented the report under "Medical Ethics." He immediately proceeded to move approval of the Report on Indirect Methods of Advertising, which forms Appendix V of the Annual Report of Council, and further moved, as a recommendation of Council, the insertion of the following sentence after para. 14(v) of the report which lays down the general rule of anonymity for practitioners appearing in "sound" or "visual" broadcasting programmes:

There may be exceptional circumstances when a departure from the foregoing rule is justified—for example, when a practitioner broadcasts in an official capacity on medico-political matters of national interest.

Since 1953, he said, pressure had been brought to bear upon the Central Ethical Committee to consider again its attitude in the matter of broadcasting by radio and television. Letters had appeared in the press maintaining that anonymity should be relaxed. Some eminent members of the profession flouted the earlier expression of opinion by the Representative Body and appeared under their own names when dealing with medical subjects on sound and visual broadcasts. The situation called for re-examination by the Committee. The Committee went into the matter very fully and reported to Council that the rule of anonymity should be continued. It was felt that any relaxation of that rule might make the situation much worse, and might be used by practitioners as an excuse for doing things which they themselves knew to be unlawful and probably wrong. The Council had asked the Committee to consider taking the matter back and reviewing it once more, suggesting that if the absolute rule of anonymity were to obtain it would be impossible for any member of the B.M.A. Council or any members of the staff, or any prominent member of the profession outside those already mentioned, to appear on television or to speak on the radio on a matter of national or medico-political importance. It was suggested that something was lost by merely saying that the person who was speaking was "a spokesman of the British Medical Association."

The Committee were loath to concede that point of view, but it went as far as it dared and added the words: "There may be exceptional circumstances when a departure from the foregoing rule [the absolute rule of anonymity] is justified." It had been made clear at the top of the document which dealt with indirect methods of advertising that the ultimate decision in all matters must rest with the individual concerned, but practitioners who were in any difficulty in deciding upon their course of action should seek guidance from the Secretary of the Association.

Dr. C. P. WALLACE (Guildford) congratulated Dr. Forbes and his committee on having moved one inch forward.

He disagreed with the statement that anonymous medical broadcasts had gained the confidence and approval of the public. Nothing could be worse than that the public should be conditioned and educated into receiving their information on medical matters from anonymous sources. He also disagreed with the view expressed in the statement that "the authority in the circumstances cited above derives from the standing of the organization or the newspaper concerned." He was unable to think that the Representative Body wished that the medical instruction of the public should be influenced by the so-called standing of the newspaper concerned. What really mattered was the circulation of the newspaper concerned.

The motion was carried.

Mr. J. C. GIBSON-MOORE (Hendon) moved as an amendment that the policy of the Association as expressed in the resolution by the Representative Body in 1951 be reaffirmed. This resolution called for a close liaison between the B.M.A. and the B.B.C. to control the selection of subjects and the scope of material presented to the public, and that practitioners approached to appear in such programmes, whether sound broadcasting or television, should insist on anonymity as part of the contract.

Dr. R. P. LISTON (Tunbridge Wells) said there were two schools of thought on the matter. The diehard school felt that any departure from the accepted policy was fraught with danger and that in no circumstances should doctors speak in their own names on medical matters on the wireless; the modern view was that people should speak in their own names with their full titles and appointments; it was felt, quite rightly, that every opportunity should be taken to educate the public in medical matters. The difference of view arose on where such information could be authentic only if the doctor giving the talk were identified. But was anonymity really a bar to authenticity? The demand for names surely did not come from the public. The man-in-the-street did not really care who spoke to him on the wireless on medical matters so long as it was a doctor.

Dr. S. NOY SCOTT (Council) hoped that the meeting would reaffirm the 1951 decision. The more the recommendation was examined in cold blood the more insidious it appeared. Once the door was opened one inch, before long there would be a flood. When a practitioner broadcast in an official capacity on medico-political matters, in nearly every case he would be either an officer or an official of the Association. Surely, that should be sufficient to show his status. He could see no conceivable way in which the naming of the doctor could help.

Dr. F. GRAY (Council) said a little bit of fact was worth more than a lot of theory. Many years ago the Council had deliberately broken its rule of anonymity by asking Lord Horder to broadcast. That was one of those exceptional instances where it had been absolutely necessary for it to be put across to the public that a certain step should not, for medical reasons, be taken, and it would not have had the same effect had it been done by an anonymous doctor.

The recommendation merely embodied the principle laid down by the G.M.C. that a doctor should not do anything to attract patients or promote his professional advantage.

Dr. F. M. ROSE (Council) said that too great a degree of rigidity in the construction of the motion was likely to defeat its own purpose.

Dr. WALLACE pleaded that the meeting should hesitate before supporting the amendment, for it would introduce a degree of rigidity into the practice of the profession with regard to broadcasting which was wholly undesirable. He said that those who, with him, were strongly in favour of a greater degree of freedom were perfectly prepared to attribute the highest motives to those who held differing views, but did expect at least to be given credit for having equally high motives. It might be worth while for the Ethical Committee, or even another committee, to consider

whether a similar arrangement be adopted for medical broadcasting to that which was in operation for religious broadcasts. The churches, especially those who subscribed to very dogmatic teaching, were in much greater danger every time a minister entered the B.B.C. pulpit, but few would be prepared to maintain that religious broadcasting suffered by the name of the preacher being announced.

Dr. R. G. GIBSON (Council) hoped that the meeting would stick to the 1951 decision. There had to be absolute anonymity or no anonymity at all.

The Hendon motion was carried.

Mr. J. C. GIBSON-MOORE (Hendon) asked the meeting to express the view that all articles by registered medical practitioners appearing in *Family Doctor* should be anonymous.

To the argument, which he said had sometimes been advanced, that it was the practice for doctors to write under their own names in publications such as the *B.M.J.*, he said that the *Family Doctor* was a publication for the general public, framed in simple, non-medical terms, and contained certain non-medical articles.

In reply to a question by Dr. ROBERT FORBES (Council), the CHAIRMAN ruled the Hendon motion out of order.

HOSPITAL AND CONSULTANT SERVICES

Mr. T. HOLMES SELLORS, chairman of the Central Consultants and Specialists Committee, presented on behalf of the Council the Annual and Supplementary Reports under "Hospital and Consultant Services," together with the memorandum of his committee on the report of the Bradbeer Committee on the internal administration of hospitals (Appendix III).

He first paid tribute to his predecessor, Dr. Rowland Hill, as chairman and to those others who had assisted in the work. He said that the report indicated progress in some directions and sustained but incomplete action in others. Real unity had been achieved with those in the practitioner field in at least one important respect which he hoped would be the herald of many others. His committee had always stood in a rather unusual position. The consultant approach to the Ministry came from the Joint Committee. Its association of unity with the Royal Colleges and the Royal Scottish Corporation had added weight to all the deliberations and actions that the Committee had taken. It had felt that the repeated suggestion that it should increase its individual membership or make alterations in its particular form of representation to represent sectional interests was not necessary. It was quality, not quantity, that counted.

The construction of the Whitley B Council had been carefully considered. The Whitley machine did present a certain number of safeguards, including the right to claim arbitration, which would be granted if the other side agreed. That could work both ways, because arbitration could be refused by the Association as well as by the Management Side. There might otherwise be imposition from above by various directives which would nullify any safeguard that arbitration or any other discussion in the Whitley machinery could achieve. The situation was not felt to be entirely satisfactory, but there had been definite progress and a good deal of understanding had been achieved between both sides of the table.

He paid tribute to the hard work done by the various subcommittees. Satisfactory progress had been made in establishing, if not officially, hospital medical advisory committees at all levels except on the regional hospital boards, and strong efforts were being made to overcome that last hurdle. The appeals machinery had worked well. There had been one instance in which a board which had not taken notice of its findings had been directed to do so by the Ministry. Permission had been obtained for whole-timers or newly elected consultants with a substantial number of sessions to opt for maximum part-time save in exceptional circumstances. Whole-timers had been permitted to undertake paid domiciliary consultants' work after submitting to a quota of unpaid work.

The whole question of hospital medical staffing was still in the melting-pot, bound up with the very important question of the S.H.M.O.s. The Committee had listened to the advice of all branches of the hospital medical staffs and had brought every possible sectional interest into the orbit of its discussions.

Remuneration of Hospital Medical Staff

Dr. C. H. STRACHAN (Oldham) moved that the Joint Negotiating Committee should, in the event of any increase in the betterment factor being granted by the Ministry, consider some means by which members of the hospital and consulting services who retired prior to the granting of the last increase in remuneration should now benefit in their pension.

He said the motion bristled with difficulties, but it would be a pity if it were rejected on that account, and asked that it should be referred to the Council.

The motion was carried as a reference to Council.

Mr. J. DUNBAR (Glasgow) moved that the Council consider the desirability of abolishing the merit award scheme for members of hospital staffs, unless in very exceptional cases, and replacing it by a system allowing for responsibility payments.

He said that 90% of consultants were dissatisfied with the present position. A consultant applying for a merit award who was given one of the lowest grades was left with a feeling of frustration and inferiority and there was much unhappiness amongst specialists and consultants. A special committee had been appointed to consider who should get merit awards, but nobody knew who were the members of it or who appointed it, and there was a great deal of secrecy about the matter at the highest level. He said he knew of no other profession in which public money was dispersed secretly. Before 1948 the incentive for consultants to gain promotion was prestige. Nowadays prestige carried money with it, and to get among the money a man needed promotion. He believed that money was still a great incentive. This age was a very materialistic one, especially among the younger members of the profession, who saw that promotion would not necessarily increase their salary, and if merit awards were given for responsibility it would restore a great incentive. Someone who did outstanding work should receive an appropriate award free from secrecy, and this should be seen and known about, not left to surmise.

He asked that the motion should be referred to Council.

Professor P. C. P. CLOAKE (Birmingham) pointed out that the merit award scheme was recommended in the Spens Report as part of the basis upon which the Committee considered the wise administration of Ministry funds in the Hospital Service would be well directed, and for that reason alone he felt that the meeting should consider very carefully before chiselling away at that Report. It had been approved and was regarded as the keystone of their stand on remuneration. He did not agree that there was much unhappiness about merit awards; he had never met it and did not believe it to be true to say so. It was true that there was a certain secrecy, which was in some respects undesirable. It was desirable, however, because it had been felt by consultants themselves that they did not wish to have the giving of a merit award to an individual blazoned abroad. He was sure prestige was still the basis; prestige could be assessed and was investigated before an award was given. He asked the meeting to reject the motion.

Mr. G. E. MOLONEY (Oxford), supporting the motion, said that general practitioners were paid on a per capita basis, which ensured that the amount of payment bore some relation to the amount of work done. The payment to a specialist or consultant bore no relation to the work done; he could work the time or pass the time; the number of patients dealt with in any one session did not matter. The qualities distinguishing one consultant from another were obscure. To be known in the right circles appeared to count for a lot; in fact, it had become almost a vicious circle. Consultants' private earnings in State hospitals were assessed on output, and it would, he said, be quite easy to assess their

National Health effort in the same way, which could be rewarded by bonus money. The higher grades of award were being used to add to the salaries of many university professors. It did not need a secret cabal to decide who were the "blue-eyed boys." He believed discerning family doctors made a better job of it, and to be consistent there should be a merit award for G.P.s or the meeting should pass the motion.

Dr. W. N. LEAK (Mid-Cheshire), commenting on the reference to merit awards being used to help increase the salaries of university professors, pointed out that if it were not for the merit awards it would be impossible to maintain the standard of medical education, because suitable people would not accept such appointments.

Mr. H. H. LANGSTON (Council) said it was not correct to say that consultants' remuneration bore no relation to the amount of work done. All consultants had a contract for a certain number of sessions, which were worked out and bore a close relationship to the work done. The suggested alternative would involve a detailed investigation of exactly how much each consultant did at each session, which was a thing about which the Consultants and Specialists Committee had been alarmed. There had been a tendency in that direction, and it was the last thing the Committee would want. He pointed out that if there had been a great deal of disquiet about the present position there would have been resolutions on the subject at the Central Consultants and Specialists Committee; he could not remember one for a very long time, and such motions as had been proposed had always been defeated. He agreed with Professor Cloake that it would be highly dangerous to try to remove one part of the Spens Report when their case was that the whole of their remuneration was based on that Report.

Mr. T. HOLMES SELLORS (Council) said that the Central Consultants and Specialists Committee had agreed to look into the matter as a result of resolutions passed at the conference. He added that they had been led to believe that if alterations were wanted the sum of money might very well be taken away altogether.

Mr. G. J. CLELAND (Ayrshire, with West Wigtownshire), supporting the motion, said the important consideration was the feeling that it was an obnoxious principle that such a subject should be completely secret.

Mr. DUNBAR, in reply, said that whenever anybody tried to do anything they were told, "Don't interfere with Spens." He thought they need not be bothered about the threat that the money would be taken away. In fact, they would rather have the money removed and be in the open than have the present position. What was under consideration was payment for responsibility, not for the amount of work done. As to the suggestion that there was no unrest, he wondered how many men who had not got a merit award would be willing to say so openly.

The motion was carried.

Dr. J. B. S. MORGAN (Derby, with Derbyshire, West) moved that the constitution of the Joint Committee be so amended or its number increased, as to include direct representation for both full-time (non-teaching) consultants and S.H.M.O.s in order to give adequate consideration of the viewpoint of both these grades in all future negotiations and discussions.

He said that the motive underlying the amendment was not necessarily dissatisfaction with the result achieved by the Joint Consultants Committee or with its individual membership. It was simply a widespread dissatisfaction throughout the 4,700 members of the two grades that their voices were not heard directly on that vital committee. It was not an attempt to secure proportional representation on the Committee, but only to obtain some representation which would give confidence to the negotiators. Dr. Morgan gave details of the constitution of the Joint Consultants Committee and pointed out that there was no S.H.M.O. representation. If the amendment were accepted, he said, it would give immense satisfaction and confidence throughout the ranks of the full-time consultants and S.H.M.O.s.

Mr. J. R. NICHOLSON-LAILEY (Council) said he hoped the meeting would not accept the amendment. In the first place the constitution of the Joint Committee was settled by treaty which was agreed between the Colleges and the Central Consultants and Specialists Committee, and in that treaty both parties could, if they so desired, dissociate themselves and proceed separately to negotiation, and so far that right had not been exercised. The Central Consultants and Specialists Committee felt that it did not require more than the present six members to represent it. In addition there were members of the Central Consultants and Specialists Committee who sat on their own as representatives also of the Royal Colleges. Of those six people, one was appointed as a full-time representative to begin with, one came from Scotland, and the other four, chairman and vice-chairman, were members, which left two seats to be filled. It was difficult to see how, in order to fill those two seats, one could indulge in the luxury of sectional representation.

The amendment was lost.

Dr. D. H. ANDERSON (Sheffield) moved that the representatives appointed by the Central Consultants and Specialists Committee to the Joint Committee should always include one whole-time consultant, one consultant from a provincial non-teaching hospital, and one S.H.M.O.

It was felt, he said, that the present numerical representation on the Joint Committee enabled the Central Consultants and Specialists Committee's influence adequately to be exercised in the deliberations of the Joint Committee. Sheffield did not necessarily wish to see numerical representation on the Joint Committee increase provided that the main groups of the specialists body could be represented. One important body not represented on the Joint Committee was that of the S.H.M.O.s, and it was felt that that lack of representation was unjust and unfortunate.

Professor P. C. P. CLOAKE (Birmingham), in asking the Representative Body to reject the motion, pointed out that the principle of election throughout the consultants representation was one of freedom.

The Sheffield amendment was lost.

Hospital Medical Staffing

Dr. V. COTTON-CORNWALL (Liverpool) moved that the meeting most emphatically take the view that the Council had failed to implement certain of the resolutions passed at the last Annual Representative Meeting on S.H.M.O. appointments and on one recommendation of the Bradbeer Committee, and, furthermore, that in its comments on these subjects in the Annual Report it had weakened the policy laid down last year.

He said that the idea behind the motion was not to reopen the discussion on the resolution passed in 1955. It sought to ask the Representative Body to re-emphasize that it was the policy-forming body of the B.M.A., and therefore resolutions passed at an Annual Representative Meeting were not suggestions or views with which Council agreed or disagreed. They were the policy resolutions of the Association, and it was binding on the Council to attempt to implement them. It followed, therefore, that the Council should not use language which could be interpreted as disagreeing with or modifying any resolutions passed at the A.R.M.

Mr. T. HOLMES SELLORS (Council) said that so far as the recommendations made by the Representative Body were concerned, where attempts to get them implemented had failed it was due to those with whom the Association were negotiating. If a direct negative were received from the Ministry there was nothing that could be done, except to report back to the A.R.M.

Dr. COTTON-CORNWALL, in reply, said that his point had not been answered. He had pointed out that in the report the Council talked about "suggestions," and he wished to emphasize that resolutions which were passed were not suggestions. Council were not justified in saying in the Annual Report that "suggestions" were made at an A.R.M., when in fact they were resolutions.

The Liverpool amendment was carried.

(At this point the business of the meeting was interrupted to allow the Chairman of the Journal Committee, Dr. J. G. M. Hamilton, to introduce to the Representative Body Mr. Harry Cooper.)

Mr. Harry Cooper

Dr. J. G. M. HAMILTON said he was grateful for the opportunity of performing what was for him personally and, he felt sure, for the Representatives a very pleasant duty.

"Since this meeting began," he said, "there has been sitting in front at the table occupied by our silent and efficient friends, the Press, Mr. Harry Cooper, reporting for the *British Medical Journal*. Mr. Cooper attended his first annual meeting as a reporter for the *Journal* in 1907, and, unless the arithmetic which has been done behind the scenes is wrong, this is the fiftieth year of his attendance at our annual meetings." (Applause.) Throughout that half-century, continued Dr. Hamilton, Mr. Cooper had by reason of illness been unable to attend only on one occasion. "I am describing for you what is obviously a wonderful performance." Not only, however, had Mr. Cooper exhibited that remarkable endurance, but his work as a reporter had throughout that time been illuminated by certain very personal characteristics which had been outstanding. The clarity, effectiveness, and economy of his reporting had been quite notable, "and if I say to you that Mr. Cooper seems to be one of a rapidly diminishing band of people who can write decent English," he continued, "you may perhaps realize that I certainly am paying one of the highest compliments that I can."

Mr. Cooper had exhibited throughout his long period of service an assiduous devotion to the Association which had far surpassed that which had been exhibited by most of the members of the Association. He was present to-day reporting for the *Journal* in spite of the handicaps of tedious and painful ill-health.

"Mr. Chairman," he concluded, "I should like now formally to introduce Mr. Harry Cooper to the Association which he has served so faithfully and to such satisfaction on our part for such a very long time."

Mr. HARRY COOPER, who rose amid prolonged applause, said that members of the Press present at the meetings were not supposed to be heard and scarcely to be seen, but he desired to be permitted to say two sentences in order to express his deep gratitude for the too kind words which had fallen from Dr. Hamilton. "I remember hearing one famous figure in medicine in his day, Sir StClair Thomson, say that the poorest way of gaining a reputation is to survive one's contemporaries, but, apart from any question of merit in survival, that survival, when it has been a question of association with the people in the B.M.A. and its *Journal*, has been an experience well worth while." He said he had never felt such pride and satisfaction as he had felt in the work which he had done for the *Journal* during a succession of editors from Dawson Williams and a succession of secretaries from Smith Whitaker.

During the last six months Mr. Cooper said he had seen doctors from another angle, and whatever cynicism a journalist might acquire—and journalists always did acquire some cynicism—had been eliminated by seeing doctors from the point of view of the patient, and realizing how kind and patient they could be.

"I wish to thank Dr. Hamilton and everybody here for their overwhelming kindness, which is quite unexpected on my part," he concluded, "and I feel sure you will pardon my embarrassment. Thank you very much."

The meeting rose to its feet and gave Mr. Cooper a prolonged ovation.

(The business of the meeting was resumed.)

Dr. A. BEAUCHAMP took the chair.

Dr. K. C. BAILEY (West Somerset) moved an amendment that the Meeting disapproved of the action of Council in not accepting the resolution dealing with hospital medical staffing as official policy of the Association, and that it should be implemented in any discussion of the Bradbeer Report.

He pointed out that the resolution referred to in 1955 was not a reference to Council, therefore it was not for Council to say what should be done about it. It was an instruction to Council from the Representative Body. The Representative Body represented all members of the profession, and having decided on policy the Central Consultants and Specialists Committee were expected to honour their dues. If, however, that Committee could not agree with the Representative Body, then the Council must accept the decision of the Representative Body and not the Central Consultants and Specialists Committee's decision in working out the policy of the Association.

Dr. A. F. DUNN CARRIE (Manchester) supported the amendment, stating that Manchester felt strongly on the matter. It concerned not only hospital staffs but also every general practitioner.

Professor P. C. P. CLOAKE (Birmingham) asked the meeting to reject the motion. If the tripartite arrangement were to be denied it would, he said, be handicapping the methods of administration in many of the largest and most important hospitals over the last fifty or hundred years.

Dr. V. COTTON-CORNWALL (Liverpool) said that the amendment did not ask the Representative Body to condemn tripartite administration at all. What the resolution of the previous year did was to call for reaffirmation that of the medical side of administration, which should be primarily the Medical Advisory Committee, was paramount, because it was the only side which knew what was in the best interests of the patient.

The amendment was carried.

Mr. J. C. MCMASTER (West Somerset) moved that a review of S.H.M.O.s was now overdue. It should be undertaken by a newly constituted central committee of agreed composition, and the criteria should be known and accepted in advance.

The startling point, he said, was that it was admitted by the Ministry of Health that 257 of the minority of 3,000 were actually doing the work of consultants. Some of those men had faced grading committees three or four times, and whoever, in the ordinary administration of justice, had heard of a court of appeal being presided over by the same judge who presided over the earlier hearing? It was preposterous. The proceedings of the committees had been conducted in a hole-and-corner manner, and it was impossible to find out what the criteria of such committees were. It was essential in future reviews that the constitution and procedure of those committees should be radically altered.

"The S.H.M.O. is a forgotten man," he concluded, "and I do appeal to the meeting to pass this and let some clear light into this murky business."

Dr. F. E. GRAHAM BONNALIE (Exeter), supporting the motion, gave one instance of what was happening at present. A member of the profession employed by 49 medical practitioners to do their gynaecology and obstetrics was condemned, because he was an S.H.M.O., for the rest of his professional life to earn a little less than half of what he earned as a general practitioner. He should at least be brought up to the level of the general practitioner.

Mr. T. HOLMES SELLORS (Council) said that the Committee was very much in sympathy with the position of S.H.M.O.s. Repeated applications had been made to the Ministry for review and it had been repeatedly refused. Reviews had been asked for from time to time for various sections of S.H.M.O.s. There was a possible way out of the difficulty: the whole question of medical staffing was under review, and the meeting could be sure that the position of the S.H.M.O. was not being forgotten, but it might not see the light for a year, 18 months, or longer.

One of the previous speakers said that the position of S.H.M.O. appeared to be a dead end, but that did not preclude the S.H.M.O. applying for a consultant's post if he felt he was competent to do so. Once he was in the post he was on the way, and there were a number of opportunities which might be given to him. But if he wanted to resign as S.H.M.O. he must stand in open competition for a post;

but a number had not felt that the risk was worth taking. To ask for a national review of S.H.M.O.s just now would be futile.

Mr. MCMASTER asked the meeting to express its view that the demand for this review, even though the Ministry had previously refused it, should be pressed to the limit. They should not always accept what the Ministry said. The other point was that his Division felt the method of review should be radically different, and that position had not been touched on.

The amendment was carried.

Mr. J. C. MCMASTER (West Somerset) next moved on behalf of Reading (1) that the post of S.H.M.O. be abolished forthwith, or failing this, as an alternative, (2) that no further S.H.M.O. posts should be established and that the present position be subject to biennial review. (3) That S.H.M.O.s should have the full right to be eligible for membership of all hospital committees and out-patient clinical lists on a par with their consultant colleagues.

Dr. W. E. BOWDEN (Warrington) said that it had been agreed that a review of S.H.M.O. posts should be made as soon as possible, but there should be a certain number of S.H.M.O. posts, under either that name or some other name, because there might be some other practitioners who failed to get the higher qualifications necessary for a consultant post but wished to remain in the hospital service. If this resolution was passed they would have to remain as registrars or join some other branch of the service. He asked that the amendment should be rejected.

Mr. H. H. LANGSTON (Winchester) also asked the meeting to reject the motion. An agreement was reached between the profession and the Ministry some three or four years ago regarding these branches of specialist practice in which S.H.M.O. posts were justifiably created. The circular which was issued as a result was issued after full consultation with the consultant branch of the profession. Therefore the profession, without breaking faith, could not now suddenly announce that it would not agree that any further appointments in the S.H.M.O. grade should be made. They were profoundly dissatisfied with the way in which the circular had been set aside; it had been pointed out to the Joint Committee that there was evidence of abuse, and if that abuse continued it would be right to ask for the circular to be withdrawn or advertisements would not be accepted. No advertisements for S.H.M.O.s were accepted for the *Journal* without full inquiry and approval by the regional committees.

Dr. A. SMITH (Lanarkshire) said that this motion asked for abolition of the grade, and then later that no posts should be established and that there should be biennial review. This should be left until the question of hospital medical staffs had been considered.

The first part of the motion was defeated.

With regard to the second part, Mr. MCMASTER said that it was essential to keep this under constant review.

Mr. A. STAVELEY GOUGH (Council) thought it was important that the meeting should realize that this could not be accepted at the moment. The Strachan Report made it clear that a grade under that of consultant was necessary in the hospital field which should be more closely related with the consultant and the present S.H.M.O. grade; that that grade should be the normal avenue for consultants. This would be the grade substituted eventually for S.H.M.O.s. It was hoped that there would be a revision of S.H.M.O.s who were doing consultants' work so that they became newly established consultants, and the field would then become open to all others to get into the line of promotion to consultancy. In the meantime it would be foolish to prevent any registrar from getting an S.H.M.O. post provided it was one which the regional committee approved.

The proposal that there should be a biennial review was adopted, but the last part of the amendment was defeated.

Dr. CLAUDE H. DAVIES (Swansea) moved that the Meeting recommend that the salary of the S.H.M.O. grade should be raised to 80% of the consultant salary throughout the whole scale.

There was considerable dissatisfaction among the grade over salaries. The minimum was 35% of the consultants' minimum while the maximum was 64% of the consultants' maximum, causing the ironical position that the S.H.M.O. with 10 years' experience received only 64% of what his consultant colleague received and less than that of a newly appointed junior consultant. His proposal would do something to facilitate future discussions on the subject, and would avoid that prolonged discussion and arbitration which had ended with the 1954 award. There was already a close link clinically and administratively between the two groups.

Mr. T. HOLMES SELLORS (Council) said the Association had been able to take the matter to arbitration recently on a salary scale adjustment of relativity, but the increase granted had been £75 per annum instead of the hoped-for £200.

The amendment was carried.

Dr. W. D. GRAY (Liverpool) moved that in a new system of hospital medical staffing the opportunity should be taken to upgrade all S.H.M.O.s to consultant rank, but in the meantime protection should be given to their existing status and rights in any new hospital staffing structure.

The grade, he felt, was a thoroughly bad one. He did not believe that it had ever been envisaged that 3,000 of the 10,000 specialists in the country would be permanently left in the grade. The general practitioner got his second opinion in the hospital from the S.H.M.O. in the same way as from the consultant. If the former were precluded from doing consultant's work the latter would have to do 50% more than at present. Professor Strachan had said that there was no intention of downgrading any S.H.M.O., but the report implied that the intermediate grade was to be a fully supervised one. If the report were to be implemented they would be senior assistants, perhaps. It was therefore necessary to protect them from what would in effect be a substantial downgrading in status. Many S.H.M.O.s were transferred officers from the local authority service who had run their own clinics for years without interference; many still did so even though the regional boards had appointed a consultant colleague. The consultant might share the work but the supervision was purely nominal.

Dr. A. SMITH (Lanarkshire) said it would create an impossible situation, when an attempt was being made to negotiate a new structure in staffing, to demand that all S.H.M.O.s should be upgraded; the request should apply to "all suitable S.H.M.O.s."

It was agreed to pass to the next business.

Mr. J. C. McMASTER (West Somerset) moved that all S.H.M.O.s engaged in consultant work unsupervised should be remunerated at consultant rates.

The Ministry of Health itself admitted that about 257 S.H.M.O.s were doing consultants' work without supervision, taking full clinical responsibility for what they did. Their top salary, even after the last increase of £75 for full-time work, was £2,025—an insulting remuneration for the responsibility undertaken. Furthermore, retirement from the consultant service was compulsory at 65 and therefore the pension rights earned were far below what they should be. If the S.H.M.O.s were not worthy to do the job they should be discharged; otherwise, they should be given the top rate for the job.

Dr. W. B. ADAM (Tunbridge Wells) supported the motion. Mr. T. HOLMES SELLORS (Council) said that if the motion were accepted the matter would be carried forward. It would not be for the first time.

The motion was carried.

Dr. J. A. RIDDLE (Dartford) proposed that no further advertisements should be accepted for S.H.M.O. posts by the *British Medical Journal* pending the decision as to the future of this grade.

He said that the *Journal*, the official journal of the Association, was being thus used to seduce doctors into posts of which the Association did not approve.

Dr. A. V. COTTON-CORNWALL (Liverpool) said that, it having been agreed that the posts should be continued, it

would be wrong to decide that they should not be advertised in the *Journal*. If the word "fresh" had been introduced it would have been a different matter.

It was agreed to pass to the next business.

Dr. F. M. ROSE (Council) asked the meeting to affirm that the house officer grades in hospitals are relatively and absolutely underpaid and to call upon Council to press for substantial increases in remuneration of these grades.

Those men were "pressed men," he said, being in the hospital because they had no other choice, and the scale of salaries was low by any standard, very much so in comparison with the senior house officer. House officers were the heart and soul of the hospital, working very strenuously, many of them having wives and children. Twenty to thirty years ago similar posts were paid at £150 with free lodging.

Mr. R. H. J. M. CORBET (Preston) referred to the extremely long hours which house officers had to work—in some cases as much as 168.

Dr. J. S. NOBLE (Blyth, with Morpeth) said it was no more nor less than sweated labour, and each of them were being asked to pay large sums out of their salaries for what was in many cases indifferent accommodation. "I would say for the unity of this profession that if we give these people a leg up it will be the best possible advertisement for membership of the B.M.A.," he said.

Mr. T. HOLMES SELLORS (Council) said that house officers were absolutely underpaid everyone would agree. At the beginning of the Service the Association had gone carefully into the relative payments of the various grades, and there had not then been a great deal of argument about discrepancies in salaries. House officers were included in the claim which was to be put forward for increased remuneration, and if success were achieved that would be the time to consider the position.

Dr. ROSE, in reply, said he hoped the Association would not wait for the upgrading but would vote for a relative grading up of the salaries of hospital officers.

The motion was carried.

Domiciliary Consultation Arrangements

Dr. L. A. GIBBONS (Council) on behalf of Reigate, moved that it should be open to the general practitioner under the domiciliary consultation scheme to call in the services of a specialist anaesthetist, not necessarily a consultant.

Mr. R. H. J. M. CORBET (Preston) supported the amendment.

Mr. T. HOLMES SELLORS (Council) said it had been agreed with the Ministry that the calling in of a specialist anaesthetist was permissive in certain cases; they had said it should be a consultant anaesthetist, but if one was not available an S.H.M.O. should be able to carry out the work. The amendment was carried.

An amendment by East Herts and Reigate asked that the Association should press for the payment of domiciliary consultation fees to whole-time consultants without restriction.

Dr. J. S. ROSS (East Herts) said that, while appreciating the achievements of their negotiators, he thought the present compromise, that the first eight domiciliary visits in each quarter should be free, was quite illogical and unsatisfactory. Most general practitioners hesitated to call in a whole-time consultant when they knew he would not be paid, which was to the detriment of the service and the patient, who would otherwise be treated at home, and it often resulted in the unnecessary use of hospital beds. The new procedure created an embarrassing situation. Were whole-time consultants to be asked whether they had done eight visits or only one?

Mr. T. HOLMES SELLORS (Council) said that if an attempt were made to get a wholesale domiciliary consultation allowance for whole-timers their duties would inevitably be reassessed, and possibly alterations would be made in their contracts. It had been hard work to get any concessions for paid domiciliary consultation for whole-timers; the Management Side of the Whitley Council always argued that it was

impracticable to adjust a man's duties so that consultations were not carried out in his own time, and to have got over the first hurdle was an achievement. The matter could be pressed again, but it might do harm.

The amendment was carried.

Dr. A. W. RIDDOLLS (York) had a motion deploring that the Ministry differentiated between domiciliary visits by whole-time and part-time consultants. The non-payment clause for the first eight visits in each quarter should be abolished, and the differential payment for distant visits should be made to whole-time and part-time consultants.

Dr. A. V. RUSSELL (Council) supported the amendment.

Mr. T. HOLMES SELLORS (Council) said that it was extremely unlikely that any further concessions would be won easily.

The amendment was carried.

Dr. D. H. ANDERSON (Sheffield) moved that a chest physician should receive a fee for a domiciliary consultation for a patient on the tuberculosis register of a chest clinic if the circumstances are such that a fee for the visit would be payable to any other physician.

He said that a chest physician had exactly the same obligations to treat a patient suffering from pulmonary tuberculosis as he had to treat one suffering from any other chest illness, no more and no less. He had certain public health obligations in the prevention of tuberculosis and aftercare, but those obligations were covered by one of the limitations which applied to all specialists. If he initiated treatment or advised on treatment carried out by the practitioner in a domiciliary case he was not entitled to payment, because he was under the same limitation as all specialists that a visit in connexion with treatment initiated by the hospital and followed up did not qualify for payment. Many patients were on the tuberculosis register of a chest clinic for up to ten years, and if some other factor arose during that time so that a chest physician was called in by the practitioner he should be paid for it.

Mr. T. HOLMES SELLORS (Council) said that the question of domiciliary visits was one of considerable difficulty, largely because of the legacy left by the old domiciliary service. An attempt had been made to differentiate between a visit that was part and parcel of the treatment of the tuberculous, which was originally statutory, and domiciliary consultation which they all recognized in the general sense. The Staff Side of Committee B had agreed to ask the Chest Group Committee for figures to show the effect of the restriction. If there were figures to show that the system was working adversely to chest physicians, the Committee would take it forward.

Dr. ANDERSON replied that if the Minister got away with it in this instance it would be found that in future diabetics and geriatrics would be excluded.

The amendment was carried.

Dr. D. W. K. BUCHANAN (Dundee City) moved that the principle by which domiciliary consultation fees are payable to full-time consultants should be extended to include also those honorary consultants employed by regional hospital boards but remunerated by universities.

This was referred to Council.

Dr. M. J. EVANS (South-west Wales) moved that in a scattered area, where a sole consultant has of necessity to perform a large number of domiciliary consultations, consideration should be given to extending the number of visits per quarter for which remuneration is allowed.

Mr. J. R. NICHOLSON-LAILEY (Council) suggested that, as the motion raised a number of points which required examination and was not something on which a decision should be taken out of hand, it should be referred to Council.

This also was referred to Council.

Study Leave

Dr. J. E. MORRISON (Stirling) moved again to request the Council to approach the Ministry and the Department of Health for Scotland on the subject of making study leave available to hospital officers, pointing out that some hospital boards do not supply a locumtenent for an absent officer

and require the remaining officers to cover the duties of the absentee. Such conditions could not be fulfilled in many smaller provincial units and there were instances where hospital officers had to delay or forfeit their right to study leave.

He said that it was particularly difficult for young men working in small hospitals to get study leave, which they urgently required to enable them to take higher qualifications, and they were debarred from doing so for a long period. So far as could be judged, regional hospital boards were quite complacent about it, and did not seem to realize that future consultants must be bred and nourished.

Dr. A. SMITH (Lanarkshire) supported the amendment.

Mr. H. H. LANGSTON (Winchester) hoped the Representative Body would support the amendment. When the Health Service was first talked about great stress had been laid on the opportunities that would be given for study to doctors, but it was now very difficult to get study leave from some boards, or, if it was given, to get an expense allowance for it. If consultants working in the Health Service and S.H.M.O.s were to do their job properly they must get appropriate opportunities for study, and money must be made available for it.

Mr. T. HOLMES SELLORS (Council) supported the amendment, with the proviso that there was no definite right to study leave. There should be opportunities for study leave.

An alteration on these lines was agreed to and the motion was carried.

Whole-time Officers and Income Tax

Dr. J. C. MACARTHUR (Lanarkshire) moved that further representations be made to the Government for the provision of income-tax relief for whole-time members of the hospital service for motor-car costs and depreciation and other essential expenditure.

He said that this sought to remove an anomaly which existed between whole-time and part-time hospital staffs. The former appreciated the efforts made by the Joint Committee on their behalf, but so far there had been little satisfactory result. This was the policy of the Association and he would ask the Representative Meeting to give the Joint Committee support for further representation.

Mr. T. HOLMES SELLORS (Council) said that one of the difficulties had been the actual wording of the law "wholly, necessarily and exclusively"; Counsel had been consulted and his opinion was awaited.

The motion was carried.

Dr. D. W. K. BUCHANAN (Dundee City) moved that it be made a condition of service by regional hospital boards that the use of a car and a telephone was obligatory. He said that this was intended to get rid of the anomaly referred to in the last motion. How many whole-time consultants could continue their work satisfactorily without a car or a telephone? The income-tax authorities would not accept that he required a telephone or a car while no obligation was put on consultants by the hospital boards that they should have them.

Mr. T. HOLMES SELLORS (Council) said that this was due to the law. In general the Whitley Council expressed the view that it was undesirable for this to be made a condition of service and the Minister agreed. The only method by which there might be income-tax exemption might be through the Royal Commission on Taxation, which expressed the opinion that reasonable requirements should be allowed in the course of duty. It was the law which was being unreasonable about this.

Dr. J. M. ALSTON (City) said that he was a consultant and knew that a great many consultants did not require a car if they lived near the hospital. They could arrange for a car if they needed it.

The motion was carried.

Dr. J. L. McCALLUM (Westminster and Holborn) moved to request the Council to reopen with the income-tax authorities the question of tax relief on subscriptions of membership of learned societies, medical books, and journals

for public health medical officers and other full-time medical practitioners. He said that this was really Association policy. Obviously people who belonged to learned medical and other societies and read their books and journals would be better at their job.

The motion was carried.

Mr. A. LAWRENCE ABEL (Marylebone) moved to recommend that a reasonable standard of accommodation and feeding be provided for hospital residents.

He said that a small subcommittee was considering this question and he asked for the support of the meeting.

The motion was carried, as was a further motion, also moved by Mr. LAWRENCE ABEL, recommending that charges for hospital residents' board and lodging should not be increased until agreement had been reached through "Whitley."

Geriatric Units

Dr. J. W. MCCARTHY (Hendon) moved:

That while strongly supporting the views of the Association as incorporated in the recommendations of the Geriatric Joint Subcommittee the Council be urged to keep these matters continually under review and to take further urgent action to secure their implementation by the Ministry at an early date.

Dr. J. L. MCCALLUM (Westminster and Holborn) said that some good work was done at Glasgow on this matter, and in the two years since there had been no repetition of people being put out of the common lodging houses into the street.

Dr. H. D. CHALKE (Council) said he was glad that this question had been put before the meeting. The Ministry was asked what its intentions were with regard to the recommendations in the report of the Geriatrics Subcommittee and they promised to do what they could when the occasion arose. This was a most vital problem for the aged and something should be done about it. There might be a need for more beds, but it was not a question of hospital beds but immediate accommodation for people who could not be kept at home and yet should not be in hospital.

Dr. ELSIE WARREN (Kensington and Hammersmith) said that the service was improving too slowly. They wanted accommodation for their aged patients. The matter was urgent.

The motion was carried.

Dr. K. C. BAILEY (West Somerset) moved that it was vitally important that there should be adequate geriatric consultants in all areas, which was carried.

Dr. H. J. BROWNE (North Staffordshire) moved to request the Council to explore the possibility of the chronic sick and Part III accommodation being brought under the local health authority.

He said that there was often difficulty if one wanted to get a patient into hospital. One had to get into touch with the local medical officer, who sent a health visitor, and then a report had to be sent to the regional hospital board. If the idea of a single authority appealed to the meeting he hoped they would support the motion.

Mr. J. R. NICHOLSON-LAILEY (Council) asked if the mover would agree to this being a reference to Council. They wanted to avoid the possibility of divorcing the chronic sick from the general hospitals. Geriatrics must be brought in as part of general medicine administered by the regional hospital board. He was not at all sure that that would be achieved if this were carried out in the terms of the amendment.

Dr. CHALKE said that this was one of the recommendations of the Geriatric Subcommittee, and he gathered that the Association policy was that all hospital accommodation should be controlled by one doctor, whatever the accommodation.

The mover indicated that he was willing that the amendment should be regarded as a reference to Council, and this was carried.

Dr. A. G. CHAMBERLAIN (Dorset) moved to ask the Council to reconsider its decision not to accept for publication in the *Journal* advertisements for combined appointments in

dermatology and venereology in the grades of consultant, S.H.M.O., or senior registrar.

He said that he was a general practitioner, but the consultants and specialists in his Division felt strongly about this subject and had asked him to move the amendment on their behalf. Since the introduction of antibiotics there had been a progressive decline in the incidence of the more serious venereal diseases and this would continue. There would soon not be sufficient work to occupy a full-time venereologist. The combined appointment was already operating in some quarters. There would continue to be outbreaks of these diseases and a residue of latent disease which would require the attention of someone trained and experienced in their treatment and management. The only solution was that training in venereal diseases should be accompanied by training in some other specialty, and the combination of posts of venereologists with some other field was inevitable.

Dr. K. M. TOMLINSON (Gloucestershire), speaking as a dermatologist, recalled that this matter was discussed by the Dermatologists Group when a combined post was advertised. It was the dermatologists' view that combined posts should not be put forward at present. He understood that venereologists were anxious to get wider areas. If there was not sufficient work for a whole-time venereologist surely there would be a clinic for a part-timer.

Miss GLADYS M. SANDES (Marylebone) supported the motion. Years ago at the London Lock Hospital venereologists were trained in venereology and one other subject.

Dr. R. M. WARREN (Southampton) said that the venereologists were against combined appointments and he thought the solution was to employ existing venereologists in wider areas.

Mr. T. HOLMES SELLORS (Council) said that the Joint Committee had promised to give this consideration. He understood that it was the view in the Venereologists Group that venereology should be combined with general medicine. On a show of hands, a count was called for and the motion was lost.

Whole-time Consultants

Dr. J. B. S. MORGAN (Derby, with Derbyshire, West) called for an increased representation of whole-time consultants and specialists on the Central Consultants and Specialists Committee.

He said that there were roughly 9,000 consultants and specialists, approximately half of whom were full-timers, yet in a membership of 75 only 12 of the Committee were full-time men.

Dr. A. SMITH (Lanarkshire) said that members of the Central Consultants and Specialists Committee were chosen on merit and were elected on a regional basis.

Mr. T. HOLMES SELLORS (Council) said that there were 30 whole-time consultants and S.H.M.O.s out of 64, including the nominated and representative members. The association of whole-time officers were invariably satisfied with the hearing they got from the committee.

The amendment was lost.

Acute Mental Illness

Dr. DORIS M. ODLUM (Bournemouth) moved a resolution deprecating the fact that mental welfare officers (laymen, without any recognized training or qualifications) had, in their capacity as duly authorized officers, power to overrule the opinions and advice of general practitioners and consultant psychiatrists regarding emergency admissions under the Lunacy Acts. She asked the meeting to deplore the lack of standardized training for mental welfare officers, including duly authorized officers, and to instruct Council to press the Ministry to formulate a national scheme of training for these officers and put it into operation without further delay.

She said it might seem so obvious that the Ministry would be prepared to do what the motion asked that it was waste of time to bring it before the meeting. In fact, the exact opposite obtained. The question of basic training had again

and again been shelved by the Ministry of Health. Many representations had been made by a great number of bodies with the same result. They were now asked to await a report from the Working Party on the Recruitment and Training of Social Workers, which would take two years to appear, and no one knew how long to implement. Last year's A.R.M. had shown, by its response to a resolution from Wandsworth, how disturbed it had been at the fact that such untrained people could override the opinions of doctors regarding emergency admissions.

Dr. J. B. WRATHALL ROWE (Harrow) said the first part of the motion quite rightly deplored the power which the duly authorized officers possessed, but the second part suggested that they should have standardized training. If they had that, they might well be able, with justification, to override that which was referred to in the first part.

Dr. K. C. BAILEY (West Somerset) said that many of the people referred to had been former relieving officers with little experience of psychiatry and realized themselves that they needed training; yet the Ministry was not prepared to give it to them, for reasons which were not readily known. The Bournemouth motion was carried.

Cleveland asked the Council to examine the question of attributable illness in reference to all members of the profession.

Mr. T. HOLMES SELLORS (Council) said the matter had already been taken to Committee B and had received sympathetic consideration. He could not be answerable with regard to its application to other branches of the profession.

The Cleveland motion was carried.

Pre-registration Posts

Dr. P. PHILLIPS (Bristol) moved that representations be made with a view to altering the Medical Act, 1950, so that a practitioner be allowed to spend a period in general practice during the course of the pre-registration year. It was becoming more important than ever that the teaching hospital atmosphere should become more and more rarefied in these days of whole-time teachers, later specialization, and selected out-patients. For a prospective general practitioner, he said, a few months in hospital in a post of some responsibility should be quite enough, and the sooner he did it and got on with his chosen work the better. With regard to the prospective specialist there could be no doubt that a few months in general practice would be of inestimable value to the man himself, to his future general-practitioner colleagues, and to his future patients.

Dr. F. M. ROSE (Council) agreed that all doctors, whether intended for general practice or not, should have some experience in it, but he thought that the year of training in hospital was essential, being the completion of the three clinical years that had already been spent. The general practitioner who did not have such training would feel the lack of it during the whole of his professional life.

Dr. R. W. McCONNEL (Buckinghamshire) said it would be satisfactory to combine six months in general practice and six months in hospital, for both the potential general practitioner and the potential specialist. The latter should have some inside knowledge of general practice, but did not need a whole year.

Mr. J. R. NICHOLSON-LAILEY (Council) opposed the motion on the ground that it might upset the whole of the Act. It was necessary to maintain the junior resident establishment in hospitals. If these people were taken out and put into general practice it would make an already difficult position even worse. Experience in general practice could help only those who were going to do either general practice or consultant work in future. The trainee-assistant scheme already existed for those who wished to get general practice experience. It was up to the potential consultant to decide whether he wanted to do some general practice; to inflict an additional period of time on him would either put extra time on his pre-registration year or deprive him of his hospital resident experience.

Dr. ALISTAIR R. FRENCH (Marylebone) pointed out that the 1950 Medical Act contained a provision for the period of

"apprenticeship" to be spent in general practice, in an approved hospital or institution or health centre. At present no health centres had been recognized and approved by the G.M.C. for that purpose, but they were written into the Act and it only required action by the G.M.C. to implement that provision.

Dr. W. E. DORNAN (Council) asked that the matter should be referred to Council. The time was particularly favourable for Council to look at the Medical Acts because of the Medical Consolidation Bill. Young men were all too afraid of an addition to their pre-registration year, and were mortally afraid that if the matter was pressed it might result in a further pre-registration year.

Dr. PHILLIPS, in reply, said that Bristol was fortunate in having the rarefied hospital teaching atmosphere, but it was also aware of the facts. Mr. Nicholson-Lailey obviously wanted to perpetuate the system of cheap labour. Nobody had suggested that any additional time would be taken up. Those who were going to be specialists would spend all their lives in hospital anyhow, so that three months in general practice would do them no harm. For the general practitioner, nine months in hospital, without attendant responsibility, would be quite enough.

The motion was lost.

Bristol further moved that posts in the mental hospitals service should be included among approved house appointments for the pre-registration practitioner.

This motion was carried.

West Somerset asked that the Council should keep under constant review the question of the time taken to fulfil the pre-registration posts required by the Medical Act, 1950.

This was referred to Council.

Medical Auxiliaries

Dr. O. C. CARTER (Bournemouth) had a motion welcoming the proposed statutory registration of medical auxiliaries provided that:

- (1) the medical profession maintains some control of the training standards to be aimed at and general ethical conduct, and
- (2) that the medical auxiliaries retain their present description and are not given independent status as belonging to professions associated with medicine.

The training of such people was largely in their own hands, and the local practitioners in the area would have practically no say in determining their standard of qualification. If some control could not be gained in the matter, then it was up to the profession to say that they would not employ such people until they had some idea of the standards they had achieved or the syllabus of their training.

Mr. T. HOLMES SELLORS (Council) said that the Joint Committee had discussed the matter with the Ministry. The point had been strongly taken by the Ministry that the auxiliaries should have maximum independence and that their status should be upgraded by the use of the word "professional." The Association had resisted that; the matter was still under discussion on a relatively confidential basis. The Joint Committee was pressing very strongly that all medical representation should be at as high a level as possible, and that their instruction and general training should not pass out of the hands of the doctors who would be working with them.

Dr. CARTER, in reply, said that Sir Zachary Cope had expressed the hope that the Representative Body would deal with the matter in the way he had suggested in moving the motion.

The motion was carried.

Cremation Certificates

Nottinghamshire moved that resident hospital staff should not be debarred from receiving a fee for completing Part B of cremation certificates.

Dr. R. E. G. SMITH, who was making his twenty-first appearance as a representative at the A.R.M., urged the meeting to pass the motion.

Dr. L. A. GIBBONS (Council) recounted an instance of a doctor in Surrey who was called to the house of a patient who had died. He charged a fee for attendance and the executive council allowed it, but the relatives appealed. It was taken as far as the Minister, who ruled that as the patient was dead he was no longer in the National Health Service, and therefore allowed the fee. If a patient died in hospital, surely he was no longer under the Hospital Service and a similar position should obtain.

Mr. T. HOLMES SELLORS (Council) pointed out that there was an obligation to supply a certificate in the case of death. All it required was removal, under paragraph 14 of the terms of service, from category I to category II.

The motion was carried.

Patients in Nursing-homes

Dr. ETHELBERTA LYNTON-LOW (Lewisham) moved that, as patients in maternity nursing-homes are entitled to obstetric domiciliary consultations under the N.H.S., the Minister be asked to allow all patients in nursing-homes full access to the complete range of consultant domiciliary service.

She said that the reasons for submitting the motion were that Lewisham considered that to withhold the service was illogical, unjust, and uneconomic. It was illogical and unjust because it presupposed that all patients in nursing-homes were wealthy, whereas that was not by any means the case. It was also illogical to permit domiciliary visits to patients in maternity homes and not to those in other nursing-homes. It was uneconomic to refuse domiciliary visits to patients in nursing-homes, because the alternative in many cases must mean the transfer of the patient by ambulance to hospital, and a bed had to be occupied.

Mr. J. R. NICHOLSON-LAILEY (Council) asked whether the motion could be accepted as a reference to Council. When the matter was originally brought up the Joint Committee approached the Ministry and asked for an extension of domiciliary consultations to patients in nursing-homes, and it was refused. In his view circumstances had changed a good deal since then and the matter might be looked at again.

The motion was carried.

Legal Responsibility of Senior Hospital Doctors

Dr. J. M. ALSTON (City) moved that by legislation or otherwise it should be ensured that senior hospital doctors should once more be held solely responsible in law for their own actions.

He reminded Representatives that on the first day of the meeting the Representative Body took very firm action to ensure the independence of action and freedom in his duties of the Editor. That was one of the best things which the Representative Body had done so far. He now asked the meeting to pass the motion which would enable hospital doctors to be assured of the independence and freedom of their actions, and of their single responsibility for their work. It was something which did not concern general practitioners directly, but the law courts had recently come to the conclusion that the state of the law was such that doctors working in hospitals were the servants of their regional board, and if there were any claim against a surgeon or physician the claim must lie against the regional board, possibly with the surgeon joined in. But the surgeon had no longer the single responsibility.

"What we are afraid of," he said, "is that if regional boards are responsible, they will tell us how to do our duties. What we want is some means of retaining and regaining our independent responsibility."

Dr. A. SMITH (Lanarkshire) moved as an amendment "That this Representative Body believes that it is not in the best interests of British medicine and the British people that the hospital doctors of the country should have the legal status of technical servants of the hospital authority."

He said that, of all the things which had been discussed, obviously the principle involved in the amendment under discussion was the most important principle to be considered.

It was no less a principle than that the hospital doctor should be in direct professional relationship with and have charge of his own patient, or whether he would be a technical assistant of the State.

In Scotland, before 1948, there was no doubt about the position at all. It was clear that the hospital doctor was in charge of his patient, and that the hospital authority merely provided the board, lodgings, and the necessary equipment. Fortuitously it came about that the laws were completely altered by the 1948 Act. In Scotland the matter was regarded as so very serious by those concerned, including the Consultants and Specialists Committee in Scotland, that a circular was sent round to all members asking for an expression of opinion whether they liked the old legal status or not. There were replies from more than 50% of those circularized, and the Department of Health took the view that that was an excellent response. Recently the matter was placed before the Central Consultants and Specialists Committee of the United Kingdom in London, and a resolution was carried which was now before the meeting in the form of the amendment.

At no point was he at issue with his colleague who had spoken before him, "but we have been informed," he said, "that if we can get a substantial volume of professional opinion behind us, then by legislation—perhaps by a Private Member's Bill—we can have the whole legal position of the doctor restored; but we should have to show a substantial amount of professional opinion behind it. We have that opinion behind us. We have the whole of the consultants in Scotland behind us and the Central Consultants and Specialists of the United Kingdom. We are now asking that this Body will endorse this general opinion that hospital doctors will not be technical assistants of the Minister but will be responsible for the people under their care."

Mr. J. R. NICHOLSON-LAILEY (Council) formally seconded the amendment.

Dr. ROBERT FORBES (Council) opposed the amendment, stating that it was a matter upon which the Representative Body should have adequate information before taking action. The defence bodies were seriously involved in a decision of that kind. The defence bodies had been looking at the matter for two or three years and had arrived at certain decisions. Dr. Smith had told the meeting how the decision was reached in the Consultants and Specialists Committee, but he did not state that the Chairman of the Medico-legal Subcommittee of the Consultants and Specialists Committee put forward very cogent arguments why that particular proposition should not be endorsed. "I plead with you," he concluded, "not to be rushed into a decision of this kind to-day. I ask that this matter be referred to Council for a full report at your Representative Body next year, so that you will have all the facts clearly in front of you before you are asked to take a decision on this important issue."

Dr. J. G. M. HAMILTON (Council) said that the arrangements which existed in England with regard to the apportionment of damages which might be awarded in cases of negligence naturally affected the function of the defence societies, but it affected them favourably, for in whatever proportion it might be there was a proportion which was paid from Exchequer funds and was therefore spared from the defence societies' funds.

The Representative Body was in possession of all the necessary facts and information to affirm the principle which was involved. It did not need to concern itself with ways and means of putting that principle back into effect, but if representatives were satisfied that there was something in the amendment which was of fundamental importance, and that the legal status of technical servants was undesirable from the medical and social aspects, then they would be able to make up their minds clearly and no doubt vote for the amendment.

Dr. ALISTAIR R. FRENCH (Marylebone) said he desired to refute the suggestion of Dr. Hamilton that the defence bodies had approached the matter and come to a decision with a prejudice connected with their financial position. "I assure

you," he said, "that the councils of the defence bodies, who are all colleagues of yours, have one consideration only in mind when looking through cases where a doctor's competence has been impugned. It is to vindicate the doctor regardless of any financial considerations."

Dr. SMITH, in reply, said he desired to make it clear that he had every confidence in medical defence societies, but the principle of freedom was involved and not a principle of legality. The desire was to restore the former position where the doctor had a single responsibility. If that position was not restored, it would not be long before executive councils gave directions as to the treatment of patients. The amendment was adopted as a reference to Council, and was carried in this form as the substantive motion.

Advertisement of Hospital Consultant Appointments

Dr. J. M. ALSTON (City) moved: That it is the policy of the Association that vacancies for hospital consultant appointments of more than one session a week should be advertised in the medical press.

Mr. H. H. LANGSTON (Winchester) asked the Representative Body not to pass the motion in its absolute form. He said there were occasions when it was to the benefit of younger consultants and S.H.M.O.s for a regional hospital board to offer a small number of vacant sessions to someone already in their employ. An elderly consultant or S.H.M.O. holding only one or two sessions might retire, and it was possible to add those sessions to those of a young consultant who had only five or six sessions, perhaps in an area in which there was not much private practice, thereby giving him an adequate remuneration.

Dr. V. COTTON-CORNWALL (Liverpool) supported the motion, and suggested that it should be referred to Council.

Mr. T. HOLMES SELLORS (Council) endorsed what Mr. Langston had said, and said that giving a few sessions had saved many young consultants from considerable hardship.

The City motion as a reference to Council was carried. Mr. A. LAWRENCE ABEL (Marylebone) moved to recommend that sufficient hospital residents should be apportioned so that each hospital resident doctor should work less than 168 hours per week.

He said he had been told that 15% of these men developed tuberculosis. He asked how the enormous increase of charges of negligence could be explained if it was not that many young residents were overworked, overtired, underfed, and working in many cases, up to 168 hours a week. Many hospitals were understaffed and the claims on men's time were exorbitant.

Mr. HOLMES SELLORS pointed out that if anything like a shift system were adopted, with residents working eight-hour shifts, the medical profession would be flooded. Entry to the profession was very carefully controlled, and care should be taken not to flood the profession.

The motion was carried as a reference to Council. Mr. LAWRENCE ABEL further moved that all medical grades of so-called "whole-time" hospital staff should be allowed to pursue the practice of their profession in their off-duty hours.

This was carried.

Remuneration Policy

Dr. J. G. M. HAMILTON, chairman of the committee charged to make recommendations designed to establish a general Association policy on remuneration, submitted the report forming Appendix IV of the Annual Report of Council, and a long series of Council recommendations as follows:

- (1) That the Association affirms its adherence to the principle that medical men and women, in whatever form of medical practice or service they are engaged, should be remunerated as doctors, and that their remuneration should not be determined by relation to that of lay personnel employed in the same sphere.
- (2) That where it can be shown that in any particular sphere of practice the levels of remuneration are such as to constitute a deterrent to recruitment, the Association take steps to promote or support negotiations for improvement.

(3) That, since the two Spens Reports have established agreed levels of remuneration for general practitioners and hospital medical staffs, and indirectly for most other sections of the profession, the Association reaffirms its policy to maintain these reports as the basis of professional remuneration.

(4) That the Government be urged to set up an independent committee of inquiry to consider what should be the range of remuneration of medical officers in the public health service, having regard to the remuneration of other sections of the profession and the desirability of the public health service maintaining its power to attract a suitable type of recruit.

(5) That, for the time being, it be left to the individual sections of the profession themselves to decide whether to continue negotiations within the Whitley Council system or to withdraw from the system, but that the position be carefully watched and reviewed from time to time, regard being paid to:

(a) the experience gained as a result of the present joint negotiations (outside Whitley) on behalf of general practitioners and all grades of hospital medical staff;

(b) the view that it might be preferable to retain the Whitley system for minor questions, leaving matters of major national financial importance to be dealt with by direct negotiation.

(6) That further efforts be made to secure a more satisfactory alternative to the Industrial Court as a means of settling disputes by arbitration.

(7) That the Association take all possible steps to promote an effective system of negotiation whereby decisions reached upon appropriate salary ranges for medical teachers will be binding upon the universities concerned.

(8) That the Association develop a policy whereby the Council will come to assume fuller responsibility for all future claims submitted by any section of the profession.

(9) That the various sections of the profession be informed of the Council's preparedness to negotiate directly at the request of any section.

Dr. HAMILTON said that since the establishment of the Remuneration Policy Committee at Glasgow two years ago there had sometimes seemed to be an idea that the Council, through the medium of the Committee, was going to produce a scale of payments of earnings of salaries for everybody, and indeed achieve rises all round. Put that way, it was ridiculous, and it was quite clear that the Committee and the Council had attempted nothing of the kind. After a detailed examination of remuneration in all the types of medical service, the Committee came to the conclusion (which was endorsed by the Council) that to attempt to draw up detailed scales of remuneration for the various medical services in such a way as to attempt to equate in terms of money one post in one service with another post in a different service was invidious and impossible, bearing in mind the complexity of the unmeasurable factors involved. It would have involved an extremely difficult, if not impossible, comparison, between different posts with different hours of work, different degrees of responsibility and different forms and lengths of training required, different perquisites in the way of climatic conditions, difference of superannuation, income tax, and allowance arrangements. These were so diverse that the Committee and the Council had decided to abandon a comparison between the posts and their salaries, and turned their attention to considerations of policy which might be set forth in a series of recommendations to the Representative Body in broader terms.

Referring to recommendation (1), he said he was sure it would meet with the approval of the Representative Body, and that the thought behind it was apparent to all present.

Dealing with recommendation (2), Dr. Hamilton said that the Remuneration Policy Committee, in attempting to come to grips with its rather difficult remit, rapidly decided that scales of remuneration in different services must be looked at in connexion with their power to attract recruits to different services. The power of a scale of remuneration to attract recruits was another way of naming the career prospects in the service, and the Committee was concerned to try to assess the career prospects. It had been decided to recommend that a principle which might be affirmed was that where in any service it could be shown that the levels of remuneration were such as to constitute a deterrent

to recruitment, the Association should take steps to right that wrong. The Association, he continued, owed a duty to its members to do its best to ensure that their remuneration was proper for the work they did; but the Association also had a duty to the public to do what it could to ensure that the various forms of medical service were properly staffed, and if it was decided that they were not properly staffed because of inadequate remuneration the Association had a duty to take the necessary steps.

Turning to recommendation (3), Dr. Hamilton asked for the reaffirmation of what had been confirmed and reaffirmed before, that in remuneration matters generally what could be conveniently called the Spens-Danckwerts standards should be those upon which claims should be based.

Recommendations 1, 2, and 3 were carried without discussion.

Dr. HAMILTON, dealing with recommendation (4), said that in considering career prospects in various medical services and the adequacy of remuneration in them, it was evident that, in the public health service, not only was there a general inadequacy of salary level, but the organization of the service was faulty. Of those in the service 50% were on salaries of less than £1,100, and 75% on salaries of less than £1,250, leaving 25% only on salaries above £1,250, with a few on salaries of £3,000 or somewhat above. The career prospects in the public health service were, he said, quite shocking, which was reflected in the decline in the quality of entrants, so that, while there were not many posts unfilled, many were filled with people who had not what was generally regarded as the necessary qualifications, including the Diploma in Public Health. There had been a notable decline in the number of medical graduates entering for courses leading to the Diploma in Public Health.

This service, he continued, was the Cinderella, but it would not be restored to a proper status by successive claims for general upgrading of salaries. The Committee and the Council felt that what was needed was a reorganization of the Service as well as an improvement, and perhaps a notable improvement, in remuneration levels so that the time would come—and the sooner the better—when the public health service, with the tremendous potential and actual value it held in the country, would once again become attractive to medical people as a sphere of work because it again exhibited some of the characteristics of a desirable career. None of those characteristics, he submitted, were exhibited now.

To achieve that happy state, he said, no better way could be seen than the Association pressing vigorously for the institution by the Government of a Public Health Service "Spens" Committee. If such a committee of inquiry (with terms of reference similar to those of two previous sub-committees) were set up, one of the bodies asked to give evidence to it would, presumably, be the Association—"And by golly! we could give them some."

On recommendation (4) Torquay moved to insert the word "forthwith" after the word "up" in line 1, and this insertion was accepted.

Dr. J. B. TILLEY (Newcastle-upon-Tyne) said the profession had been accused on many occasions of dividing itself into fragments. The public health service welcomed the affirmation that the profession would stand together. On behalf of the public health service and the Public Health Committee of the Association he wholeheartedly supported the recommendation.

Recommendation (4), as amended, was carried.

Dr. HAMILTON, in moving recommendation (5) said that the Council had been obliged to give considerable and detailed consideration to the negotiations. It was unnecessary to emphasize to the meeting the amount of criticism which there had been at various times and in various places about the working of the Whitley machinery. His committee had invited the opinion of the Staff Sides of the Whitley Committees on its function; there being no functioning Committee A, this had meant Committees B and C, the Staff Sides of both of which had confirmed the view that there were advantages of considerable magnitude in

advising the profession to continue financial negotiations through the Whitley machine, while recognizing that there were still unsolved and indeed notable disadvantages to the Whitley organization. The first and perhaps the most important advantage was the existence of the Regional Appeals System within the Whitley system to which Dr. Tilley had made some reference on the first day of the meeting, the Association acting as the appellant's professional organization. Of those appeals all but one or two had been successful. Any other form of remuneration negotiations would not necessarily carry with them the regional appeal system. The committee had decided not to advise the Council to advise the Representative Body to advise the profession to abandon Whitley. The first drawback was that negotiations in the Whitley Council, in the ordinary sense, did not happen. Perhaps the chief drawback was that although application for arbitration by the Industrial Court had always been granted, that court was not considered suitable for dealing with professional matters, being by design and training an industrial court. In course of time the profession might come to appreciate that the Whitley system was suitable for decisions upon comparatively small and even local affairs, whereas for financial matters of a major and national kind some sort of direct or *ad hoc* negotiations might well turn out to be better.

The recommendation was carried.

Recommendation (6) was carried without discussion.

In moving recommendation (7), Dr. Hamilton said that in so far as the public health service was the Cinderella of the profession the medical teachers for universities were Cinderella's little sister. University teachers' salaries were paid at the sweet will of the universities, which to a large degree drew their funds from the Exchequer from the University Grants Committee, but there was nothing binding upon them to accept anybody's recommendation as to scales of salaries which they did in fact pay. The Committee suggested, through the Council, that the Council should attempt to achieve some form of negotiation with the University Grants Committee to obtain proper salaries for university medical staffs, including research workers and people in preclinical departments, and that the Association should endeavour to obtain some system whereby negotiations of that kind should result in something which would be binding upon the universities to apply uniformly.

The recommendation was carried.

In moving recommendation (8) Dr. Hamilton said it had been noticeable that over the years—especially since the N.H.S. had started and since autonomous bodies had played a large and important part, rightly, in financial matters in connexion with the appropriate sections of the profession—the Council seemed to have lessened its firm grasp on and even displayed a declining interest in claims and in their prosecution. That was only natural, since the sectional experts had been engaged and had done a lot of the work for the Council, which, in any event, had a great deal of other work to do. But the Council had been reminded of that tendency and asked to apply its mind more closely to remuneration problems, including the actual promulgation of claims. It was embarking on delicate ground. There were other people involved in negotiations on remuneration. In the hospital field in particular there were colleges and corporations to which the Association was under treaty of union in the form of the Joint Committee. However, it was suggested that the Council should always be aware of what was going on.

Dr. T. D. F. MONEY (Norwich) moved an amendment asking the Association to develop a policy whereby the Council would come to assume complete responsibility for all future remuneration claims submitted by any section of the profession and that this unity be achieved by having a single negotiating committee. He expressed regret that the Remuneration Committee's report should have come up at so late an hour with so few people to listen to it. Speaking to his amendment, he said the final answer to the situation must be a committee answerable to the Council, representative of all sections, and capable of putting up claims on a

just basis, avoiding jostling, leapfrogging, and a sense of being left out which the smaller sections of the profession felt.

Dr. HAMILTON asked that the amendment be rejected, not because he was out of sympathy with what it suggested but because it asked for a certain step to be taken which he regarded as inopportune. "We must concern ourselves not only with ourselves," he said. "We must realize that we are partners with other people." He hoped the Representative Body would not be over-impressed with the reference to the smaller sections being left out in the cold. He felt that to have been an overstatement, but, if even if it was not, the Council's policy, which up to the present the meeting had been good enough to accept, governed the matter.

Dr. S. WAND (Council) described the amendment as self-contradictory. He asked how the Council could assume responsibility and then leave it to a single negotiating committee. To place all matters in the hands of one single responsible negotiating committee—although it might for particular purposes delegate it—would defeat the object of the main motion.

The Norwich amendment was lost.

Dr. HAMILTON, in moving recommendation (9), said the Council would be at pains to offer its services in every way to sectional propositions, but it would naturally be appreciated that those services could not be offered unless the Council felt the claim to be a proper one.

Recommendation (9) was carried.

Dr. H. H. GOODMAN (Newcastle-upon-Tyne) moved that these recommendations on remuneration policy be accepted and implemented with the least possible delay and that special emphasis should be placed on the policy outlined in the first recommendation that medical men and women should be remunerated as doctors.

This was carried.

Dr. J. W. MCCARTHY (Hendon) moved that, while welcoming the principles enunciated in the report on remuneration, the Council nevertheless be requested to prepare a scale of salaries appropriate for research workers so that suitably qualified practitioners will continue to be attracted to this important branch of medicine.

He said that research workers were being lost to other posts because of the higher remuneration offered, but he accepted the references to their situation which Dr. Hamilton had already made.

Dr. HAMILTON said the Council was aware of the inadequacy of such payments and reference had already been made to the matter during the course of the meeting. Action had already been started in regard to full-time non-professional medical teachers and research workers.

The motion by Hendon asking the Council to review the remuneration of research workers "so that suitably qualified practitioners will continue to be attracted to this important branch of medicine" was lost on a technicality. But it is understood that this motion will be considered by the Council in due course.

The meeting rose at 6.45 p.m.

ELECTIONS

During the course of the meeting the following results of elections were announced:

Chairman of Representative Body: Dr. I. D. Grant (unopposed).

Deputy Chairman: Dr. A. Beauchamp (unopposed).

Ten members of Council by Representative Body as a whole: Mr. Lawrence Abel, Dr. H. Guy Dain, Dr. Robert Forbes, Dr. F. Gray, Dr. Annis Gillie, Dr. I. M. Jones, Mr. H. H. Langston, Dr. J. A. Pridham, Dr. S. Wand, Mr. A. Dickson Wright.

Two members of Council by representatives of Scottish constituencies: Dr. G. W. Ireland, Dr. J. C. Macarthur.

One member of Council by representatives of constituencies in Wales: Dr. T. W. Davies.

REPRESENTATIVES AT DINNER

At the end of the first day of the Annual Representative Meeting the representatives dined together at the Hotel Metropole under the chairmanship of Dr. I. D. Grant. The President of the Association, Dr. T. C. Routley, was present.

Dr. JACK MILLER, one of the Glasgow representatives, proposed the health of the Chairman. He said that the choice of a Scot to propose the health of a fellow Scot showed that the Scot was highly respected in his own land. The Association in recent years had had in its councils many distinguished Scotsmen—he mentioned the names of J. B. Miller, Walter Jope, George C. Anderson, W. M. Knox, Catherine Harrower, and others. They had given great service to the Association, and they were proof that medical politics was very much in Scottish blood. Glasgow, indeed, might compete with Birmingham in the number of those who had held high office. Dr. Ian Grant, their present Chairman, who was born 65 years ago, showed his strong sense of the fitness of things by choosing Glasgow as his university and afterwards as his field of professional activity. He had qualified in 1913, and after service in the first world war he settled down in practice in Glasgow, where he had proved to be the family doctor *par excellence*, the guide, philosopher, and friend of many, and had built up a large industrial practice. His interest in medical politics began at an early stage in his career. He had been chairman of the Scottish Committee of the Association, and a member for many years of the General Medical Services Committee and of its forerunner the Insurance Acts Committee. His recent election as a member of the General Medical Council was yet another manifestation of the regard of his colleagues. The chairmanship of the Representative Body was one of the greatest honours the Association could confer, and on entering his third year in that exalted position they extended to him their best wishes for his continued success and health and happiness.

The toast was enthusiastically drunk, and Dr. GRANT, in reply, spoke of the great privilege and honour it had been to him to be Chairman of the Representative Body for a second year. With the help of his Deputy Chairman, Dr. A. Beauchamp, and the excellent secretaries he could not go wrong in matters of procedure, and the Representative Body had proved to be a very warmhearted and understanding company, as well as the effective mouthpiece of the Association. He commented on the fact that, he believed for the first time, they had a father and son in the Representative Body, their old friend and former Chairman Dr. S. Wand, and Dr. L. G. R. Wand. They trusted that the son would in future years play as distinguished a part in Association affairs as his father had done. Service for a body like the Association had its rewards, especially in the evolution of one's outlook from a local or parochial to a national one. He concluded by thanking them for the kindness they had invariably shown him, not least on the present occasion.

After the dinner the representatives joined their ladies, who had been dining together elsewhere, and a dance took place in the Winter Garden of the Hotel Metropole.

REPRESENTATIVES' LADIES' DINNER

Mrs. Clarence Routley presided over the Representatives' Ladies' Dinner in the Hotel Metropole on the same evening as the Representatives' Dinner. Mrs. Alexander Hall proposed Mrs. Routley's health, and in doing so paid tribute to the warmth of the hospitality that all who had been in Canada last year had enjoyed. Mrs. Hall hoped that those who came to Brighton to work would profit from the meetings and that the others would enjoy the entertainment arranged for them by the Ladies' Committee which had worked so hard on their behalf. Mrs. Routley replied, and after some entertainment provided by Vernon Lee the ladies joined their menfolk in dancing until midnight. To Dr. C. Lamorna Hingston, honorary secretary of the Ladies' Committee, goes much of the credit for the successful evening.

ANNUAL GENERAL MEETING

The 124th Annual General Meeting of the British Medical Association was held at the Dome, Brighton, on Monday, July 9, 1956, at 12.30 p.m., with the retiring President, Dr. T. C. ROUTLEY, in the chair.

The notice of the meeting, which was published in the *Supplement to the British Medical Journal* of June 16, 1956, was taken as read.

The Minutes of the last Annual General Meeting held in London on June 4, 1956, as published in the *Supplement*, were signed as correct.

The Balance Sheet and Income and Expenditure Account for the year ended December 31, 1955, were adopted without discussion.

The Auditors, Messrs. Price Waterhouse and Co., were reappointed Auditors until the next Annual General Meeting at a fee of 650 guineas.

It was announced that the President for 1956-7, Dr. Alexander H. Hall, O.B.E., M.D. (Hove), would be inducted into office at the adjourned Annual General Meeting later in the day. It was also reported that Mr. Weldon P. T. Watts, M.S., F.R.C.S.Ed. (Newcastle-upon-Tyne), had been elected by the Representative Body as President of the Association for 1957-8.

Dr. ALEXANDER HALL, President-elect, said that by reason of the ravages of old age the old Brighton banner hanging in the Great Hall of the Association was in danger of disintegration, and the Brighton and Mid-Sussex Division, determined to keep the flag flying, had had a new and beautiful banner prepared which he asked the President to accept for the Association. "I assure you that all members of this Division are marching solidly behind it."

Dr. ROUTLEY, on behalf of the Association as a whole, said that he felt it a distinct privilege and pleasure to accept this banner to hang in the Great Hall in London. He thought history would record that the heart and soul and character of an individual or an institution were symbolized in the flag which flew from the mess tent, and the same could be said of a banner. He was sure that the beautiful banner which had been presented this morning typified the character, ideals, and aspirations of the men and women who constituted the Division, and they were entrusting it to the safe keeping of the body as a whole in order that their character might become part of that great institution along with the flags and banners from other parts of the world.

He would assure Dr. Hall that the banner would be well taken care of; it would occupy a proud place in the Great Hall; and on behalf of the Association of all its officers and members he thanked the Division most sincerely.

The meeting then stood adjourned until 8.15 p.m.

EXTRAORDINARY GENERAL MEETING

An Extraordinary General Meeting of the British Medical Association was held in the Dome, Brighton, on Monday, July 9, at the conclusion of the first part of the Annual General Meeting, with Dr. T. C. ROUTLEY, President, in the chair. The following resolution to amend Article 3 of the Articles of Association was carried without discussion:

After "eligible as an ordinary Member of the Association" and before "subject as aforesaid" insert "Provided always that no person shall be eligible for membership of the Association without the previous sanction of the Council if (had he previously been a member) his membership would automatically have terminated under Article 10 (c)."

The proceedings then concluded.

OPENING OF TRADE EXHIBITION

On Monday morning the President-elect of the Association, accompanied by other officers and a large number of members, opened the exhibition of pharmaceutical products, instruments, appliances, and medical publications at the Corn Exchange, Brighton. The opening of the Representative Meeting had been postponed for one hour in order to permit of the largest possible attendance.

Dr. ALEXANDER HALL said that it was with pleasure that he welcomed to the exhibition so many old friends and also some new ones exhibiting for the first time. The Annual Meeting would not be complete without the exhibition, which enabled so many members to review this magnificent and representative display of surgical instruments, drugs, books, etc., all under one roof. There was only one regrettable absence and that was a new and powerful medium for the control of a weeping sky. He congratulated the exhibitors on the manner of presentation, so clear and so attractive that even he who ran might read, but it was hoped that the proximity of the building to that in which the meeting was being held would mean that most of the members would be able to review it in a much more leisurely way than usual with benefit to themselves and to the exhibitors.

It was with pleasure that he declared the exhibition open and wished it every success.

The exhibition was well attended at an early hour, and much interest was shown in the many novelties exhibited. The stands numbered over fifty and were predominantly pharmaceutical. They included also some very effective food exhibits, and the surgical exhibits of Down Bros. and Mayer & Phelps Ltd. and other surgical firms attracted much attention. A preview of the exhibits was published in the *Supplement* of June 30 (p. 411).

Several book stands added to the interest of the display, and there were exhibits by such bodies as the Board of Medical Auxiliaries, *Family Doctor*, the National Association for the Prevention of Tuberculosis, and the N.O.T.B. Association.

"IN BRIGHTON LAST WEEK"

Cocktails

How things begin is a good guide to how they will continue, and the cocktail party given by the Brighton and Mid-Sussex Division on the eve of the Representative Meeting was an excellent augury. Dr. C. Barrington Prowse (Chairman of the Division) and Mrs. Barrington Prowse received the guests. There was a mingling in good strength of members of the host Division with visiting representatives, the result being a crowded, talkative get-together, which was precisely what was intended. Dr. John Beynon and Dr. Guy Daynes were mainly responsible for the arrangements.

Another, more intimate, cocktail party was that given by the Sussex Association of the Medical Women's Federation on Friday, July 6, at the New Sussex Hospital for Women, for women representatives and medical women accompanying representatives. The President of the Sussex Association, Dr. M. I. Neal Edwards, received some ninety guests, and Dr. Margaret Paul, the honorary secretary, was largely responsible for organizing this enjoyable event.

Sheltered Waters

The all-day steamer trip from Portsmouth down and around the Solent arranged for Sunday, July 8, indeed provided the sheltered waters that had been promised the more fearful among those who had booked passages. Alas, a blanket of fog descended as soon as the good ship *Whippingham* left harbour and anchor had to be dropped. The British Railways had thoughtfully provided a pamphlet—"Welcome Aboard"—describing the landmarks to be seen on the voyage, but though an occasional freshening of the

Correspondence

Because of heavy pressure on our space, correspondents are asked to keep their letters short.

Social Workers

SIR,—I have read with interest the letter from the Chairman, and the Chairman of the Training Subcommittee, of the Association of Psychiatric Social Workers (*Supplement*, July 7, p. 4) in which certain criticisms were made of the evidence given by the B.M.A. to the Working Party on Social Workers.

The primary concern of the Subcommittee which prepared the B.M.A.'s evidence was the health needs of the community, and considerable attention was given to the means whereby the social services can be utilized to the best advantage by the general practitioner. There is abundant evidence that homes are being over-visited by members of statutory and voluntary organizations alike, and the Subcommittee made recommendations to aim at its prevention.

The B.M.A. Subcommittee did not suggest that all social problems should be treated by doctors and nurses, although it was unanimous in its view that these problems cannot be considered in isolation and that proper co-ordination of work is essential. It is a little surprising to find disagreement with the view of the B.M.A. that some training in sociological work should be given to those whose work brings them into the homes of the people. It was, of course, not intended to include in this category trained and experienced social workers, but only those others whose work is not "social work" in the accepted sense who would be enabled to perform their duties to better advantage if they were given some basic instruction in the elements of medico-social work. The Subcommittee certainly did not group rent collectors, insurance agents, and others with trained social workers.

The Subcommittee gave most careful scrutiny to syllabuses of training for degrees or diplomas in social sciences, and came to the conclusion that as these are constituted at present, and without practical training, they do not provide adequate preparation for social work in the field.

The writers of the letter consider that an increase in practical training would be a retrograde move, but this was most certainly not the view of the Subcommittee, who are of opinion that at present an essential part of the training of the social worker which makes her fit to carry out her duties is that which she obtains after she has received her degree or diploma. It is the health visitor, working in close co-operation with the general practitioner, who is the essential family social worker. Her duties have now been widened to include the whole family. Illness and accompanying social problems in one member inevitably affect the rest of the family. That is why the Subcommittee is anxious to see that the family health visitor should be the one who, when she encounters conditions which she feels require expert and specialized additional social help, should be able to call on the services of a suitably trained social worker.—I am, etc.,

H. D. CHALKE,
Chairman, Social Workers
Subcommittee, B.M.A.

London, W.C.1.

Consultant's Contract Terminated

SIR,—In April, 1955, a committee visited a certain hospital to review the establishment of medical consultants at the instigation of the finance and general purposes committee of the South-west Metropolitan Regional Hospital Board. The visitors were two retired consultants, who were strangers to the hospital, and the deputy senior administrative medical officer of the board. The consulting staff of the hospital was invited at short notice to meet the review team over "a glass of sherry" at 12.45 p.m. in the office of the physician superintendent. The team had already discussed their business with the physician superintendent, who had been only 18 months in the hospital. It is understood that for most of

Concert at the Dome

A concert was given for the Association in the Dome on Sunday evening, July 8, by the Southern Philharmonic Orchestra, under the direction of Mr. Herbert Menges. This event, which was attended by a large and appreciative audience, was made possible by the sponsorship of Ciba Laboratories Limited, Horsham. Appropriately, the main work of the evening was Rachmaninoff's Piano Concerto No. 2 in C minor, as it is dedicated to the doctor who helped the composer over his nervous breakdown. The soloist was Peter Katin, and his brilliant playing was warmly applauded.

CONDITIONS OF SERVICE OF PUBLIC
HEALTH MEDICAL OFFICERS

COMMITTEE C AGREEMENT

Committee C of the Medical Whitley Council has reached agreement about an addition to the annual leave arrangements where a medical officer falls sick during a period of annual leave, and about the employment of married women officers, and has recommended all local authorities to make effective forthwith the following revised arrangements.

Annual Leave

In the event of a medical officer falling sick during the period of his annual leave, and provided he produces at the time a medical certificate, he shall be regarded as on sick leave from the date of his medical certificate and further annual leave shall be suspended from that date.

Marriage Bar for Women Medical Officers

No woman doctor should be disqualified from obtaining employment in the public health service or be subject to dismissal from employment in the public health service simply by reason of marriage.

COMPETITION FOR MEDICAL FILMS

The Council of the British Medical Association is prepared to consider the annual award of two prizes of fifty guineas each, with certificates, for 16-mm. medical films. One prize will be for commercial and the other for non-commercial film producers. The first competition will be held next year, and the closing date for receipt of entries is September 30, 1957.

The choice of subject is left to the competitor. The judges will pay special regard to the value of the film to the B.M.A. Film Library, and the likelihood of its frequent use. For example, a film showing a broad clinical presentation of a subject is likely to be more acceptable than one limited to a demonstration of operative technique.

Full details of the competition may be obtained from the Secretary, British Medical Association, B.M.A. House, Tavistock Square, London, W.C.1.

HOSPITALITY

A French boy aged 19 would like to stay for three months with a British medical family on an *au pair* basis. A French boy aged 13 would like to arrange a holiday exchange with a British boy between July 20 and August 20. He would like to stay near the sea.

Would anyone interested please get into touch with Brigadier H. A. Sandiford, International Medical Visitors Bureau, B.M.A. House, Tavistock Square, London, W.C.1.

the team's visit the chairman of the medical committee and the group secretary were present as observers. A copy of the review committee's report to the board was received by each of the hospital's consultants on August 18. The post held by a certain consultant who had happened to be away on leave at the time of the team's visit was considered in the report to be redundant, and it was recommended that the work needed could be done on an on-call basis. This consultant had received no intimation that the team was making a report of this kind. Again without further communication, the regional board sent a letter dated August 30 terminating the consultant's appointment on November 30, 1955. The group medical committee held a well-attended meeting at the earliest opportunity on October 5, and all present, except the physician superintendent, voted for a strong protest to be made to the board against the decision of redundancy. This protest was unanimously supported by the hospital management committee. The visiting team's advice of redundancy had been given as the result of the physician superintendent's figures of the consulting and operating work done during 1954. The consultant had not kept a record of the numbers of patients seen as in-patients, out-patients, and as requested by other members of the staff, and does not agree with the superintendent's assessment. The consultant has kept a full record of the numbers of patients seen and treated since December, 1955, until the end of May, 1956, and this showed that a considerable portion of the work had not been included in previous official records.

An appeal by the consultant to the Ministry of Health was heard in January, 1956. The previous medical superintendent of the hospital and three members of the medical committee voluntarily attended at the Ministry and supported the appeal. The board's decision was upheld, but the Ministry instructed the board that it was morally responsible to provide comparable alternative employment. The board has not yet done this, and the consultant, after 17 years' service at the hospital, has lost pension rights and the status of a consultant in the hospital. The physician superintendent has stated that he considers much of the work which the consultant did previously to be within the scope of his own duties as a consultant.

An occurrence such as this is, of course, uncommon, but it must be utterly condemned, because doctors cannot be expected to work well in such circumstances. If the action of the board in terminating a contract in this way is not repudiated a very damaging degree of mistrust between superintendents and their colleagues in hospitals and between hospital doctors and regional boards will certainly follow. The procedure began by a consultant's contract being terminated without any hearing by a regional board, on the report of two strangers to a hospital who received information from only the physician superintendent. Is this some new form of justice—to condemn a person unheard and then leave him to get the conviction reversed if he can? I think not. It is simply one of these administrative blunders which the Lord Chief Justice recently stamped on.—I am, etc.,

London, W.I.

J. M. ALSTON.

Emergency Call Service

SIR,—I have read, more with sorrow than anger, of the antagonistic opinion of the General Medical Services Committee about the new wireless emergency service. Is this not like King Canute, who tried to stop the sea, or the present trade unions with their opinion of automation?

Although I personally am not interested in this new wireless emergency service, being resident outside the area, I do think, as a practitioner of many years' standing, that it is an excellent idea. Especially so as I read in the brochure that postgraduates are to be employed. This surely is one way of introducing the specialist-to-be to types of cases with which the G.P. deals, thus achieving the result of G.P.s and future consultants working harmoniously again, as used to be the case before the 1948 National Health Service.

I would suggest that the General Medical Services Committee should welcome this with open arms, especially as it would give the G.P.s some time off for relaxation, thus reducing to a certain extent the increase in the death rate of comparatively youthful G.P.s. Also, if this new scheme comes under the auspices of the G.M.S. Committee it would prevent any abuse which might arise from its use.

This or a similar service is bound to come in the near future, despite the ostrich's opposition, whether we G.P.s remain on the capitation fee as at present or if a full-time salary service comes into being one day. I would therefore suggest humbly that the G.M.S. Committee reconsider the matter now whilst it is still new and not wake up one day to find it is an established fact which has to be accepted, whether it is good or bad.—I am, etc.,

London, S.E.6.

R. G. WIGODER.

Association Notices

Diary of Central Meetings

JULY

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|-----------|---|
| 16 Mon. | S.H.M.O.s Group Executive Committee, 2 p.m. |
| 18 Wed. | Alternative Edition Subcommittee, Joint Formulary Committee, 11 a.m. |
| 18 Wed. | Emergency Call Subcommittee, G.M.S. Committee, 2 p.m. |
| 19 Thurs. | G.M.S. Committee, 10.30 a.m. |
| 19 Thurs. | Guillebaud Subcommittee, Central Consultants and Specialists Committee, 11 a.m. |
| 19 Thurs. | Joint Committee of the B.M.A. and Magistrates' Association, 2 p.m. |
| 23 Mon. | Staff Side, General Whitley Council (at 14, Russell Square, W.C.), 10.30 a.m. |
| 23 Mon. | Full General Whitley Council (at 14, Russell Square, W.C.), 2.30 p.m. |
| 24 Tues. | Staff Side, Committee B, Medical Whitley Council, 10.30 a.m. |
| 24 Tues. | Chest Services Subcommittee, Central Consultants and Specialists Committee, 2 p.m. |
| 24 Tues. | Full Committee B, Medical Whitley Council (at 14, Russell Square, London, W.C.), 2.30 p.m. |
| 24 Tues. | Medical Whitley Council (at 14, Russell Square, London, W.C.), 2.30 p.m. |
| 25 Wed. | Joint Consultants Committee (at Royal College of Surgeons of England, Lincoln's Inn Fields, W.C.), 10.30 a.m. |

Branch and Division Meetings to be Held

- CHESTERFIELD DIVISION.—At Chesterfield Royal Hospital, Thursday July 19, 8.30 p.m., annual meeting.
- HUDDERSFIELD DIVISION.—At Huddersfield Royal Infirmary, Monday, July 16, 8.15 p.m., annual general meeting.
- MAIDSTONE DIVISION.—At Royal Star Hotel, Maidstone, Friday, July 20, 7.30 for 8 p.m., annual dinner; 9 p.m., A.G.M.
- NORTH STAFFS DIVISION.—At Cheshire Joint Sanatorium, Market Drayton, Thursday, July 19, 2.30 p.m., cricket match. Also facilities for tennis and swimming. Short clinical address by Dr. P. W. Edwards. Friends and relatives are invited.

Meetings of Branches and Divisions

BIRKENHEAD AND WIRRAL DIVISION

A combined meeting of the Birkenhead and Wirral Division and the Birkenhead Medical Society was held on March 3. Twenty-one members attended the meeting, which was preceded by dinner. The guest speaker, Dr. W. H. McMenemey, addressed the meeting on "Charles Hastings and the Early Days of the British Medical Association."

A meeting was held on May 2 at the works of the Associated Ethyl Co. Ltd., of Ellesmere Port, at the invitation of Dr. P. S. I. Barry, deputy chief medical officer. Eighteen members attended, and the invitation was extended to the Chester and Wallasey Divisions. After lunch talks were given on the production of tetraethyl lead and its medical considerations and hazards by Mr. Smith, works manager, Dr. Boyd, chief medical officer, and Dr. Barry. After a visit to the medical centre and tour round the works Dr. Thelwall Jones gave an address on "Medicine in Industry." The meeting concluded with a cocktail party at the Grosvenor Hotel.

SUPPLEMENT TO THE BRITISH MEDICAL JOURNAL

LONDON SATURDAY JULY 21 1956

CONTENTS

Annual Representative Meeting (continued)	55	"In Brighton Last Week"	70
The Annual Dinner	63	Cricket	71
Adjourned Annual General Meeting	64	The Remuneration Claim	71
Religious Services	65	Medical Ethics	72
Medicine and the Church	66	Hospitality	72
Proceedings of Council	67	Correspondence	72
Overseas Conference	68	B.M.A. Library	74
Christian Medical Fellowship Breakfast	70	Association Notices	74

British Medical Association

ANNUAL REPRESENTATIVE MEETING, BRIGHTON, 1956*

FOURTH DAY

Monday, July 9

The Representative Meeting reassembled for its final session at 10 a.m., with Dr. I. D. GRANT in the chair.

VOTES OF THANKS

The CHAIRMAN moved that the cordial thanks of the Representative Body be conveyed to the following for the help they had given towards the success of the meeting:

The Mayor (Councillor Lewis Cohen, J.P.) and Corporation of Brighton.

The Chairman of the Publicity Committee of the Corporation, the Director of Publicity (Mr. G. E. M. Johnson), and his staff.

The Director of the Royal Pavilion Estate (Mr. Clifford Musgrave, F.L.A.) and his staff.

The Chief Constable of Brighton.

The Parks and Gardens Superintendent and his staff.

The Automobile Association.

British Railways.

All who had provided hospitality for overseas visitors.

All who had provided hospitality for the ladies, including the Eastbourne Division of the B.M.A.

Ciba Laboratories, for the Sunday Concert.

The Brighton Philharmonic Society, for providing stewards for the Sunday Concert.

The Sussex Association of the Medical Women's Federation.

The Brighton and Mid-Sussex Division of the B.M.A. for the cocktail party.

The Local Executive Committee.

The Ladies' Committee, and all others who had contributed to the comfort and entertainment of the representatives and their ladies.

OTHER MOTIONS BY DIVISIONS

Summary of Annual Report

Dr. D. L. GULLICK (East Herts) moved:

That in addition to its Annual Report, the Council be asked to consider the publication through the medium of its Public Relations Department of a short summary of that report for issue to all members.

The Public Relations seemed the obvious department to deal with the matter. He reminded the meeting that, while

*The first part of this report appeared in last week's Supplement.

the Association possessed an excellent public relations department, each and every member was individually a public relations officer for the Association and would all be glad of instruction from the experts.

The motion was carried.

Date of Annual Representative Meeting

Dr. R. M. S. MCCONAGHEY (Torquay) moved that the Council be asked to consider changing the date of the A.R.M. from early summer to the autumn.

After the Torquay meeting it had been felt that resorts were unhappy about having conference meetings in late June or in July, especially if the conference was of any size. Members, too, would probably be just as happy to meet in the autumn.

Dr. J. S. M. ORD (Glasgow) objected because members would have so many other commitments in the autumn. Further, attendance at a June or July meeting could be combined with an annual holiday.

Dr. MCCONAGHEY, in reply, said that if the meeting were held in the autumn members would be fresher after their annual leave.

The motion was carried.

Accommodation at 1958 Annual Meeting

Dr. ELSIE WARREN (Kensington and Hammersmith) moved:

That the Council be asked to consider whether more could be done to help members who wish to have their children staying at Margate during the Annual Meeting there in 1958.

She said something should be done to enable more young fathers to attend.

Dr. A. BARKER (Council) assured the meeting that the East Kent Division would do their best to accommodate everybody.

The motion was carried.

Medal of the Association

Mr. D. S. PRACY (Nuneaton and Tamworth) moved that the meeting, remembering that the first object for which the Association was established was to promote the medical and allied sciences and to maintain the honour and interests

of the medical profession, was disturbed that the Council had not exercised its powers for many years to recognize the distinguished merit of the scientific work of many members of the profession by the award of the medal of the Association. It considered that attention to that matter should be given by the Council.

The last award, he reminded representatives, was in 1926, and if the Association had continued and had bestowed it upon the discoverers of insulin, the sulphonamides, and penicillin it would have honoured itself. The medal could be awarded to a person who was not a member of the Association, and its award was not limited to people of British nationality.

The CHAIRMAN OF COUNCIL informed the Representative Body that the matter was under consideration.

The Nuneaton and Tamworth motion was carried.

Convalescent Homes for Doctors

Dr. JOAN CHAPPELL (North Middlesex) moved that the Council be asked to consider ways and means by which a convalescent home or homes could be established for the use of members of the medical profession and their immediate relations. She said that the Association could not use its own funds for the purpose, but medicine was the only profession without that amenity.

Dr. R. H. MOORE (North Middlesex) seconded the motion, which was carried.

Medical Implications of Modern Weapons

Dr. J. S. HAPPEL (Winchester) formally moved that, as any future war was likely to start with little warning, it was essential that members of the medical profession should understand the medical implications of modern weapons. The Government should arrange courses in those subjects. The motion was carried as a reference to Council.

National Major Casualties Service

In moving on behalf of Mid-Cheshire that the meeting considered that the Council should discuss with the Government the formation of a major "Casualties Service" covering the whole country, with special reference to the position of medical practitioners, Dr. W. N. LEAK expressed the hope that Council would take notice of the letters which he had written on the subject and which had been published in the *Journal*, because they were based on experience and not on fancy.

The motion was carried.

Medical Acts Consolidating Bill

There was a motion by Hendon that, in view of the decision of the General Medical Council to promote a consolidating Bill for the approval of Parliament, the Council be requested to examine and report on the working of the Medical Acts, 1858-1950, with special reference to the difficulties attendant upon provisional registration, disciplinary procedure, and elective representation of the profession, and to take any urgent action that appeared necessary and desirable.

In moving it, Dr. ROBERT FORBES said that at the moment there was a consolidating Bill going through the House of Lords which sought to consolidate some twenty Medical Acts, and it was desirable that special attention should be paid to difficulties which had emerged in the operation of provisional registration, and that consideration should be given to disciplinary procedure with respect to some difficulties which had been encountered, and to elective representation of the profession. He suggested that some suitable proposals might be prepared for consideration at the next Representative Body.

Dr. H. GUY DAIN (Council) said that the consolidating Bill was only a consolidating Bill and did not introduce any new problems. It was an attempt to gather all the Acts together and bring them completely up to date. The

drafters of the Bill had been most insistent that there should be nothing new in it, and it would not give any opportunity to make any alterations in the existing law. It was only in 1950 that there was a Medical Act, and it would be many years before any alteration could be effected.

The motion was carried.

Consultation with Profession

Dr. R. P. HENDRY (Rugby, with South Warwickshire) moved to express the earnest hope that in future any medical committee or council which advises or acquiesces in any major change in medical or medico-political policy will either take steps to ascertain the views of the profession as a whole or else make it clear that the opinion expressed is solely that of the individuals forming the committee, etc., and by no means necessarily that of the profession as a whole.

He said that this was prompted by the heroin controversy. There was a little trouble in Dublin because of the issue of the report on marriage and divorce before the Council had ratified it. The World Health Organization had raised the heroin controversy by asking for the Government's views and the views of the medical profession, and those views should have been taken into consideration. The purpose of the motion was not to put any pressure on any committee to agree with the view of the British Medical Association, but it should be made clear that it was their views and not necessarily the views of all the members of the profession.

The motion was carried.

Mr. D. S. PRACY (Council) said that he had been asked to move, on behalf of Rugby, that the Council should obtain from members nominated by it to serve on statutory committees an undertaking that if matters affecting medical practice are discussed or appear on the agenda they will press for an adjournment of the matter or item until steps have been taken to ascertain the opinion of the medical profession in this country. As the form of the motion might make it too rigid he asked that it should be accepted as a reference to Council.

Dr. C. W. WALKER (Cambridge and Huntingdon) said that this really would not do. He was nominated to serve on the Central Health Services Council as a general practitioner and he was asked not to consider himself as a representative of the B.M.A. but to say and think as he liked, and he had done so. It was important that members nominated by the Association to serve on these statutory committees should feel free to express their own views freely and frankly. Such members had a lot to learn; they got glimpses of the workings of a Government department and to know and like their medical colleagues in the Ministry.

Dr. B. HIRSH (Manchester) said that the question of the relationship between the statutory committees and the Divisions had been dealt with by the Council, but the ramifications of the question of the relationship between the statutory committees and the local Divisions had never been clarified. The local medical committee was being built up and the Division was struggling to keep alive. Two conferences had discussed the problem and had come to different conclusions. The first duty of members of the B.M.A. was to the B.M.A., and he hoped that B.M.A. members who were members of statutory committees would not act to the harm of the Association.

Dr. E. A. GREGG (Chairman of Council) said that this was always a difficult position. Certain things could happen and the individual member was obliged, during a discussion, to come to a decision. On the other hand, he was there because the Association understood him to be a person who was imbued with its views and principles. It was sometimes difficult to remember what view was expressed by the Association on a particular matter, or whether a definite policy had been laid down by it. However, he thought there was much in this resolution. It was important that the Association's nominees should bear in mind the warnings which had been given.

OCCUPATIONAL HEALTH

Dr. J. A. L. VAUGHAN JONES, chairman of the Occupational Health Committee, presented the sections of the report under "Occupational Health." He said that two years ago he informed the Representative Body that the policy of the Association was that the Ministry of Health should exercise general supervision over all health services. That did not mean direction. Last year he again pointed out that the Association still had the same policy.

In the current year he had to report that, if there were no greater interest in the occupational health services shown by the Ministry of Health than they had made apparent in the past two years, then the Association would seriously have to reconsider the present policy, because the Ministry of Labour and National Service, although in a somewhat limited field, had, by the establishment of its Industrial Health Advisory Committee, shown a real and continuing interest in occupational health and its services. The circumstances had been somewhat complicated by the late Minister of Health's becoming the Minister of Labour and National Service.

The Committee had not embarked on any further large-scale planning because of the surveys of industry undertaken on behalf of the Industrial Health Advisory Committee of the Ministry of Labour and National Service. The first survey was of all the industries in the town of Halifax to try to find out the extent of the problem of health in industry, to what extent services were already provided, whether those services were adequate, and, if not, what additional services were desirable. That survey had taken almost twelve months and the report should be available in October.

The second survey was that of an industry. The chosen one was the pottery industry, which was known to present certain hazards, though much had already been done to eliminate the known hazards. The area chosen was Stoke and district. Even though that did not cover all the establishments of the industry, it could be accepted as a representative sample.

The work in both those surveys had been undertaken by the medical and lay inspectorate of the factory department of the Ministry of Labour, a department which worked under a continuous burden of understaffing, but achieved a great deal of first-class work. With the inadequate staffing it was impossible for the department to fulfil all its normal obligations to industry, and in spite of economic crises it was false economy to try to save at the expense of the staff. When it was realized that 20 million days' work were lost yearly because of industrial accidents and a mere 3½ million due to strikes, it was clear that there was room for much greater efforts on the part of the Safety, Health, and Welfare Division of the Ministry of Labour and National Service to save the country's economy.

When the reports of those surveys were available it might be possible to assess the requirements of industry in terms of medical and other facilities. From that, it was wise that progress should be made by a process of evolution rather than revolution.

If there was a sudden demand for a large number of additional medical officers for industry, it was not certain that adequately trained medical personnel would be available. "That brings me to the question of training," he continued. "It is impossible to add to the already overburdened curriculum, but at least we should again endeavour to persuade our clinicians in teaching hospitals to relate the effects of sickness to the question of work and resettlement rather more effectively than was done at present." Most of the additional work in industry should be done by general practitioners on a part-time basis, and the Council had invited medical schools to provide full-time and part-time postgraduate courses to enable general practitioners to be competent as well as willing to undertake the responsibilities which an appointment in industry entailed. Those were not jobs which could be

Dr. C. P. WALLACE (Guildford) said that he hoped this motion would be rejected. Great care should be taken to send forward people whose views were known and about whose principles there was no doubt. The Association should nominate men who would give their best services to these statutory committees but not act as stooges.

Dr. ROBERT FORBES (Council) moved that the meeting proceed to the next business, which was seconded and carried.

Accidents to Doctors

Dr. W. N. LEAK (Mid-Cheshire) moved to ask the Council to discuss with the Government the matter of compensation for doctors injured or who lost their lives in attending accidents. He said that the legal position was that if a doctor in the N.H.S. was called upon to attend a National Health Service patient he had to go. If he lost his life there was a pension for his widow, at the discretion of the fund, based on his length of service. If he got pneumonia or some other disability he got nothing. At the time of an accident the doctor did not think about such things, but it was the Association's duty to think for him. The award of a medal would not sustain him for the rest of his life.

Dr. E. A. GREGG (Chairman of Council) suggested that it would be better to let the Council consider this and then decide whether to go to the Government or come back to the Representative Body first. He proposed that this should be a reference to Council.

It was agreed that the motion should be treated as a reference to Council, and it was carried in that form.

Statutory and "Item of Service" Fees

Dr. J. C. ARTHUR (Gateshead) moved that these fees should be reviewed in the light of 1956 values of money. He said that piecemeal reviews were going on all the while, but the Division felt that the time had come when the whole of these fees should be looked at *en bloc*, and he understood this was being done. If so, this resolution would only reinforce that action.

Dr. A. BROWN (Cambridge and Huntingdon) said that this review was being made, and when something definite was settled a statement would be issued to the profession.

The motion was carried.

Dr. J. C. ARTHUR (Gateshead) also moved that a small booklet listing briefly all statutory, agreed, or recommended "item of service" fees be made available. He understood that this also was being done.

The motion was carried.

Fire Dangers in Home and Factory

Miss GLADYS M. SANDES (Marylebone) moved to call attention to the urgent need for much more intensive propaganda to inform members of the community of the dangers of auto-inflammable materials and other fire dangers in the home and factory. She said that new materials were being evolved very quickly, and development and research in man-made fibres was far in advance of scientific investigation. This was one of the causes of the increased number of accidents of this type. At the moment she understood there was no time for further legislation, and it was therefore very important to press for propaganda on this subject.

The motion was carried.

Association Tie

Dr. H. A. FAULKNER (Willesden) moved that the Association, having acquired a coat-of-arms, should now acquire a tie.

He said that during the last few days all present had felt themselves to be members of a brotherhood. He proposed that that brotherhood should be "tied" with a B.M.A. tie.

Dr. J. G. M. HAMILTON (Council) trusted that the B.M.A. would not indulge in this kind of stupidity.

The CHAIRMAN OF COUNCIL also opposed the motion, as did Dr. J. B. WRATHALL ROWE (Harrow).

Dr. FAULKNER, in reply, said he did not see why the harmless idea of a tie should be attacked.

The motion was negatived.

lightly undertaken, "and we must show ourselves fully capable of giving the very real assistance which we can contribute to a healthy working environment and a happy and contented working population. This is a matter of mental as well as physical health." More full-time officers and more specialists in occupational health would also be required.

Automation was not a popular term, but the issue had to be faced that there would be redeployment of personnel in industry and eventually shorter working hours. Practitioners could assist considerably in that redeployment.

He appealed to representatives to try to develop more Occupational Health Advisory Councils, particularly in the industrial areas of London, the Midlands, Lancashire, the North-east, and Scotland and Wales. Joint consultation was a major function in industry, and with the addition of the doctors much could be achieved in promoting a better understanding of the problems which would always arise.

The pattern of worker, employer, and doctor sitting together had been followed in the Industrial Health Advisory Committee of the Ministry of Labour and National Service; practitioners must take the initiative in promoting those councils locally, and in inevitably improving the industrial atmosphere by frank discussion of each others' difficulties.

"May I most earnestly ask for your support in this established concept?" he concluded. "You can achieve locally what is being achieved centrally, and the decisions arrived at centrally will be much more easily applied in the periphery if similar discussions have already taken place. The Council hope to see at least ten new advisory councils in the coming year, but it all depends on the initiative of local Divisions."

Dr. W. S. PARKER (Public Health Service), in reinforcing what Dr. Vaughan Jones had said about the Occupational Health Advisory Council, said that it consisted of four members of the local B.M.A. division, four employers, and four employees with power to co-opt. In the coming winter his own Joint Advisory Council was organizing a half-day conference of 250 people, including doctors, employers, and employees, the subject being occupational dermatitis. Such meetings helped to reduce hazards and cut down industrial accidents. It was a tragedy, he said, that there were only eleven such councils in the country.

Administration of Morphine by Nurses in Industry

Dr. ALISTAIR R. FRENCH (Marylebone) moved to express astonishment at the refusal of the Home Secretary to legalize the administration of morphine by competent nurses in serious industrial accidents, and instructed the Council to press for this essential medical service to industrial workers.

He explained that a deputation from the Royal College of Nursing and the Association went to see the Home Secretary, and requested an amendment in the law (it could be amended by regulation) to provide that competent nurses employed in industry should be responsible persons to administer morphine in cases where there was likely to be delay in getting a doctor to the scene. To the great surprise of many, the Home Secretary, after consideration, replied that he could not agree to extend that concession to responsible nurses in scheduled factories where severe accidents were likely to occur. The Home Secretary considered that the proper way to provide for a serious accident was to ensure that there were arrangements for securing the early attendance of a doctor.

Dr. R. P. HENDRY (Rugby, with South Warwickshire) pointed out that it was merely a matter of acting in emergency in specified, predetermined agreement with the industrial medical officer who had advised it. Admittedly it could conceivably have some dangers, but he considered that the chance of a nurse being guilty of an error of judgment was slight. The advantages far outweighed any disadvantages in his view.

Dr. J. S. NOBLE (Blyth, with Morpeth) said that the motion placed upon their excellent nursing colleagues one extra bit of responsibility which fundamentally was the responsibility of medical practitioners, and he did not consider that they would be quite fair in doing that. A shocked patient required intravenous morphine in many cases, and that was not the job for a nurse to carry out. "We are making too many exceptions with regard to the use of dangerous drugs," he concluded, "and I ask the meeting to reject this motion, not to cast a slur on the nurses but rather to safeguard them."

Dr. VAUGHAN JONES said he hoped that the meeting would pass the motion, because it would reinforce the Committee when a visit was made to the Ministry. So far as the question of responsibility was concerned, the Royal College of Nursing was combining in the visit to the Ministry, and the point could be submitted that it was a realistic and practical scheme.

Dr. FRENCH, in reply, asked the meeting to pass the motion unanimously, remembering that it was not a question of whether nurses were capable of accepting responsibility. If midwives were considered sufficiently competent to administer pethidine, there was little reason why nurses in industry should not administer morphine in emergencies.

The motion was carried.

First-aid Manuals

The CHAIRMAN, formally on behalf of Gateshead, moved that the statement that the Association was taking an interest in the preparation of a textbook for first-aid workers was to be welcomed, and urged that consultation with the Association was desirable in the preparation of all books of this nature claiming to be standard teaching manuals.

He said that in his view it was unnecessary for the Association to prepare a textbook for first-aid workers of their own when there were two perfectly satisfactory ones already in existence.

Dr. J. A. L. VAUGHAN JONES (Council) said that in his opinion Gateshead had got hold of the wrong end of the stick. When the first-aid book first came along it was to be a tome of some 700 foolscap pages, and if one believed all it said the impression would be gained that doctors were not needed in industry at all. It had been reduced to reasonable proportions, and it was felt that the Association had an interest in the production of any manual on industrial first aid.

Dr. C. P. WALLACE (Guildford) said it was not the function of the Association to try to usurp the position of an organization such as the British Red Cross or the St. John Ambulance Brigade. There was a tendency to suggest that the Association should be doing this, that, and the other thing—the jobs of other organizations—and he urged the meeting to reject the motion.

Dr. G. S. R. LITTLE (Greenwich and Deptford) said he had been associated with the St. John Ambulance Brigade for some twenty-two or twenty-three years, and recently with the British Red Cross, and he was filled with admiration for both organizations; but the motion merely stated that the Association was taking an interest in the preparation of a textbook on first aid, and if the motion was rejected it would be tantamount to saying that the Association did not take an interest. In spite of the St. John Ambulance Brigade and the British Red Cross it was desirable that the Association should take an interest.

The motion was carried.

Use of Antibiotics by Nurses

Dr. H. WALKER (South-west Essex) moved that nursing staff employed in industry should follow hospital practice and never use antibiotics or chemotherapy in any form without the express instructions in writing in each case of a registered medical practitioner.

This was agreed.

MEDICAL FILMS

Dr. R. P. LISTON, chairman of the Film Committee, presented the Annual Report under "Medical Films."

He expressed his committee's thanks for the gifts of films which had been received.

He said that the Academy of Medical Sciences of the U.S.S.R. had presented to the Association a film on "The Circular Vascular Suture" and that the Association had given the Russian visitors a copy of a film on "Corneal Grafting."

The Council had agreed to the holding of an annual film competition, details of which would be published in the *Journal* in due course.

The revision of the film catalogue had been undertaken on lines which it was thought would provide an easy and acceptable guide.

The report was approved.

MEDICAL BENEVOLENCE

Dr. H. M. GOLDING, chairman of the Charities Committee, presented the report under "Medical Benevolence."

He expressed the committee's gratitude for the increased income amounting to £45 over last year's, but pointed out that it represented only £45 on £12,000. He said that their appreciation was a little tinged with fear because in these times of rising costs there were more claims than ever, especially for children going to school. He entered a special plea on behalf of elderly and lonely people, who, he said, greatly appreciated a little company. "We have often been accused of excessive prescribing," he said, "but we shall never be brought to book for giving too much of the mixture of sympathy, friendliness, and thought for others." He appealed to the whole profession to take a wide conception of benevolence so that the needy should find sustenance, the elderly and lonely comfort, and the disabled and sick encouragement to endure.

Dr. J. T. BALDWIN (East and Midlothian) expressed special appreciation of the excellent work of the Ladies' Guild, and asked that there should be some reference to that in the committee's report.

Dr. GOLDING said that his committee was in no way unmindful of the wonderful work of the Guild. The difficulty about referring to them in the report was that they did most of their visiting to those who needed financial assistance, and it was feared that in some parts of the country, even where the Guild were very active, some cases might be missed. He had no wish to say anything which would in any way detract from the value of their work.

The report was approved.

PUBLIC RELATIONS

Dr. H. GUY DAIN, Chairman of the Public Relations Committee, presented the sections of the report under "Public Relations."

The department had had an excellent and busy year; relations with the public had been enormously improved since its introduction. It was continuing to answer questions from the public and the Press on all matters of general interest, and could deal with all sorts of quaint and curious queries with the least possible delay.

During the year the department had seized its opportunities cleverly and effectively to advance the point of view which the Association wished to get over to the public. Very well attended press conferences had been called to deal with reports on such questions as hypnotism and divine healing and on homosexuality and prostitution. It was not necessary to point the moral of the effectiveness of the work of the department on heroin.

After the tremendous excitement in one or two hospitals where conjoined twins had been born and the whole public relations of those hospitals had broken down, the department had invited the Press to come and discuss the matter.

The invitation had been received with great enthusiasm and the committee had been extremely gratified with the importance in the press world of those who had attended. The Ministry had ultimately agreed to issue to hospitals a code of behaviour between hospitals and the press which it was hoped would smooth relations between the two, helping the Press to get the information which it properly should have and enabling the hospitals to give it with the least possible difficulty. The committee had received the greatest possible help from the Press, particularly from the president of the Press Council, Sir Linton Andrews (editor of the *Yorkshire Post*). It was proposed to have continually in existence a body to which difficulties could be referred. It was hoped to improve still further the relations between the hospitals and the Press.

A disappointing feature of the past had been the lack of support for the Hastings Lectures. The Yorkshire Branch had very kindly undertaken to organize a meeting for the provinces, and the result had been a most gratifying success for the lecture, which had been given by Sir Henry Cohen.

Dr. C. P. WALLACE (Guildford) paid a warm tribute to the work of Mr. Pringle, the Public Relations Officer. He expressed disappointment that the Council should have turned down a resolution calling for an effort to be made to educate the public on the primary responsibility of people for their aged relatives. There were strong reasons why the matter should be pressed home, including the shortage of hospital beds and the straining of the resources of the already over-taxed nursing profession.

Dr. F. A. BELAM (Guildford) protested against the iniquity of medical officers of health having to implement compulsory removal of patients from their homes—a thing which he had always done with the utmost reluctance, for it often resulted in the very imminent death of the patient. The best person to bring influence on the relatives in the matter was the family doctor, and he ought to do it.

Dr. W. WOOLLEY (Council) said that neither the Council nor the Public Relations Committee had opposed the resolution mentioned by the last speaker. All that had been said was that the individual doctors were already doing the necessary work and would go on advising and doing all they possibly could, but that if there was to be mass propaganda to induce people to look after their aged relatives it was better undertaken by the Government, the churches, or other organizations. Meanwhile doctors, as individuals, would continue to do their best in individual cases.

The report was approved.

ARMED FORCES

Major-General J. C. A. DOWSE, chairman of the Armed Forces Committee, presented the sections of the report under "Armed Forces."

He said that the Committee disagreed with the Waverley Report on three points. First, the Committee thought it entirely wrong that there should be two lines of promotion, one for the professional side and one for the administrative. Other methods should be employed to give the professional side adequate financial inducements. Secondly, the Waverley Committee did not appear to realize the vast problem of preventive medicine in the armed Forces, and the Armed Forces Committee had stressed to the Minister of Defence that the mere possession of a D.P.H. was not a qualification for the higher work of preventive medicine. Finally, in a memorandum to the Minister of Defence it had been pointed out that doctors in the armed Forces should be paid at rates comparable with those in the Civil Service.

The report was approved.

SCOTLAND

Dr. W. M. KNOX, on behalf of Council, presented the report under "Scotland" and the memorandum of evidence by the Scottish Committee on Medical Participation in the Control and Management of Hospitals, which forms Appendix VII of the Annual Report of Council.

The report was approved.

WALES

Dr. T. W. DAVIES, chairman of the Welsh Committee, presented the Annual Report under "Wales." The report was approved.

INTERNATIONAL RELATIONS

Dr. J. A. PRIDHAM, chairman of the International Relations Committee, presented the Annual Report under "International Relations."

He said that the cornerstone of their international relations was the World Medical Association, which, he stressed, was a voluntary organization, and should not be confused with the World Health Organization, which was supported entirely by Government funds and run by Government officials. He pointed out that the World Medical Association was started in B.M.A. House in 1946, although born officially in Paris in 1947, and the B.M.A. had played a large part in its formation and in supporting it. At present, he said, 80% of its funds were contributed by America, and the aim was to increase the contribution of the rest of the world to 50%. He pointed out that the work of international organizations affected everyone; they passed resolutions and drew up conventions which Governments were persuaded to honour, and cited that on heroin as a recent example. The W.M.A. had a permanent medical observer at Geneva so that national associations could be kept fully informed of what was happening. It had been decided by the Council, at the request of the W.M.A., to start a British supporting group either in the autumn or early in the following year.

The PRESIDENT (Dr. T. C. Routley) said that the W.M.A. owed a great debt of gratitude to the B.M.A. If there were not a World Medical Association, he said, one would have to be invented.

Dr. J. S. HAPPEL (Winchester) moved to instruct the Council to continue to press the Government to ratify the Geneva Convention of 1949.

This was carried and the report was approved.

REFORM OF THE NATIONAL HEALTH SERVICE

Dr. H. H. D. SUTHERLAND, chairman of the Amending Acts Committee, presented the Annual Report under "Reform of the National Health Service."

Referring to a suggested code of conduct for patients, he said for it to be enforced and mandatory there would have to be statutory provisions and certain penalties, which neither Parliament, the people, nor the Press would approve.

Code of Conduct for Patients

Dr. M. R. SHERIDAN (North Middlesex) moved on behalf of Cumberland a motion regretting that the Council had discontinued consideration of a code of conduct for patients, and urging that the matter should be pursued further.

He said there was a minority of patients who were more than just uncooperative, who would be anything from an irritation to an intolerable nuisance. The few doctors who were found to be in breach of their terms of service could be dealt with before tribunals, and he suggested that what was sauce for the goose was sauce for the gander. He agreed that at present the making of an enforceable code of conduct for patients was problematical, but the motion was a suggestion as to the direction in which the matter should be pursued.

Dr. R. H. MOORE (North Middlesex), supporting the motion, said that the success of the National Health Service depended on a gentleman's agreement between patient and doctor, which at the moment was one-sided, as only the doctor signed it.

Dr. C. P. WALLACE (Guildford) supported the view of Council as expressed in para. 74 of the Annual Report of Council. "For goodness' sake let us look after our own code of conduct and let us do all we can to encourage a sound code of conduct among our patients. Do not let us try to put them in strait-jackets and then take them out because of some breach of etiquette because of the heat of

the moment." All doctors had suffered from patients, but they forgave them and he hoped they would continue to do so. The large majority of patients were co-operative. That must never be forgotten. The one thing which mattered was the doctor-patient relationship; that had been stated over and over again in these meetings and that must be one as between friends and not one caged by rules of ethics.

The CHAIRMAN said that Manchester objected to their motion under this heading being included in the starred motion, as they were entitled to do, and it would be taken separately.

The Cumberland motion was lost.

Dr. B. HIRSH (Manchester) asked the meeting to say that, in view of the fact that savage penalties were inflicted on doctors for infraction of their terms of service, there should be some penalty for patients who abused it. He said he thought it was tragic that one of the most important resolutions at the meeting should be carried on in an atmosphere of rush and excitement, for this affected every doctor in the country. The duty of the Association was to protect the interests of the doctor, but one sometimes got the impression that it was protecting the public. If anyone ever needed the help of his organization it was the doctor. His terms of service covered 24 hours a day, seven days a week, and 365 days in the year. His life was spent in an atmosphere of sickness and tragedy. Owing to the great advances of medicine it was assumed, if anyone died, that someone had been negligent. There were three tribunals, the Medical Services Tribunal, which he had already mentioned, the High Court of Justice, and the General Medical Council. The doctor was unique in that he could be punished three times for the same offence. The patient received tremendous benefits, but what protection had the community against abuses by the patient? None. He could send for the doctor 50 times a day, get him out maliciously at night, but there was no punishment for that. On one occasion a doctor under provocation told the patient to go to hell; he was fined £10. What would have been the fine if the patient had told the doctor to go to hell? None at all. The paragraph said that the problem was not a large one and that a code of conduct would not serve any practical purpose. The patient was so perfect that he did not need any rules, while the doctor needed three courts of correction. Somebody would say that it could not be done, but the Ministry of Pensions and National Insurance warned members of the public that false statements calculated to obtain benefits were liable to be dealt with as a criminal offence. There should be a similar warning for patients who abused the medical services. Most people would agree that under the Act no patient could do anything wrong and no doctor could do anything right.

Dr. A. BARKER (Council) said that the meeting had listened to a very dramatic speech which he hoped would not be taken too seriously. ("Why?") Because it was not true.

Dr. C. V. BROWN (Manchester) said that doctors were under contract to the Ministry, but the patient was not. The practical solution would be to compel patients making complaints to lodge £2 with the executive council, which would only be refunded if the complaint was substantiated. He urged the meeting to maintain the self-respect of the profession by supporting this motion.

Dr. A. V. RUSSELL (Council and Amending Acts Committee) said that he felt great sympathy with the Manchester motion. It was true that doctors had duties and patients had rights, but politics was the art of what was possible. The Amending Acts Committee spent many hours over the problem and had come to the conclusion that with the present set-up the patient was in the position of being able to swing votes one way or the other, so that in the political arena the Association would not get the assistance of any political party on the suggestion that patients should be punished. Many suggestions were discussed as to the action which could be taken, but were rejected; the suggestion just made by Dr. Brown was valuable and the Amending Acts Committee might well consider it. He asked the meeting to reject the motion.

Dr. ST. G. B. D. GRAY (South-west Essex): As we treat our patients so they treat us. I have no trouble with my patients.

Dr. H. H. D. SUTHERLAND (Council) said that this was a small problem, and they must avoid getting into the position of being inflamed by a political type of speech.

Dr. HIRSH, in reply, said that he had not been convinced by the arguments against the motion. Dr. Russell said that there was no likelihood of its being accepted by the political parties; but that "should not concern us: it is our job to protect the doctors."

The motion was carried.

Dr. ANNIS GILLIE (Paddington) moved that the attention of the Government should be drawn to the need for continuous education of the public, both in youth and in adult life, in the constructive and responsible use of the National Health Service.

Dr. H. H. D. SUTHERLAND accepted it on behalf of Council and it was carried.

Dr. R. H. MOORE (North Middlesex) moved that the right of buying and selling of the goodwill of practices should be restored. He said that this would be the means of restoring to them, their children, and those who followed after, the right of freedom of movement. At the moment a doctor was forced to accept the conditions of his practice. If he was getting old and the local council built ten-story blocks of flats without a lift, or if his health was not equal to carrying on a large practice, he could not go to a smaller or easier one. The Act had been devised with that end in view. One Minister of Health had said that he would never be satisfied until he had the medical profession under his thumb; but the initiative was still with the profession, it was not entirely under the thumb of any politician, and he would suggest that they should break the shackles on them. He asked that the amendment should be passed by the necessary two-thirds majority, because this was a change in Association policy.

Dr. ST. G. B. D. GRAY (South-west Essex) said that it was only in the British Commonwealth of Nations that the buying and selling of practices existed. Their colleagues in other countries looked upon it as unethical, even immoral. When the Act was discussed in the House of Commons in February, 1948, not a single word was raised in the House of Commons in defence of the buying and selling of practices. The House of Commons was a pretty good cross-section of public opinion in the country ("No"); therefore it appeared to him that the buying and selling of practices was frowned upon in every part of the world except the British Commonwealth, and also by lay persons.

Dr. A. M. MAIDEN (Lincoln) said that the resolution of the Glasgow Meeting in 1954 had been framed in such a way as to say that it was impracticable to seek the regaining of goodwill but had done nothing to negative reopening the matter if at any time the political climate changed. It had seemed that such a possibility was at least practicable.

The present motion was rather clouding the issue. Association policy was, "Goodwill: we are sorry about it; let us leave it at that." The motion sought to reopen the matter. He thought it was far better left as it had been at Glasgow.

Dr. L. J. BARFORD (Reigate) said that doctors no longer owned their practices, despite the fact that they had so far not been paid for them. They should remain the property of the doctor until they had been paid for. If it was possible to sell goodwill the changing of practices would be much easier. An old partner might be encouraged to retire if his junior partners were able to purchase his share, and it would be more valuable to him if the compensation was due to him.

A Representative spoke from the floor proposing that the meeting pass to the next business "before any further damage is done."

Dr. MAIDEN asked whether the acceptance of the motion would alter the position in relation to the Glasgow resolution. The CHAIRMAN said the Glasgow resolution would then be overruled.

It was agreed to pass to the next business.

OTHER ASSOCIATION ACTIVITIES

The CHAIRMAN OF COUNCIL moved the reports under "Other Association Activities," together with the report of the Committee on Medical Education (Appendix VIII) and the Evidence submitted by the Association to the Working Party on Social Workers.

Dr. DORIS M. ODLUM (Bournemouth), speaking as chairman of the Joint Committee of Doctors and Magistrates, called attention to that committee's report on "Cruelty to and Neglect of Children."

Dr. C. P. WALLACE (Guildford) expressed his great disappointment that the Council had not had time to report on the important finding of the Guillebaud Committee. There had never been a better example of the mountain being in labour and bringing forth a mouse! It was a most unfortunate report and one with which he could not feel that the Association would agree. He expressed the hope that the Council would address themselves to it in the very near future.

Elections to G.M.C.

Dr. F. MCC. THOMPSON (Wembley) moved that the meeting viewed with concern the advanced average age of the B.M.A. nominees for election to the General Medical Council.

All members would be fully conscious of the debt which was owed to the Association's representatives on the G.M.C. for their expenditure of time, energy, and experience on behalf of the members of the profession, but he felt that there ought to be a leavening of younger practitioners nominated by the Association, perhaps some of those more actively engaged in National Health Service practice. He reminded the meeting that the G.M.C., in addition to being a disciplinary body, was concerned with medical education, and it was therefore important to have a representation of younger men when day-to-day problems were under consideration.

Dr. C. WATNEY ROE (Chelsea and Fulham) agreed. He said there had been some dissatisfaction after the last G.M.C. election. He wished to make it clear, however, that the elder statesmen were very valuable indeed, and that the profession was most grateful to them for all that they did.

Dr. R. P. HENDRY (Rugby, with South Warwickshire) asked that the meeting should throw out "such a noxious motion." It should be ability, not age, that determined who should be elected. There was a lot to be said for having younger people, but it was up to Divisions to nominate them and persuade the Representative Body in five years' time that the people they nominated were better than those who had borne the burden for so many years.

Dr. A. BROWN (chairman of Private Practice Committee) explained that when the elections became imminent the existing candidates were asked if they wished to stand again. Notices were then sent out to all Divisions asking them to make nominations, and the names came up to the Representative Body. If it was felt that the ages of the candidates were too great, that they were in danger of getting into senile decay, the remedy was in the hands, first, of divisions, and, secondly, of the Representative Body.

Dr. THOMPSON, in reply, said he agreed with everything that Dr. Brown had said.

The motion was lost.

Dr. A. BARKER (Council) suggested that Association Headquarters should circulate to members the names and a short history of all candidates nominated by Divisions for election to the General Medical Council, and that the B.M.A. nominations should not be limited to the number of vacancies on the Council.

He said that East Kent had no criticism of the personalities or age of representatives on the General Medical Council, but it was felt that, although the present method of selection was democratic, there was a danger that some extremely able man might not get the votes he should because he was not known.

This was carried as a reference to Council.

Undergraduate Training in General Practice

Dr. ETHELBERTA M. LYNTON-LOW (Lewisham) moved that the General Medical Council be requested to consider including a period of training and instruction in general medical practice in the curriculum of medical students.

She said that her Division was of the view that a short period should be devoted during the final year of all students to general practice, whether or not they were to become general practitioners. Some knowledge, even if slight, of conditions, problems, and pitfalls of general practice would help to establish a better understanding between hospital staff and general practitioners, and it would give the student a better opportunity of deciding rightly whether he or she was suited for general practice or not.

Dr. F. M. ROSE (Council) said it might not generally be known that arrangements were already being made practically all over the country between local general practitioners and medical schools so that such training was available to a certain number of final-year students. In his view it was important that those who were not going in for general practice should still avail themselves of the opportunity to gain an insight into general practice. He would not ask that it should be made compulsory at the present stage.

Dr. E. C. WARNER (Marylebone), speaking as the dean of one of the medical schools, expressed the hope that the meeting would pass the resolution. It was becoming the policy of all the medical schools to introduce a period of training in general practice, and that policy was appreciated greatly by students and doctors alike.

The motion was carried.

The "National Formulary"

Dr. D. PATON (Buckinghamshire) formally moved that the Ministry be urged, through a central testing organization or otherwise, to make one more effort to bring the *National Formulary* up to date, so that a practitioner, keeping in step with medical research and progress, was not compelled to prescribe a proprietary preparation for lack of a *Formulary* equivalent.

Dr. A. B. DAVIES (Walsall and Lichfield and National Formulary Committee) said that the *National Formulary* did not pretend to teach people how to prescribe nor did it tell them to prescribe economically, though it might assist in both respects. When a new preparation was launched it could of course be prescribed, whether it was a proprietary product or not. It merely had to be justified. If attempts were made to produce an equivalent to the proprietary product, it did not necessarily follow that the new official preparation would be any cheaper than the original; in any case, much time was taken in attempting to produce an equivalent. Generally only the original producers had the "know-how." As soon as a preparation had been standardized the Formulary Committee issued supplements, which were sent round to practitioners and inserted in the *Formulary*; and in any copy of the *Formulary* in Schedule A there were listed no fewer than 240 equivalents of proprietary preparations, and in another list in Schedule B all substances which had exactly the same pharmacological effect. In his view the National Formulary Committee was doing all it could to meet the matter and assist the practitioner in his prescribing.

The motion was lost.

Cases of Attempted Suicide

Dr. DORIS M. ODLUM (Bournemouth) moved a resolution which noted with concern the fact that in recent years a large number of people had been imprisoned for attempting suicide. She called upon the meeting to support the statement of the Joint Committee of the B.M.A. and the Magistrates' Association in 1947 that "there is a strong case for amendment of the law so that attempted suicide (excluding suicide pacts or incitement of another person to commit suicide) would not be dealt with as an illegal offence," and expressed satisfaction that the committee was giving further consideration to this subject.

The matter, she said, was serious, and in support quoted the following figures. In 1953, 563 people were brought before the courts, charged, and convicted of attempted suicide. In 1954, 577, of whom 391 were men and 172 women, were similarly dealt with. In 1953 a number of people were imprisoned without the option of a fine for attempted suicide. There were 32 men and 6 women, and in 1954 there were 37 men and 9 women. In one case a sentence of imprisonment of two years was passed, and on appeal it was reduced to two months by the Lord Chief Justice, who spoke of the unsatisfactory position of the law. Great Britain and Poland were the only two countries in the world in which attempted suicide was an indictable offence, and Bournemouth asked the meeting to support the statement of the Joint Committee of the B.M.A. and the Magistrates' Association made in 1947 that there was a strong case for amendment of the law so that attempted suicide (excluding suicide pacts or incitement of another person to commit suicide) would not be dealt with as an illegal offence.

Dr. W. M. FORD-ROBERTSON (Middle East) supported the motion, and pointed out that even in countries which were unenlightened in psychiatric and mental-health knowledge attempted suicide was not treated as a criminal offence.

Dr. J. S. M. ORD (Glasgow) thought that more consideration should be given to the motion, and said that a great many attempted suicides were young people who, if they were sent for psychiatric treatment, would have a stigma attached to them, sometimes making it difficult to obtain a job.

Dr. ODLUM, in reply, said that, although the Joint Committee had been informed by the police that when they were brought in by a general practitioner their powers were used only in order to help patients who had no relatives or friends, in view of the number of attempted suicides given terms of imprisonment it was difficult not to believe that some of those cases were being treated as criminals and not in the interests of their health.

The Bournemouth motion was carried.

A motion by West Somerset, that as a matter of urgency Council should consider the need for further discussion with the Magistrates' Association of the treatment of attempted suicide, particularly as the majority of these cases were in need of psychiatric treatment, was carried.

The Chronic Alcoholic

West Somerset moved that the problem of the chronic alcoholic patient with regard to discharge from treatment and subsequent relapse should be a matter for consideration between the B.M.A. and the Magistrates' Association with a view to alteration of the law.

The motion was carried.

Chairmanship of Council

The CHAIRMAN said he was sure every representative would regret to hear that Dr. E. A. Gregg did not propose to seek re-election as Chairman of Council. Dr. Gregg had been one of the outstanding personalities of the British Medical Association, first as Chairman of the Insurance Acts Committee, then as Chairman of the Representative Body, and more recently as Chairman of Council. He had been unstinting of his time and energies, having travelled all over the world on behalf of the Association, whose reputation he had enhanced by his charm, tact, courtesy, and knowledge. His name was synonymous with that of the British Medical Association. The Chairman concluded by expressing the hope that Dr. Gregg would continue to give the Association the benefit of his wisdom and sound judgment for many years to come.

The motion was carried by a standing vote, the Representatives rising and applauding.

Dr. GREGG said it was an embarrassing moment. The picture painted by the Chairman was one of considerable exaggeration. (Cries of "No.") He added that he appreciated all that had been said and the kind way in which the meeting had received it.

Dr. J. M. ALSTON (City) moved a vote of thanks to Dr. I. D. Grant. He said that in many years of service Dr. Grant had been known to everyone as a fine man and a fine friend, able and skilled in the business of the Association.

The motion was carried with acclamation.

The CHAIRMAN thanked the Representative Body for their reception of Dr. Alston's speech, and went on to express his thanks to Dr. A. Beauchamp, his deputy, who had taken the chair on several occasions.

He also expressed the sincere thanks of the meeting to the secretariat, who had worked tremendously hard in preparing the agenda, to the clerical staff, who had worked long hours and performed their duties so pleasantly, and also to Dr. Clegg and the *Journal* staff, whose work, done ungrudgingly and demanding many hours of overtime, was of tremendous importance. He said he was sure the meeting would want to send a message of congratulation to Dr. Agnes Kelynack, assistant secretary, who had recovered from an illness, and whom they would all be glad to see back at work with the secretariat.

The meeting terminated at 1.45 p.m.

THE ANNUAL DINNER

The Annual Dinner in connexion with the 124th Annual Meeting of the Association was held at the Hotel Metropole, Brighton, on Tuesday, July 10, when the President, Dr. ALEXANDER H. HALL, O.B.E., presided over a company of some 350 members and guests. The names of the more prominent of the guests appear in the ensuing report. They included the MAYOR OF BRIGHTON (Councillor Lewis Cohen), the APOSTOLIC DELEGATE (The Most Rev. Gerald O'Hara), and the HIGH SHERIFF OF SUSSEX (Colonel Swanston Lees).

The toast of "The British Medical Association" was proposed by Sir SEYMOUR HOWARD, Bart., a former Lord Mayor of London. He spoke with admiration of the way in which the Association had conducted its business during the days it had spent in Brighton. It had furnished an example to politicians and trade union leaders, and he proceeded to draw certain parallels between the task of those in commerce and industry in the City and those in the world of medicine. There was at the present time a certain moral sickness affecting the body politic. So many unknown factors had yet to be discovered that he was afraid they could not expect to reach a solution of the labour problems at the moment. There were too many politicians who were eager to resort to the knife, ready "to operate on Russian influenza and try to remove it like an appendix," and at the other extreme there were those who trusted to magical formulae which were called slogans. In the City they had to deal not infrequently with rising temperatures, but they used the gavel rather than the clinical thermometer. The perfect bedside manner was as difficult to acquire in City affairs as it must be sometimes in medicine—it was one of those things which one had to be born with or not have at all.

Nevertheless, he assured them that the world of business had an immense respect for the medical profession. It was the profession above all others in which more was freely given to the public out of the generosity of their hearts and their wisdom and experience than in any other profession in the world. "The fact that large numbers in this land rise up and call you blessed is worth more than money can buy." Many in other walks of life could never expect to see the result of their labours, but the members of the medical profession had the satisfaction in many cases of witnessing the restoration of grateful patients.

He coupled with the toast the name of Dr. Alexander Hall, who, he was sure, would fill the presidential chair with very great distinction. He had heard it said that whoever was President of a body such as this did not really matter because he was so well buttressed by the expert advice and knowledge of permanent officials that he could never put a foot wrong. That was a wrong way of look-

ing at the matter, because when a man of great distinction like Dr. Hall filled the presidential chair he invested it with something of his own personality. They were very proud in Brighton to have Dr. Alexander Hall as President of this great Association, and they were sure that he would bring new lustre to bear upon the position.

The PRESIDENT, in responding to the toast, suitably thanked the proposer, and spoke of his eminence in civic affairs and his recent extensive travels, which had included visits to Russia and to Canada and the United States. Dr. Hall went on to say that the Association, although it was 124 years old, had no geriatric problem of its own. The public were apt to think of them, disregarding their work in scientific medicine, as fully occupied with conditions of service and rates of pay; others confused the Association with the General Medical Council. But the Association was a voluntary body with no statutory powers, though it did maintain its standard of professional conduct. More and more their efforts were directed towards prevention, and it might be that at some future time clinicians would find themselves in a minority.

A Successful Meeting

Many months of strenuous effort had gone into the preparation for the Brighton Meeting. It would be impossible to mention all who had worked for its success, but mention must be made of Dr. John Beynon, honorary secretary of the local executive committee, and of Dr. H. G. McGregor, the science secretary. The executive officer, Mr. G. A. Peck, and the several local sub-secretaries deserved high praise, as well as many friends, both medical and lay. They had had the most loyal co-operation from the officials and other public bodies. From the time the meeting was first mooted three years ago they had been briefed in the most friendly way by Headquarters, from which a steady stream of guidance had come. He mentioned in particular the helpfulness of the Secretary of the Association, Dr. Angus Macrae, the Assistant Secretary, Dr. Walter Hedgcock, and the Editor, Dr. H. A. Clegg. Finally he mentioned the work of Dr. Lamorna Hingston, the hon. secretary of the Ladies' Committee, and the many other ladies who had acted with charm and efficiency. A special debt of gratitude was due from him to his predecessor, Dr. T. C. Routley, from whom he had learned much.

The Guests

The CHAIRMAN OF COUNCIL (Dr. S. Wand) proposed the health of the guests, but before doing so he spoke of the outstanding work of his predecessor in the chair of the Council, Dr. E. A. Gregg. He had served in the chair for a period that had been only twice exceeded in the history of the Association, and both occasions were exceptional. The first was the long chairmanship of the founder, Sir Charles Hastings, and the second instance occurred during the first world war. Dr. Gregg had led them with conspicuous ability, and he felt that in that assembly they should offer thanks to him as had already been done in the Council and in the Representative Body. He also referred to the devotion with which Miss Gregg had assisted her father on social occasions during his chairmanship.

Dr. Wand went on to refer to the honour recently accorded to one who was with them that evening, Sir Tudor Thomas, and who earlier in the day had received the accolade.

Three members of the Association were present that evening who were present when the Association last met in Brighton in 1913. They were Dr. Helen Boyle, Dr. W. Barrington Prowse, and Dr. L. A. Parry. Many of them recalled Dr. Parry's membership of the Council, and it was delightful to meet again one who had given such service to the Association.

Among the guests they welcomed the Mayor of Brighton, without whose help and that of his corporation the arrangements for such a meeting as this would have been impossible. Another notable guest was the Apostolic Delegate, the Most Rev. Gerald O'Hara; yet another was the Ambassador of

the Dominican Republic, H.E. Dr. L. F. Thomen, a medical colleague whom they were very glad to welcome. The guests also included the High Sheriff of Sussex (Colonel Swanston Eeles) and many other notable persons associated with Brighton and the county. To the director of the Royal Pavilion Estate they were specially indebted for the excellent setting of the Representative and scientific meetings. The President had already made reference to the local secretaries, whose work had been magnificent, and to the co-operation of the ladies, but he had omitted to mention Mrs. Hall, who had presided over the Ladies' Committee with such distinction. An unusually large number of delegates were present from overseas. Among those who came from kindred associations in foreign countries he must mention one name, that of Dr. L. A. Hulst, of the World Medical Association. It was a good thing to have this interchange of delegates. Medicine had no national boundaries. It was a universal brotherhood. Among their colleagues from overseas Branches and affiliated associations he must mention Sir Henry Newland, of Australia, Dr. J. H. Struthers, President of the Medical Association of South Africa, and Dr. J. C. McFeely, President of the Irish Medical Association. He extended a warm welcome to all their colleagues and looked forward to meeting them again.

The MAYOR OF BRIGHTON (Alderman Lewis Cohen), in reply, congratulated the Association on the organization of its meeting and the catholicity of its discussions. He referred to the great change which had come over the medical profession and the attitude of the public towards it since the Association last met in Brighton 43 years ago. The profession had wholeheartedly co-operated in the National Health Service, and he hoped to see yet further extensions of medical care.

Sir HENRY NEWLAND, who also responded, said that he was no stranger to Brighton; he was there as long ago as 1889. Later on, in the first world war, he was attached to the Australian General Hospital in Brighton, and now he was here again enjoying the hospitality of the Association. He rejoiced in the spirit which had been manifest throughout that meeting.

Dr. JOHN BEYNON, the local general secretary, and Dr. H. G. MCGREGOR, the science secretary, also briefly acknowledged the compliments which had been paid to them.

ADJOURNED ANNUAL GENERAL MEETING

The Adjourned 124th Annual General Meeting was held in the Dome, Brighton, on the evening of Monday, July 9. A distinguished company assembled under the chairmanship of the retiring President, Dr. T. C. ROUTLEY, who installed his successor, Dr. Alexander Hall, as President of the Association for 1956-7. Among those on the platform were the Mayors of Brighton and Hove.

Dr. Routley said that Dr. Hall needed no introduction to a Sussex gathering. After serving in the first world war as medical officer in the R.A.M.C. in France and Mesopotamia, and engaging in other service abroad after the war had ended, he started in general practice in Hove in 1923. He quickly gained a reputation, and was honoured by his fellow practitioners, whom he served in several executive positions. When the meeting at Brighton was proposed he was chosen by them as worthy of the highest office in the Association, a choice which was ratified by the Council and the Representative Body. Dr. Routley concluded by expressing the hope that during the coming year Dr. Hall would experience as much joy and satisfaction as he himself had done during his year of office. Dr. Hall was then invested with the presidential badge, and Mrs. Hall with the President's lady's badge.

Dr. S. WAND, Chairman of Council, moved a vote of thanks to the retiring President. The past year, he said, had been a memorable one in the annals of the Association, especially for the meeting in Canada, of whose Medical Association Dr. Routley also was president. They were very grateful for the hospitality shown to those of them

who made the journey to Canada last year. He himself first came across Dr. Routley many years ago in Geneva, and admired his gifts of chairmanship, in which he created order out of chaos. He played a very important part in the formation of the World Medical Association. In his own country he had been for many years secretary of the Canadian Medical Association, and his experience of medical affairs was very wide. About ten days ago Dr. and Mrs. Routley celebrated their fortieth wedding anniversary, though no one would think it to look at them. On taking leave of Dr. Routley as President he called upon the meeting to accord him a hearty vote of thanks.

The vote of thanks was enthusiastically given.

Introduction of Delegates and Representatives

The following delegates from kindred associations were then introduced to the President by the Chairman of Council:

Professor Dr. L. A. Hulst (World Medical Association), Dr. A. J. Bedell (American Medical Association), Dr. E. F. Crutchlow (Canadian Medical Association), Professor O. E. R. Abhayaratne (Ceylon Medical Association), H.E. Dr. Luis F. Thomen (Medical Association of the Dominican Republic), Dr. Rudolf Weise (West German Medical Association), Dr. R. K. Bhandari (Indian Medical Association), Dr. P. Noack (Medical Association of Israel), Dr. W. J. Royaards (Royal Netherlands Medical Association), Dr. J. Haffner (Norwegian Medical Association), Dr. J. H. Struthers (Medical Association of South Africa), Dr. V. Manilovic (Union of Medical Societies of Yugoslavia).

The following representatives of Overseas Branches were next introduced:

Dr. W. S. Haynes (Kenya), Dr. A. G. M. Davies (Uganda), Dr. Baden R. Cooke, Dr. B. R. Morey, and Dr. R. R. Winton (New South Wales), Dr. H. W. Horn (Queensland), Dr. E. P. Cherry, Dr. Malcolm Cockburn, and Dr. F. K. Muggford (South Australian), Dr. K. Melville Kelly and Dr. Jean M. Gunson (Tasmanian), Dr. D. A. Carter and Dr. Keith H. Hallam (Victorian), Dr. Ralph H. Crisp (Western Australian), Mr. H. H. Barnett, Mr. A. Perry, and Dr. J. M. Twigg (New Zealand), Dr. K. J. Dunlop (Assam), Mr. A. R. Hodgson (Hong Kong and China), Dr. Mary L. Grove-White, Dr. H. A. Reid, and Dr. Thelma M. Ward (Malaya), Dr. P. Moran and Dr. J. C. McFeely (Branches in the Republic of Ireland), Wing Commander H. B. Kelly (Aden), Dr. W. M. Ford-Robertson (Middle East), Rev. Dr. C. W. Silk (Bahamas), Dr. C. Gun-Munro (Grenada), Mr. N. J. L. Margetson (Leeward Islands).

The Association Prizes were then presented by the President:

Sir Charles Hastings Clinical Prize to Dr. W. A. Brown, of Peterlee, Co. Durham; Charles Oliver Hawthorne Clinical Prize to Dr. T. J. C. Warriner, of Surbiton, Surrey; the Nathaniel Bishop Harman Prize to Mr. T. L. Dormandy, of London; the Stewart Prize to Dr. R. E. Hope Simpson, of Cirencester.

Prizes were presented to the following nurses: Student nurses' first prize, Julie M. Jerrett, Cardiff; second prize, Margaret S. Clay, Lincoln; State-registered nurses working in hospital: first prize, Peggy E. Gowing-Scopes, London; second prize, Arthur Whitehead, Bradford; State-registered nurses working outside hospital: first prize, Margery Hodgkinson, Lewes; second prize, Flora M. Farnsworth, South Petherton, Somerset.

Medical students' prizes: Mr. D. C. Thomas, Trinity College, Dublin; Mr. S. J. Steele, Middlesex Hospital.

President's Address

The PRESIDENT then delivered his address from the chair. It was published in the last issue of the *British Medical Journal*.

Dr. I. D. GRANT, Chairman of the Representative Body, proposed a vote of thanks to the President for an inspiring and stimulating address. The *motif* that had run through the address was the responsibility of the family doctor in the working of the National Health Service. The President

had posed many questions, and to some he had himself given the answer. It was absolutely essential that the general practitioner should take his rightful place in that service. He must never surrender his responsibility. Ultimately the welfare of the patient must lie in his hands.

The vote of thanks was accorded with prolonged applause. The whole company then adjourned to the near-by Royal Pavilion, where members and guests were received by Dr. Pavillon, where members and guests were received by Dr. and Mrs. Hall. At one time the queue waiting to be received must have numbered many hundreds. A marquee had been erected in the gardens, and the floodlighting and the academic robes of many of those present made an animated and colourful spectacle.

RELIGIOUS SERVICES

BISHOP OF CHICHESTER ON SPIRITUAL HEALING

A service for the British Medical Association was held at the parish church of St. Peter, Brighton, on July 10, when the preacher was the Bishop of Chichester, the Rt. Rev. G. K. A. Bell, D.D. Members robed in St. Peter's Church Hall, York Place, and walked in procession to the church. The Mayor of Brighton also attended.

The lessons were read respectively by the Chairman of Council (Dr. S. Wand) and the President of the Association (Dr. Alexander Hall), and among the hymns were "All people that on earth do dwell," "Praise, my soul, the King of Heaven," and the *Te Deum*.

Promotion of Health

The BISHOP OF CHICHESTER, whose text was, "I came that they might have life," asked the congregation to consider certain special ways in which Christ and the doctors, the Church and medicine, had common ground. "I can do so more readily in view of the recent publication of the special committee on divine healing. I should like to pay my tribute to that report as a real step forward."

The most significant development in twentieth-century medicine was the widening of horizons in regard to health and healing. Modern medicine was much more concerned than of old with the promotion of health as opposed to the mere alleviation of disease. It was also to an extent not realized before social in character, dealing with the individual in relation to his social environment. Finally, modern medicine laid greatly increased emphasis on mental, moral, and spiritual factors in human life.

Medicine now treated man as a whole human being. It attacked disease as a revolt against the sound and right order of living. Christ treated the human being as an integrated personality, and when He preached the gospel of the Kingdom He was extending the rule of God over the spiritual and physical alike. With regard to the profoundly social character of modern medicine, they knew now much better than their fathers how greatly environment affected the health of the individual. This was indeed the message of the Bible. The claim for social justice lay at the very heart of the prophetic writings of the Old Testament. Christ spoke of His mission to proclaim release to the captives, the recovery of sight to the blind. He spoke of those who had given food to the hungry and clothes to the naked as inheritors of the kingdom prepared for them from the foundation of the world. Paul continually emphasized the dependence of all members of the body upon one another. The mental, moral, and spiritual factors were now acknowledged to be the common concern of religion and medicine. In a review of the present state of public health as a world problem Dr. Winslow, of the World Health Organization, had pointed to mental and emotional diseases as the basic factors in man's ill-health. The memorandum of the Special Committee of the B.M.A. had pointed out how greatly physical health was influenced by human relations and personal and emotional factors. It was everywhere made clear in the gospels that faith was a condition of health.

"I came," said Christ, "that they might have life, and that they might have it abundantly." The first vital difference between human beings was between those who did not and those who did believe in a creative living God. The first type of people were willing to believe that God created the world, but they took the view that once it was brought into being it was left to itself. In the realm of nature they claimed that every event could be explained in the terms of manifest cause and consequence, and that there could be no intervention from the spiritual world. The second type of people believed not only that God made the world but that He was constantly remaking it, that it was not a system controlled by unchangeable law, but that there was a moral order in the universe with intervention from the spiritual world and unrelenting action against evil.

Healing of Sickness

This great power of God operated through the skill of the medical profession and of nurses, but it operated also through the ministry of religion in what was known as divine healing. The minister of religion must always have as his chief aim the bringing of the whole being of the patient into union with God. The memorandum he had quoted also said that we could not afford, especially in critical illness, to discard any means at our disposal which might lead to restoration. All the functions of the personality reacted upon one another. The Committee itself had mentioned prayer, the laying on of hands, and unction. All these were aimed at the recovery of the patient. They were part of the regular ministry which the Church had used since Christ gave to His disciples the command to heal all manner of diseases and sicknesses in response to faith.

Summing up, Dr. Bell said, "I believe that it is part of the function of the Church of Christ not only to give people comfort in the narrow sense of that word, but also true spiritual ministrations, always in full co-operation with the members of the medical profession. Religion and medicine have been too long divorced. The Church was once afraid of science; let it be so no longer. But neither let scientific medicine be shy of the Church. Science and religion are indispensable for the treatment of any human being as a whole, and each will help the other."

At the end of the service a collection was made for medical charities.

ROMAN CATHOLIC SERVICE

Roman Catholic doctors of the B.M.A. attended Mass at St. Joseph's Church, Brighton, on July 8. The celebrant was Father Leahy, parish priest, assisted by Father Munns.

The APOSTOLIC DELEGATE, the Most Rev. Gerald O'Hara, D.D., preached a sermon on St. Matthew vi. 15-20. It was, he said, indeed fitting that the Catholic members of the B.M.A. should assemble and before the altar of God pray, in the course of their important conference, for His Blessing on the conference so that it would lead to the benefit of all those to whom the medical and surgical professions were called to minister. The eyes of the world were focused on their deliberations, and he hoped that no resolutions would come from these which were at variance with God's Holy Ordinance.

His Grace paid public tribute to the Catholic members of the medical profession in England and throughout the world, because of that spirit of lively faith with which they were upholding, often against opposition, the standards and the law of Christ in that field to which they had dedicated their lives and their talents.

The Catholic doctor never took a materialistic view of the human body on which he exercised his art. He saw in the human body, however loathsome it might appear, the tabernacle of a soul, the temple of the living God, that was destined after life in this world to be united with the soul in Heaven.

To-day, it was necessary to be on guard against the wolves in sheep's clothing referred to in the Gospel. There were

some medical schools and some of the most renowned universities the world over where such were to be found. Operations and treatments were practised which were opposed to the Word of God, which said: "Thou shalt not kill." The Archbishop criticized some of the textbooks which students were compelled to study. One on physiology said that the human ear was such a faulty instrument that a second-class plumber could have devised a better one, thus speaking blasphemy of the Creator. The Catholic doctor knew that he was called on to save life, never to kill or to mutilate unless, as His Holiness the Pope had said, certain operations were necessary.

Science and Religion

The Roman Catholic doctor was the true scientist. He knew that there could never be a conflict between the real truths of science (as distinct from pseudo-science) which had God as their author. Credit must be given to the scientist when he was in his own field and proposed truths about that field. But it often happened that when a scientist acquired world-wide prestige he was asked to give his view about religion and faith, on which he was abysmally ignorant.

The Apostolic Delegate appealed to doctors and surgeons to stay close to the sanctuary. The better Catholics doctors were the deeper their faith, and not only would they be better men, they would be better healers of men. Many a sick man had learned to think of his own soul. Doctors had many opportunities not only to apply the remedies of their profession, but, like priests, of saying the good word which could be like balm to souls.

In giving his blessing to Catholic doctors, His Grace said that the church was proud of them. He knew that they would always be true to the teaching of the faith and would merit the richness of the bounty of God.

The service was followed by a reception at the Royal Pavilion Hotel by invitation of the Sussex Branch of the Guild of SS. Luke, Cosmas and Damian, and a luncheon.

SERVICE FOR JEWISH DOCTORS

On the morning of July 7 a service for Jewish doctors was held in the Middle Street Synagogue, Brighton. The Rev. I. N. Fabricant, minister of the Jewish community in Brighton, welcomed Jewish members of the Association to morning service and gave a brief address on "The Jews and Medicine." The service was followed by a reception in the vestry room.

MEDICINE AND THE CHURCH

BISHOP OF DURHAM ON SPIRITUAL HEALING

There was a large attendance of doctors and clergy for the discussion on "Medicine and the Church" organized by the Churches' Council of Healing in connexion with the Association's Annual Meeting. It was held at the Hotel Metropole, Brighton, on July 6 and was preceded by a reception for doctors and ministers. The principal speakers were the Bishop of Durham (the Rt. Rev. Maurice Harland) and Dr. Mary Esslemont, who was chairman of the committee which prepared the B.M.A.'s evidence to the Archbishops' Commission on Divine Healing.

The BISHOP OF LEWES (the Rt. Rev. Geoffrey Hodgson Warde), who presided, said that it had long been his earnest wish and prayer that the time should be reached when there was a complete partnership between the parish priest or the hospital chaplain and the doctor.

Co-operation Growing

Dr. ESSLEMONT outlined the findings of the B.M.A. Committee and confirmed that there was evidence from all parts of the country that co-operation between doctors and clergy

was growing. She instanced the recent invitations to the Association to send two representatives to the Hospital Chaplains' Conference at Oxford.

Doctors felt it important that clergy and public should understand the ethical rules of the medical profession and the fact that they were designed to keep up the standards of the medical profession, not to protect the practitioner.

To some chaplains who found they were not always welcomed in hospitals, she pointed out that not even general practitioners were always welcomed there. They ought not to blame the hospital staff. The fact was that often general practitioners and visiting clergy visited at a time which was convenient to them, and not at a time convenient to the hospital staff and the patients.

Divine Healing

The BISHOP OF DURHAM announced that the Archbishops' Commission on Divine Healing, of which he is chairman, would not be in a position to publish a report for the next 12 months.

"Spiritual healing" was a term open to grave misconceptions. His lordship preferred "divine healing," which, although not adequate, did imply that healing was divine and that those who were engaged in combating disease and promoting health were continuously trying to do the will of God. He was convinced that any consideration of divine healing which did not fully recognize the work and ministry of the medical profession was false and dangerous.

Dr. Harland believed that our Lord's command, "Heal the sick," was directed to the medical profession, the clergy, and Christians as such—to all three. The Church believed that there were "diversities of gifts" and that those called to the medical profession were consciously or unconsciously obeying the divine vocation. Man was, roughly speaking for convenience, a trinity of body, mind, and spirit—the physical, the mental, and the spiritual—and all three were closely interwoven and subject to disease and illness. His lordship, as a Christian, believed that everything turned upon the right relationship with God and faith in Him, and that the Church's ministry to the sick must be devoted to establishing this relationship.

In his ministry to the sick he always tried to turn their attention away from being obsessed with their illness, and to concentrate upon the loving presence of our Lord, His power and His will, in perfect trust that He was fulfilling in them His purpose and love. He had known persons make a wonderful recovery. Far more remarkable in his experience were those who knew that they would not recover yet were made whole.

The subject of divine healing was large and complex. There were many who claimed to be healers and to be able to cure diseases. How far their claims were true still remained to be seen. As the Bishop saw it, the question was not whether this and that disease could be cured by spiritual ministrations, but how men and women could be brought to the condition in which they were able to receive the power and love which fulfilled their particular and real need. They sought to heal the patient, not primarily the disease. The fact could not be overlooked that man's purpose in this world was to die and so enter eternity. There was a mystery about pain and suffering which could not be understood, especially the suffering of little children and innocent people.

Medicine and the Church, working together, should encourage a dynamic philosophy of health which would enable every citizen to find a way of life based on moral principle and on a sound knowledge of the factors which promoted health and well-being.

Discussion

In reply to a question why the speakers disliked public healing meetings, the Bishop of Durham spoke of the damage done in a parish in which he had been where

there were services advertised: "Faith Healing Mission. Bring your sick to be healed." The people went full of faith; they came back disillusioned. The sort of service which whipped up the emotions could be very impressive, and all knew of cases of people throwing away their crutches and walking off the platform—and being as bad again two hours afterwards. Wholly right and proper, however, were services of divine healing where people came by invitation after being prepared.

Dr. P. W. R. PETRIE said that faith which removed fear helped recovery. He believed that this was a mission of healing not only for the individual but for the community as a whole. Many of the strain-and-stress diseases were due to frustration, because people had no purpose to-day except material ends.

Dr. J. S. NOBLE endorsed, as a general practitioner, the reference to the terrible psychological effects of some of these mumbo-jumbo healing sessions. He also endorsed the value of a partnership between the clergyman and the doctor.

Dr. R. R. WINTON referred to the miracles of our Lord. The BISHOP OF DURHAM replied that the Church had never lost the power of performing miracles.

Rev. C. C. BURNHAM, Heathfield, spoke of his collaboration with a local doctor. Once a week at early celebration they prayed for his patients. In one case in which the doctor and he were concerned a child was said to have only an hour to live. He blessed the child—and the child was still alive. Was faith on the part of the individual necessary? He often prayed and laid hands on people who had no faith at all.

Dr. BERTHA UPTON-JONES, a general practitioner, said that the opposite of love was fear; therefore, if these states were brought on by fear, one could heal by bringing in love again.

In thanking the speakers, Dr. E. E. CLAXTON, Assistant Secretary, B.M.A., said that he was sure that neither Church nor Medicine was satisfied with helping the individual only. He believed that a divided Church was no answer to a divided world.

PROCEEDINGS OF COUNCIL

The last meeting of the retiring Council was held at the Royal Pavilion, Brighton, on July 7, Dr. E. A. GREGG presiding. The meeting was devoted to the clearing up of outstanding business and lasted only one hour, preceding the resumption of the Representative Meeting.

The deaths of two former members of Council, Dr. A. J. Drew, of the West Indies, and Dr. H. B. Morgan, of London, were reported, and letters of condolence to the relatives were authorized.

The names of the several members of the Association upon whom honours have recently been conferred were read and the congratulations of the Council were extended to them.

Correspondence on a proposed review of part-time fees paid by local authorities was laid before the Council, and it was agreed that the matter be pursued further by interview rather than by letter.

A number of matters were left over to the new Council. These included an invitation to the Association to give written evidence to the Maternity Services Committee set up by the Ministry of Health under the chairmanship of Lord Cranbrook to review the present organization of maternity services in England and Wales.

A question arose on the medical membership of hospital administrative bodies, and the recommendation of the Guillebaud Committee that the total number of medical members on a regional board or management committee should not exceed 25% save in quite exceptional circumstances. Mr. LAWRENCE ABEL pointed out that it was important to make sure what proportion of doctors on these committees were chosen by the profession and what proportion were selected by the Government. It was re-

ported that the Joint Consultants Committee would be considering the matter on July 25, and it was decided to invite the Joint Committee to receive representatives of the General Medical Services and Public Health Committees.

Various invitations to appoint delegates to conferences or meetings of kindred associations were considered and in most cases accepted.

Awards in the B.M.A. prize competitions, recommended by the Science Committee, were approved.

Discussion took place, at the instance of Dr. VAUGHAN JONES, on the remuneration of university medical teachers, but was adjourned to the first meeting of the new Council.

The report of the Private Practice Committee, presented by Dr. A. BROWN, with certain recommendations for the amendment of fees for examinations was adopted.

Other reports presented and approved were from the Committee on Medical Education, the Edinburgh Meeting (1959) Steering Committee, the Central Ethical Committee, the Armed Forces Committee (with a draft letter to the Ministry embodying comments on the Waverley report), the Overseas Committee (with a report by Mr. J. L. GILKS, the chairman, on his visit to Malta), the General Medical Services Committee, the Legal Actions Committee, and the Journal, Family Doctor, and Finance Committees.

At the close of the meeting Dr. E. A. GREGG intimated that, having served as chairman for more than the usual term, he did not propose to allow his name to go forward for re-election as Chairman of the new Council. He spoke appreciatively of the kindness and co-operation he had received on all sides.

Widespread regret was expressed at this decision, and several members spoke in terms of high appreciation of Dr. Gregg's exceptional services, their remarks being endorsed by the whole Council.

FIRST MEETING OF NEW COUNCIL

Election of Dr. S. Wand to the Chair

The first meeting of the new Council was held at the Royal Pavilion, Brighton, on July 9, immediately on the conclusion of the Annual Representative Meeting.

Dr. A. BEAUCHAMP proposed the election of Dr. S. Wand as Chairman for the next three years. The nomination was seconded from several places in the Council, and, there being no other nomination, Dr. Wand was unanimously elected amid repeated applause.

Dr. WAND thanked the Council for this extreme honour. When he came to his first Annual Representative Meeting he had never thought the time would come when he would stand in this position. He would do his best, and if his best was not good enough he hoped that members would not hesitate to let him know. He would be very fortunate in Council in having the advice of two distinguished past Chairmen (Dr. H. G. Dain and Dr. E. A. Gregg). He wished to pay a tribute to Dr. Gregg for his past services. He had led them with great wisdom and understanding. He had given his services in the most unselfish way and had earned their admiration, and they would hold him for all time in great affection.

On the motion of Dr. ROBERT FORBES it was resolved to place the Council's appreciation of Dr. Gregg's services in a formal minute.

The Chairman welcomed two new members of Council—Dr. E. A. Gerrard, of Manchester, and Dr. Catherine Harrower, of Glasgow.

The Council then turned to the business of electing its representatives on the Standing Committees, the appointment or reappointment of many Special Committees, and the representation of the Association on outside bodies.

Various Business

The SECRETARY reported that he had arranged that the delegation which was shortly to visit the U.S.S.R. should

take as a present to the Russian Academy of Medical Sciences a gavel and block made from a tree which grew in the garden of Tavistock House, the residence of Charles Dickens, Dickens being a figure well known in Russia.

Dr. J. A. PRIDHAM, chairman of the International Relations Committee, read a letter from Dr. Donslorst, professor of medicine at Belgrade University, who had arrived at the end of the Representative Meeting. It was the first time that such a contact had been formed with Yugoslavia, and it was suggested that the letter should be embodied in the proceedings of Council. It ran as follows:

"As the delegate of the Union of the Medical Societies of Yugoslavia and your guest I have the honour to greet the 124th Annual Meeting of the British Medical Association and to wish you great success in your further work. Connexions between the English and the Yugoslav people during the past two wars, in which we had a common enemy, and the help which we received from you in defence of our liberty and the independence of our citizens we respect and appreciate deeply. We, the doctors of Yugoslavia, as well as all our people, owe special thanks to English doctors, members of your Society, as well as to the other medical workers of England, who gave us help and support in the heaviest hours of our history. Our country wishes to develop and to deepen the friendly connexions between the doctors of our two countries.

"Finally, in the name of all the doctors of Yugoslavia, in the name of the Medical Societies of Yugoslavia, whose secretary I am, in the name of the Serbian Medical Society, whose general secretary I am, and in my own name, I wish all doctors of England, members of your Society, great success in their further work in the advancement of English medicine. The progress of English medicine is of great importance in the development of our medicine, as well as in that of medicine throughout the world."

The Council returned to the subject of the remuneration of university medical teachers—a matter left over from the old Council. Dr. VAUGHAN JONES said that medical teachers wished to be separately represented in negotiations with the University Grants Committee. They did not regard the Association of University Teachers as the appropriate organization to represent them. It was high time they had a permanent negotiating committee. Dr. J. G. M. HAMILTON said that they were under an obligation to take action in this matter. The Council had before it a memorandum dealing with the remuneration of university medical teachers and research workers and a recommendation that it be approved. It was important that any representations they wished to make should be made soon, although the memorandum had not been the subject of detailed consideration in Council. In any approach to the University Grants Committee he suggested that they should be represented by the Chairman of Council and by Mr. Holmes Sellors, chairman of the Central Consultants and Specialists Committee, in addition to five members whom it was proposed should form the deputation. This was agreed to, as also was a motion by Dr. Vaughan Jones that approaches should be made with a view to establishing permanent negotiating machinery on behalf of medical teachers.

Dr. T. C. ROUTLEY, Immediate Past President, said that this was the last occasion on which he would have the opportunity of meeting the Council as one of its members, and he wished to say how greatly he had enjoyed the privilege of sitting on the Council and in the Representative Body. He found the business here handled in very much the same way as it was in Canada. He also expressed his thanks to Sir John McNee, who had stood in for him on many occasions as President when he could not be in this country, and to the Secretary and Editor, who had kept him fully informed of affairs.

The CHAIRMAN thanked Dr. Routley in the name of the Council for his devoted service.

BRITISH MEDICAL GUILD

The meeting of Council was followed by the annual meeting of the trustees of the British Medical Guild, Dr. Wand presiding. Dr. Wand was appointed chairman of the Board, and the other officers and staff and executive

committee were reappointed and the financial statement approved. It was reported that the trustees of the General Medical Services Defence Trust had placed at the disposal of the Guild a sum of £5,000 to be used for assisting the practitioners in Malta in the dispute with their Government. From the Guild Trust Fund, thus augmented, £1,200 had been sent to the defence fund of the Medical Officers' Union of Malta and was gratefully acknowledged. In April agreement was reached between the Government of Malta and the medical profession, and up to the time the agreement was signed it had not been necessary for any part of the £1,200 sent for the assistance of the doctors in Malta to be used.

OVERSEAS CONFERENCE

The Overseas Conference in connexion with the Association's Annual Meeting was held at the Hotel Metropole, Brighton, on July 11, with Mr. J. L. GLKS, chairman of the Overseas Committee, in the chair. The Chairman of Council and the Chairman of the Representative Body attended the Conference.

White Paper on H.M. Overseas Civil Service

Dr. E. GREY-TURNER, Assistant Secretary, referred to the recent White Paper (Cmd. 9768) on the organization of the Overseas Civil Service, an extremely important document for those in Government service in the Colonies. In 1954 an earlier White Paper was published which led to the foundation of H.M. Overseas Civil Service. That was merely a change of name, but still it revealed the direction in which the mind of the Government was moving. The change of name was welcomed by the B.M.A., but a few months ago the Overseas Committee felt that the situation was still obscure and asked for a deputation. It was requested to wait until the Secretary of State had made a statement in Parliament, and in due course the statement was made and the new White Paper was published.

His Committee had a number of comments to make on it, but he would confine himself to one. Good as were the proposals in many respects, they had one major defect: they did not give any reasonable assurance of a full career in medicine overseas. A man might enter the Government service at the age of 28 or 30, and hope to spend his working life in overseas territories, but, with political developments, the country of his choice might suddenly be made self-governing, and he would be out of a job, perhaps with generous compensation, but having lost his career in the middle of his life. The National Health Service made it almost impossible for a doctor from overseas to get a job here, and the White Paper offered no solution to that problem.

Turning to other matters, Dr. Grey-Turner referred to the Malta dispute as the kind of thing that might happen elsewhere. In Malta there were certain circumstances which enabled the doctors to put up a resistance, but it must not be assumed that that would happen in other cases. There were two medical bodies in Malta—the Malta Branch of the B.M.A. and a Medical Officers Union. The latter was able to do things which the B.M.A. could not do, and there were other things which could be done better by the B.M.A., and as the two bodies had an almost identical membership it was a very strong combination. The B.M.A. had been able to help Malta through the British Medical Guild, whose operations he described.

Dr. Grey-Turner circulated to the Conference a list of nine points of procedure to be recommended to overseas Branches in conducting negotiations with their Governments. He drew attention especially to five of them: (1) to take whatever steps were possible to obtain information of any plans that the local Government might have; (2) to ask the Government to receive a deputation; (3) possibly to enlist the support of other professions; (4) to inform the

Government that the profession's views on its plans would be communicated to the public; and (5) to inform the local press.

Changing Conditions Overseas

Dr. A. G. M. DAVIES (Uganda) said that he was instructed by his Branch to pay a tribute to the work of the Overseas Committee and Dr. Grey-Turner. He did not think the answer to the problem raised in the White Paper would ever be produced by Government departments. The position was roughly that there were a large number of doctors who were having to decide whether or not to retire from overseas service at 45 with some chance of getting a job in this country or to go on to 55 with a slightly increased pension and no chance of a job in this country. The White Paper offered a form of limited charity—charity in the sense of pay without work when necessary, and limited in that it stopped at 50 years of age. He thought the conception of a unified service based on this country was an excellent one. He went on to refer to an experiment which was being carried out in Uganda—an arrangement with Great Ormond Street whereby a senior registrar in paediatrics and two nursing sisters went out to Uganda for a two-year period, becoming to all intents and purposes members of the service there, but still technically on the staff of Great Ormond Street. It seemed to him that they might be able to arrange some similar system of seconding with regional hospital boards.

Dr. MARY L. GROVE-WHITE (Malaya) said that it was the opinion of the committee of the Southern Division of her Branch that Headquarters should press the Colonial Office to offer to extend the option of conditions of service similar to those now applied in Nigeria. They should press in particular for an extension of the period of employment. The age of 55 was far too young to contemplate retirement even in tropical countries.

Dr. KEITH HALLAM (Victoria) said that he had been interested in hearing about the short-term service of colonial medical officers. Many of these medical officers came to Australia and found a very happy life and conditions which suited them. There was opportunity in Australia for suited doctors. In Victoria a survey had shown a considerable shortage both in general practice and the public services. The picture might change during the next five or ten years, but there was opportunity at present for middle-aged doctors—men and women aged between 40 and 50—to practise in Australia.

Professor D. E. C. MEKIE (Council) said that doctors were in danger of being offered up on the altar of political expediency. It was not satisfactory for any doctor to know that he could be chucked out of his career in mid-life, even with generous compensation. Until a few years ago a doctor who went into the Colonial Service could be retired at about 50 and then come to this country and make an income. That prospect had been taken away by the introduction of the National Health Service. The whole question of conditions of employment of ex-Service officers in the Colonial Medical Service was critical, and the B.M.A. should if necessary do more than merely make representations to the Colonial Office.

Dr. I. D. GRANT (Chairman of the Representative Body) said that the chance of getting employment in this country even at 35, still less at 45, was very slight. By the method of appointment to general practice and to hospitals here, the average young man found when he qualified that he must on no account lose his place in the queue. If he went away for five or six years, no matter how capable he was, his chances of getting back into the queue were very slender.

Dr. DAVIES (Uganda) pointed out that so far as colonial governments were concerned it was actually to their advantage for it to be difficult for a returning doctor to get a job in this country.

Dr. GREY-TURNER remarked that his Committee had asked to have a representative of the Ministry of Health present at the next deputation to the Colonial Office. In reply to Sir TUDOR THOMAS, he said that the number of members who

were ex-patriate officers in H.M. Civil Service was probably 600 or 800—an important group, but a small number relatively to the overseas membership.

The CHAIRMAN remarked that the fact that this White Paper had been issued indicated that Government departments were not very happy about the conditions.

The Rev. Dr. C. W. SILK (Bahamas) asked whether the White Paper referred to the Bahamas, and went on to describe the peculiar conditions in that colony, where there was a "closed shop," so that if a doctor was out of his present job he would have no right whatever to practise in the Bahamas.

Dr. T. C. ROUTLEY (Canada) spoke of the movement in some quarters towards a whole-time State-salaried medical service. He came from a part of the world where they would never bring in such a service.

Procedure in Conducting Negotiations

The Conference considered the list of recommendations to Overseas Branches in conducting negotiations with their Governments. Dr. MARY GROVE-WHITE (Malaya) said that in Singapore the new Minister of Health decided to set up a Medical Advisory Council to which the Branch made certain nominations, but in the event only one representative of the B.M.A. was chosen. It seemed most desirable in such cases to secure adequate representation of general practice. Dr. P. HARNARAYAN (Trinidad) said that it had been found an advantage in Trinidad to enlist the support of members of the legal profession. He also mentioned that in Trinidad the Minister of Social Services had set up a committee to investigate the working of the National Health Service in Great Britain. They in the B.M.A. Branch had already drawn up a plan under the guidance of their honorary secretary, Dr. J. A. Waterman.

An Australian delegate said that there was a movement in some quarters to put specialists such as radiologists and pathologists on a whole-time salaried basis. If one section of the medical profession was made an entirely salaried service it would not be long before the movement extended to the whole fabric.

Dr. D. P. STEVENSON (Deputy Secretary) said that the major parts of the service in Great Britain were the general-practitioner and hospital service. The hospital service was in the main part-time, and if it was found that the number of whole-time appointments was going up they would continue to do all they could to ensure that the great majority of consultants who were part-time should go on being so if they wished. So far as the general practitioner was concerned, he did not think the Government itself would consider the establishment of a whole-time service. From time to time letters appeared in the *Journal* from young men who desired a whole-time salaried service, but there was no question that the overwhelming majority were against it. The parent body was four-square on this subject, and would resist any attempt to have a whole-time salaried service.

Dr. L. A. GIBBONS (Council) supported what Dr. Stevenson had said. He hoped that in time a Commonwealth Medical Association would be formed.

Dr. GROVE-WHITE (Malaya) said that Malaya was considering resolving itself into an incorporated Branch, probably to be called the Malayan Medical Association.

The question was raised by Dr. DAVIES (Uganda) whether anyone employed in Government service who became secretary of a Branch had the right to speak in public as secretary of the Branch on Government policy. Dr. GREY-TURNER said that there had been one case in which a member had been reprimanded by his Government for his remarks at a former Overseas Conference which were reported in the *Supplement*. One way of overcoming any difficulty in this respect was to ensure that the secretary of the Branch was not in the Government service, but even so with Government officers on a Branch Council it was necessary to walk warily.

Sir HENRY NEWLAND said that under the constitution of Australia the medical profession could not be nationalized.

After the war, the Labour Government then in power brought in a referendum one part of which laid it down that there should be no industrial conscription in any shape or form. The Government introduced a Bill which embodied a whole-time salaried service. The B.M.A. Branch raised an objection, and a test case was brought to court. The verdict of the High Court was that a nationalized profession as proposed by the Government was a form of civil conscription and was against the constitution, and that was why the service in Australia to-day was a voluntary one.

The CHAIRMAN OF COUNCIL (Dr. S. Wand) pointed out that if in some of the overseas Branches the vast majority of members were in a national service it would become increasingly difficult to get a Branch secretary who could speak for the doctors. With regard to the proposal of, for example, Malaya to turn itself into a Federal Council there might be a danger of the Branch becoming more or less hamstrung because its secretary and most of its members were in full-time Government employment. It would thus have difficulty in speaking on behalf of the profession, and Headquarters might have to be informed at a much earlier stage so that if necessary the steps that were taken might emanate from London.

Dr. GROVE-WHITE said that the Government was likely to have more sympathy with a national organization than with a Branch of the B.M.A.

Dr. W. M. FORD-ROBERTSON (Middle East) gave an interesting brief description of the development during the past five years of a Branch in a region full of strong nationalistic feelings. The Middle East Branch, reorganized in 1951, was different from others in that its territory of operation was entirely in foreign lands. It lay in the Arab world of Lebanon, Syria, Iraq, Jordan, and Kuwait on the Persian Gulf. The membership had risen to between 220 and 230. It had been found that meetings taking the form of symposiums, with papers, business discussions, and social events, served best to stimulate interest, and such meetings had been held at Bagdad, Damascus, Kuwait, Teheran, and Beirut. Men from the different countries continued to work together with a common basis of interest and co-operation, and this had been a conspicuous element in the success of the Branch. The "king pin" of the meetings had been the presence of several distinguished medical colleagues from the United Kingdom as guest speakers.

The luncheon to Overseas representatives was held at the Royal Albion Hotel on July 6, when 64 representatives were present. The Chairman of the Representative Body, Dr. I. D. GRANT, welcomed the visitors, and Dr. W. M. FORD-ROBERTSON, of the Middle East Branch, replied. Sir HENRY NEWLAND, a Vice-President of the Association, also spoke.

At the close of the Conference, which was one of the best attended since the series started at the Centenary Meeting of the Association in 1932, the members and other guests were entertained at an "At Home" for overseas visitors given by the Empire Medical Advisory Bureau. The Medical Director of the Bureau, Brigadier H. A. SANDIFORD, received the guests.

Corrections.—In the report of the A.R.M. under the heading "Immigrants with Communicable Diseases" (*Supplement*, July 14, p. 20) it should have been stated that Dr. R. S. Rudland (Coventry) spoke on the question of x rays for immigrants, not Dr. J. Ballantine. The motion under the heading "Air Pollution" (p. 20) moved by Dr. D. S. Robertson (City of Edinburgh) should have been reported as having been carried. In the section of the report under the heading "R.M.O. Examinations" (p. 39) the name of Dr. C. D. Meadowcroft should replace that of Dr. W. Morgan Evans. Under the heading "Domiciliary Consultation Arrangements" (p. 44) the East Herts and Reigate amendment asking "that the Association should press for the payment of domiciliary consultation fees to whole-time consultants without restriction" should have read "... fees to whole-time specialists up to the permitted maximum."

CHRISTIAN MEDICAL FELLOWSHIP BREAKFAST

MAKING MEN WHOLE

The annual breakfast of the Christian Medical Fellowship, which has long been a feature of the Annual Meeting, was held at the Hotel Metropole, Brighton, on July 12, when the chair was taken by Dr. ALEXANDER H. HALL, President of the British Medical Association. The address was given by Dr. D. MARTYN LLOYD-JONES, who spoke on "Medicine and the Whole Man," basing his remarks on the story of the ten lepers who were cleansed, only one of whom turned back and glorified God, and of him it was said, "Thy faith hath made thee whole." A partial idea of man, said Dr. Lloyd-Jones, was often current. But it was now becoming recognized, not by religion only, that the whole man had to be taken into account, and always if that were done he must be considered in his relation to God. As St. Augustine said, "Thou hast made us for Thyself, and our hearts are restless until they rest in Thee." Man was not a mere animal but reflected the life eternal. There was that in man which was always calling out for something bigger, because he had been made by God and for God and could not function without correspondence with his Maker.

Nothing but Christianity could deal with the whole man. That was the peculiar character of the Christian faith. This leper who turned back had something which the others did not possess. They had got rid of their symptoms, but he was made whole. Many members of the medical profession had regarded the Christian Church as a kind of special department of the hospital, much in the same way as they would regard the radiological department. The Church was thought of as offering a type of psychotherapy. He protested against that idea. The Church of the Christian faith could never be a department of medicine. Instead of the State taking over medicine, medicine should be taken over by the Church. The Church was too often thought of as offering some benign institutional aid, as the home of kindness, sympathy, and understanding. It was all that, but it was much more. It existed not merely for the relief of symptoms but for making men whole through faith by reconciliation to God.

"IN BRIGHTON LAST WEEK"

Receptions and Dances

The glories of old Brighton—the Brighton of the Regency, and of an even earlier time when in the eighteenth century the Royal Pavilion, a fabulous palace of domes and minarets, first astonished the Sussex coast—seemed to be revived for some of the social events of the Annual Meeting. After delivering his uncommonly stimulating address last Monday, the President, Dr. ALEXANDER HALL, and Mrs. Hall gave a reception at the Pavilion. This exotic building, with its Oriental architecture, bamboo banisters, and walls and ceilings lavishly painted with a tropical flora, contrasted strikingly with the mediaeval if colourful academic robes worn by many of the guests. On Wednesday the same perfect setting was provided for the civic reception given by the Mayor of Brighton (Alderman Lewis C. Cohen) and Mrs. R. H. Coleman-Cohen, who received many hundreds of guests. It was attended by the President and officers and members of the British Medical Association and their ladies, as well as by a large assembly representative of the public and social life of Brighton and the county. The museum, the art galleries, and the assembly rooms of the Royal Pavilion, and the floodlit gardens made a splendid setting for these memorable occasions, and dancing continued into the night.

While Brighton's claim to be one of the healthiest spots in England is unchallenged, it can surely have few rivals, too, for architectural and natural beauty. Tours to the country-

side north of the city included visits to Lewes and near-by Glynde, the Devil's Dyke, and, further afield, Arundel and the Hastings area. The chalk downs have changed much in appearance since the absence of rabbits allowed the grass to grow tall, though from the distance the contours are seen to give an unchanging shelter to the Domesday villages among them. The main festivities concluded with the B.M.A. supper-dance at the Hotel Metropole, and the Brighton Division earned the congratulations of all who were fortunate to attend this happy function.

Golf Competitions

The Leinster and Childe Cup golf competitions were played on Wednesday, July 11, at the West Sussex Golf Course, Pulborough. The winner of the Leinster Cup was Dr. W. L. James (South-east Essex Division) and of the Childe Cup Dr. P. S. Steen (South Essex Division).

The Notts Ladies' Challenge Cup was played on July 11 at the East Brighton Golf Course. The winner was Mrs. Alexander Hall, of Hove.

The Treasurer's Cup was played on Thursday, July 12, at the West Sussex Golf Course, and was won by Dr. S. H. Martin (Nuneaton and Tamworth Division).

CRICKET

B.M.A. v. LAW SOCIETY

AT HURLINGHAM, JULY 1

B.M.A.	
P. C. Rushton (London Hospital), c. Law, b. Nicholls	34
R. A. M. Case (Birmingham Hospital), c. Sutton-Mattocks, b. Nicholls	44
G. Barwell (Guy's Hospital), b. Nicholls	11
P. Cardew (St. George's Hospital), c. Oakley, b. Wood	79
G. Hill (Charing Cross Hospital), c. Bowcock, b. Williams	5
J. Figueroa (University College), not out	31
G. B. Clarke (Guy's Hospital), b. Bowcock	7
R. Abraham (St. Bartholomew's Hospital), run out	10
Extras	3
Total (for 7 wks declared)	224
E. Keat (Charing Cross Hospital), H. E. R. Chew (London Hospital), and R. Percival (London Hospital) did not bat.	
BOWLING.—Nicholls 3-68; Small 0-36; Wood 1-35; Williams 1-45; Singleton 0-22; Bowcock 1-4; Outhwaite 0-11	

LAW SOCIETY	
G. Williams, run out	4
T. M. Sutton-Mattocks, l.b.w., b. Clarke	32
G. Oakley, c. Chew, b. Clarke	63
D. Small, c. Chew, b. Clarke	11
E. Singleton, c. Chew, b. Clarke	2
S. Mundy, c. and b. Clarke	35
J. Wood, b. Clarke	30
G. Law, not out	13
Extras	4
Total (for 7 wks)	194
B. Bowcock, O. Nicholls, and T. L. Outhwaite did not bat.	
BOWLING.—Chew 0-34; Clarke 6-110; Percival 0-29; Barwell 0-10; Rushton 0-7	

The Minister of Health has approved revised salary scales and conditions of service for administrative and clerical staff. A memorandum (H.M.(56)44), together with a copy of A.C. Circular No. 50, setting out the revised scales agreed by the Administrative and Clerical Staffs Council of the Whitley Councils for the Health Services, has been circulated to hospital authorities. The revised scales take effect from February 1, 1956.

THE REMUNERATION CLAIM

MINISTERS' REJECTION

As stated in the medical press a fortnight ago (*Supplement*, July 7, p. 2), an outline of the case for an adjustment of the betterment factor for general medical practitioners and all grades of hospital medical staff in the National Health Service was recently sent to the Minister of Health and the Secretary of State for Scotland. The full text will be published in next week's issue.

The following reply, dated July 13, has been received by the Secretary of the Negotiating Committee from Sir John Hawton, Permanent Secretary of the Ministry of Health:

Déar Dr. Macrae,—On June 14 you wrote to me, and to the Secretary of the Department of Health for Scotland, enclosing a memorandum outlining the case which the Negotiating Committee wished to present to the Minister and the Secretary of State for Scotland, concerning remuneration.

The memorandum has been submitted to the Ministers.

We are asked by them to say that they do not accept the premises on which the memorandum is based. In their view the remuneration of the medical profession, like that of others, must be determined from time to time in the light of all relevant circumstances. The Ministers have asked us to say that in present circumstances they would not feel justified in giving consideration to any claim for a general increase in medical remuneration. In view of this they feel that the Negotiating Committee may wish to defer sending their proposed deputation at the present time.—

Yours sincerely,

(Signed) JOHN HAWTON.

NEGOTIATING COMMITTEE'S STATEMENT

The following statement has been issued on behalf of the Negotiating Committee:

The doctors of the country will be astonished by the flat rejection of a claim which in justice and logic cannot seriously be challenged. The members of the medical profession have borne without complaint the steady decline in the real value of their incomes during the past five years, even though some of them are suffering hardship, and during recent years have refrained from adding to the Government's difficulties by putting forward a claim. This year the profession was at last driven to request an adjustment. The Minister's curt dismissal of that request will shock the profession, and will be regarded as a poor recognition of the restraint it has shown.

The claim is based on the decline in the value of money since April 1, 1951. The claim is that the remuneration of all members of the medical profession whose case is covered by the two Spens Committees (General Practitioners and Hospital Medical Staffs) should, as at April 1, 1956, be increased by not less than 24%, which is the amount by which their real incomes—taken as a whole—have declined in value since 1951.

The claim in no way runs counter to the recent plea by the Chancellor of the Exchequer for a halt in new wage and salary claims, for the simple reason that the claim is merely one for the implementation of a contractual obligation already in existence and which has been so since 1948. Having entered the National Health Service at the Government's invitation, the medical profession inevitably and for all time thereafter entrusted to the Government the maintenance of its economic status. The discharge of that trust is a responsibility that was undertaken by Parliament and the nation as soon as the National Health Service was established.

The Negotiating Committee is meeting at once to consider the action it must take.

ANSWER TO PARLIAMENTARY QUESTIONS

We print below the reply given by Mr. R. H. Turton, the Minister of Health, to Lieutenant-Colonel Lipton on

Correspondence

Because of heavy pressure on our space, correspondents are asked to keep their letters short.

Improving General Practice

SIR,—The writer of the poignant first leader in *The Times* of July 3 states that the cause of our country's faulty economic trends lies in a discrepancy between the conception on which the economy is based and the structure by which it operates. Basically, the recent article by Dr. J. R. F. Jenkins (*Supplement*, June 16, p. 351), and the observations of your correspondents upon it, draw attention to exactly the same tendency in general practice, and I beg to suggest that the same insidious downward trend in quality of work in this branch of medicine will inevitably follow.

The conception of good general practice, epitomized in the recorded work of the late Sir James Mackenzie, was one in which vision and originality of thought and action played a large part. Translated into present-day conditions, it follows that the practitioner must be in a position to carry out work to the limit of his ability and must have time and adequate encouragement so to do. If financial reward is to encourage this end, then it must be vehemently stated that the capitation fee does not serve this purpose. Breadth of vision and originality cannot be equated with numbers on a list; in fact, large numbers discourage these very traits which have embellished general practice in the past. There is here surely a deep gulf between concept of purpose and structure in practice. It is further confirmed by the fact that proved originality in general practice by published work does not help a man to settle in practice these days; this is probably because ability to maintain or increase a list—rightly or wrongly—not considered necessarily synonymous with such a quality. Furthermore, if it be true that hospitals are intended to serve general practice and not replace it, as this month's *Practitioner* propounds, then it follows logically that recognition of the practitioner, and his being enabled to carry out minor investigations and procedures therein, should be the rule and not the exception.

I submit, Sir, that the same divergence between concept and structure is beginning to pervade general practice just as it is the economics of the country, and in both cases encourages a rigidity which can never lead to progress. Any attempt to improve structure which is inconsistent with the furthering of an envisaged ideal can only be one of symptomatic expediency.—I am, etc.,

Colwyn Bay.

D. S. CRAIG.

Training Scheme for Registrars

SIR,—I view with great concern Professor Alexander Kennedy's suggestion (*Supplement*, July 7, p. 5) for overcoming the shortage of psychiatrists, for the following reasons.

(1) The shortage is more apparent than real. At the present time it is by no means certain that experienced S.H.M.O.s and senior registrars who have been in psychiatry for seven or more years will obtain consultant appointments, unless the Government greatly increases the consultant establishment, which is most unlikely. There is no doubt that the mental health of the country demands such an increase. However, public opinion does not yet fully recognize it, and, even if it did, the economy of the nation could not support such an increase, either now or in the near future.

(2) Although there are notable exceptions, the majority of those who have a training in general medicine, paediatrics, and especially neurology are quite unsuited temperamentally to become psychiatrists. The practice of good clinical psychiatry is primarily dependent on the ability to develop "empathy" with patients, which can only be done by those whose own personalities are sufficiently flexible to accept the

insights of analytic psychiatry, whether Freudian, Jungian, Sullivan, etc. Disappointed physicians and neurologists usually possess a resistance to such concepts which could only be overcome by a training analysis. A practical impossibility.

(3) The possession of widespread experience in other specialties in no way justifies shortening the period of training required. I would almost suggest that it requires a lengthening of training in order to overcome the "organic" prejudices of the other specialties. The possession of an M.R.C.P. sometimes constitutes a stumbling-block to the practice of good psychiatry. The present tendency of boards to demand the possession of such a degree is as irrational as expecting all physicians to have the D.P.M. Dynamic psychiatry, and in particular the work of John Bowlby² and Spitz,³ has perhaps suggested that a knowledge of personality development is of more value to the physician than is the knowledge of obscure biochemistry or advanced medicine to the clinical psychiatrist.

Psychiatry is a specialty in its own right, and, rather than general medicine providing a good basis for the practice of psychiatry, I suggest that dynamic psychiatry is the basis of good medicine. Physical methods of treatment, including the latest batch of tranquillizers, are quite secondary in importance to an analytic approach. They are useful, but only as a means of facilitating empathy and psychotherapy in its widest sense. Seven years in psychiatry, including two years in North America, only confirm my opinion that, however valuable an organic approach may be, it is no substitute for an approach based on an integration of the great analytic schools and learning theory, whether one's work is in the so-called back wards or in acute neurosis units.—I am, etc.,

Wakefield.

HUMPHREY B. KIDD.

REFERENCES

- ¹ Mullahy, P., *Contributions of H. S. Sullivan*, 1952, p. 27. New York.
- ² Bowlby, J., *Maternal Care and Mental Health*, 1951. W.H.O., Geneva.
- ³ Spitz, R., "Infantile Depression and the General Adaptation Syndrome," in *Depression*, edited by P. H. Hoch and J. Zubin, 1954. Grune and Stratton, New York.

Return of Goodwill

SIR,—If one takes notice of recent letters published in the *Supplement*, it is clear that frustration, discontent, and hardship are becoming commonplace in general practice. The grumbles can be briefly summarized as follows: (1) the farce of a 1948 compensation figure not tied to the prevailing value of the pound (what would our private fees have been now in comparison with 1948?); (2) the niggardly interest rate given on our compensation; (3) the heartbreaking pension figures afforded to those who were middle-aged at the inception of the Service; (4) the utter frustration at the loss of freedom of movement; (5) the difficulty of entry of the younger man into general practice.

To all these complaints I would add yet a further injustice—the complete absence of financial value put upon experience. A young man who is lucky enough to be allocated a practice immediately starts at the same income level as his fellow G.P. with the same-sized practice but who has been in practice for 15 to 30 years or more. Surely this is an utter farce. It is difficult to imagine any other profession or trade which would tolerate this state of affairs. Perhaps this anomaly is the one and only point in favour of a salaried service—one would at least (we hope) receive increments of pay for length of service.

But the most frustrating factor of all is the loss of freedom of movement. In the "bad old days" of ownership of goodwill, an ageing G.P. in a busy industrial practice would "sell out" and buy a less arduous, albeit less remunerative, practice in surroundings more congenial and kinder to his and his family's health. This system had the twofold advantage of creating advertised openings for the younger man who was prepared to take on a busy (and remunerative) practice, and at the same time allowing the older man to "get out," and scale down the tempo of his work. In addition, the incoming doctor had the advantage

of a few months' introduction to his practice by the vendor. To-day, in a nutshell, the younger man cannot "get in" and the older man cannot "get out." All that the ageing man can do to ease his work is to take in a partner at the cost of a third to a half of his income and continue to live in the same place.

It is indeed a solemn thought for the young G.P., who has no compensation at stake and who has just started in practice, that he will, most probably, live and work in the same place for the rest of his days, and that at the end of his working life he will be in receipt of approximately the same income as the day he started. The only possible answer to this frustrating state of affairs lies in the return of the right to buy and sell our practices once again. It is utter nonsense to talk of the "buying and selling of souls." There is a world of difference between the "old-fashioned" idea of an introduction by a vendor to his successor and the present impersonal system of executive council vacancy advertisement (in many of which neither house nor surgery premises are available). The sooner goodwill is returned the better for all—young and old.

But, alas, this is only just one more letter to the *Journal* bellyaching about our complaints. There have been many before, and undoubtedly there will be many to follow. The important point is this: just how many of us does a letter such as this truly represent? If it represents the majority of us in general practice, then strong and resolute action is called for. Many, far too many, high-sounding words about the abstract idealism of medicine have been written in the past in the *Journal*; much, far too much, has been written in consideration of our patients. It is high time for charity to begin at home and to consider our own lives, our wives, and families before it is too late. It is essential for us to become realists in thought and action if we are not to become abject automatons without any will, life, or future of our own.

And who is to assess whether all these letters to the *Journal* are just the outbursts of a minority of frustrated cranks or whether they are genuinely representative of a cross-section of G.P.s as a whole? It is quite plainly the B.M.A.'s duty to investigate and to find out just how deep is this discontent and frustration in general practice to-day. The B.M.A. alone has the facilities to carry out such an investigation. This could be achieved by a questionnaire sent out to all those in practice. This should be very simple and to the point. Because it is from the loss of goodwill that all the evils I have mentioned above arise, there should be one question only: "Are you in favour of the restoration of the right to buy and sell practices?" If such a questionnaire shows that we are solid in our demand for reform, then the B.M.A. must act for us in a strong, forthright, and uncompromising manner. With the assurance of adequate backing from the main mass of G.P.s it should not be beyond the powers of our representatives and leaders to present a cast-iron demand on our behalf.

Should this plea for a lead—i.e., a questionnaire—fail, then we must remember that it is still in our hands, should we wish it, to put formal resolutions for such an inquiry through our various Divisions. Apathy, apart from converting us into prematurely aged paupers, will get us nowhere.—I am, etc.,

Glossop, Derbyshire.

H. M. R. WADDELL.

Economical Administration?

SIR,—Each political party assures the electorate that it wishes the nation to have a first-class health service. One might thus assume that the voters supporting these parties would try to see that the service is economically run and that no restrictions on effort put up its cost or reduced its efficiency.

Would it not be useful to have the proportions of clerks, porters, telephonists, and other lay personnel related to the number of doctors and nurses employed, these figures to be published regularly? Was it necessary, when the Service

Monday, July 16, who asked the Minister of Health on what grounds he refused to disclose the increases in doctors' pay asked for by the British Medical Association.

Mr. TURTON: Because, so far, there has been no claim published by the profession. The communication on this subject has only been in the form of a preliminary memorandum sent to my Department and to that of my right hon. Friend the Secretary of State for Scotland. To this a reply has now been sent stating that, in the present circumstances, my right hon. Friend and I would not feel justified in giving consideration to any claim for a general increase in medical remuneration.

Lieutenant-Colonel LIPTON: Before we can decide whether that reply was justified or not, can we not be told what the doctors asked for? Why all this secrecy? If trade unionists want something the whole world knows about it; why cannot we be told what the doctors want?

Mr. TURTON: There has been no claim published by the profession. As I said last week, I must act in accordance with what I believe is the proper procedure in this matter, and not anticipate publication when I have received what is in fact only a draft memorandum.

Lieutenant-Colonel LIPTON: In view of the unsatisfactory nature of the reply, I beg to give notice that I will raise the matter again.

MEDICAL ETHICS

INDIRECT METHODS OF ADVERTISING

At the Annual Representative Meeting at Brighton Dr. ROBERT FORBES, chairman of the Central Ethical Committee, presenting the Council's report under "Medical Ethics" (*Supplement*, July 14, p. 39), moved the approval of the Report on Indirect Methods of Advertising which formed Appendix V of the Annual Report of Council. The motion was carried. Dr. Forbes then went on to move the recommendation that the following paragraph be inserted after para. 14 (v) of the report which lays down the general rule of anonymity for practitioners appearing in "sound" or "visual" broadcasting programmes:

There may be exceptional circumstances when a departure from the foregoing rule is justified—for example, when a practitioner broadcasts in an official capacity on medico-political matters of national interest.

After Dr. Forbes had spoken to the recommendation Mr. J. C. GIBSON-MOORE (Hendon) moved as an amendment that the policy of the Association as expressed in the resolution by the Representative Body in 1951 be reaffirmed. After a discussion the Hendon amendment was carried, which meant that the recommendation moved by Dr. Forbes on behalf of the Council was negated.

The wording of the report in the *Supplement* on this part of the proceedings of the Representative Meeting made it appear as if the recommendation was carried.

HOSPITALITY

A French doctor's son would like to spend 6 to 8 months as a paying guest with a medical family living near London or Cambridge. A French doctor's daughter, aged 14, would like to spend one month by the sea with a medical family in this country on an exchange basis. The British girl would stay partly in Paris and partly by the sea.

A Danish doctor's son, aged 17, would like to arrange a holiday exchange of 4 to 6 weeks with a British doctor's son in July.

A Yugoslav medical student, aged 20, would like to arrange a holiday exchange with a British student living in the vicinity of London.

Would anyone interested please get into touch with Brigadier H. A. Sandiford, International Medical Visitors Bureau, B.M.A. House, Tavistock Square, London, W.C.1.

began, to double, treble, or even quadruple certain categories of the former?

One might assume that a ward sister, charged with observation of the sick, might easily deal with less serious matters. But one, in a teaching hospital, tells me that she cannot be entrusted with spare electric bulbs or curtain hooks for the ward. I just wonder what restrictive practices lie behind this. Is it really necessary, as she informs me, for two men to appear to change a bulb which she could do herself from a stock held on her account?

If this is a union rule, does the union defend a procedure putting up the cost of the Service and do the politicians condone it? It seems a small matter, but does it not indicate much more waste of public money?—I am, etc.,

Hitchin.

G. C. PETHER.

B.M.A. LIBRARY

The Library service is available to all members of the Association resident in Great Britain and Northern Ireland (and by special arrangement to members of the Irish Medical Association). A copy of the Library Rules will be forwarded on application to the Librarian at B.M.A. House.

The following books have been added to the Library:

- Hig, F. L., and Ames, L. B.: *Child Behavior*. 1955.
Joseph, H., and Zern, G.: *Emotional Problems of Children*. 1954.
Keefer, C. S., and Leard, S. E.: *Prolonged and Perplexing Fevers*. 1955.
Keeney, E. L.: *Practical Medical Mycology*. 1955.
Kirk, P. H., and Sternberg, E. D.: *Doctors' Offices and Clinics: Medical and Dental*. 1955.
Lewis, R. W.: *Joints of the Extremities: A Radiographic Study*. 1955.
Long, R. H.: *The Physician and the Law*. 1955.
Marfatia, J. C.: *Behaviour Problems of Children*. 1956.
Masserman, J. H.: *Practice of Dynamic Psychiatry*. 1955.
Morgan, A. H.: *Kinships of Animals and Man: A Textbook of Animal Biology*. 1955.
Moseley, H. F. (Editor): *Textbook of Surgery*. Second edition. 1955.
Proudfit, F. T., and Robinson, C. H.: *Nutrition and Diet Therapy*. Eleventh edition. 1955.
Pryor, W. J.: *Manual of Anaesthetic Techniques*. 1956.
Roberts' Nutrition Work with Children. Third edition by Ethel Austin Martin. 1954.
Roche, A. E.: *Practical Urology: Case-comments and Late Results*. 1956.
Soddy, K. (Editor): *Mental Health and Infant Development*. Vol. I. Papers and Discussions. Vol. II. Case Histories. 1955.
Spivack, J. L.: *Surgical Technic of Abdominal Operations*. Fifth edition. 1955.
Stutz, E., and Vieten, H.: *Die Bronchographie*. 1955.
Thorne, F. C.: *Principles of Psychological Examining*. 1955.
Virtue, R. W.: *Hypothermic Anesthesia*. 1955.
Weil, P. G.: *Hypotension, Shock and Circulatory Failure*. 1955.
Zoethout, W. D., and Tuttle, W. W.: *Textbook of Physiology*. Twelfth edition. 1955.

H.M. Forces Appointments

ROYAL NAVY

Surgeon Commander W. G. C. Fitzpatrick has retired.

ROYAL NAVAL VOLUNTEER RESERVE

Surgeon Captain J. V. Williams, Q.H.P., has retired.

Surgeon Lieutenant G. L. Bolt to be Surgeon Lieutenant-Commander.

ROYAL ARMY MEDICAL CORPS

Captains J. Thompson and N. C. Rogers to be Majors.

REGULAR ARMY RESERVE OF OFFICERS

Major-General W. E. Tyndall, C.B., C.B.E., M.C., late R.A.M.C., having attained the age limit of liability to recall, has ceased to belong to the R.A.R.O.

ROYAL ARMY MEDICAL CORPS

Lieutenant-Colonel (Acting Colonel) E. M. Elmhirst, T.D., from A.E.R.O., to be Lieutenant-Colonel, and has been granted the honorary rank of Colonel.

Major W. R. Cunningham, E.R.D., having attained the age limit of liability to recall, has ceased to belong to the R.A.R.O., retaining the rank of Major.

ARMY EMERGENCY RESERVE OF OFFICERS

ROYAL ARMY MEDICAL CORPS

Lieutenant-Colonel H. K. Meller, M.B.E., T.D., has been granted the acting rank of Colonel.

Captain (Acting Major) L. J. Rubinstein, from A.E.R.O., National Service list, to be Captain, retaining the acting rank of Major.

Association Notices

Diary of Central Meetings

JULY

- 23 Mon. Staff Side, General Whitley Council (at 14, Russell Square, W.C.), 10.30 a.m.
23 Mon. Full General Whitley Council (at 14, Russell Square, W.C.), 2.30 p.m.
24 Tues. Staff Side, Committee B, Medical Whitley Council, 10.30 a.m.
24 Tues. Chest Services Subcommittee, Central Consultants and Specialists Committee, 2 p.m.
24 Tues. Full Committee B, Medical Whitley Council (at 14, Russell Square, London, W.C.), 2.30 p.m.
24 Tues. Medical Whitley Council (at 14, Russell Square, London, W.C.), 2.30 p.m.
25 Wed. Joint Consultants Committee (at Royal College of Surgeons of England, Lincoln's Inn Fields, W.C.), 10.30 a.m.

Branch and Division Meetings to be Held

DORSET DIVISION.—At Digby Hotel, Sherborne, Tuesday, July 24, dinner for members and their ladies.

NORTH-EAST SUFFOLK DIVISION.—At Wherry Hotel, Oulton Broad, Thursday, July 26, 7.45 for 8 p.m., dinner and presentation to Dr. S. B. Hughes.

NORTH OF ENGLAND BRANCH.—At Northumberland Golf Club, High Gosforth Park, Thursday, July 26, 12 noon, annual meeting; 1 p.m., lunch.

SOUTH MIDDLESEX DIVISION.—At Casino Hotel, Tagg's Island, Monday, July 23, 9 p.m., meeting.

WEMBLEY DIVISION.—On Wednesday, July 25, 2.30 p.m., visit to Wander Factory and Ovaltine Farms, King's Langley, Herts. Friends and children invited.

Meetings of Branches and Divisions

BOLTON DIVISION

The annual meeting was held on May 25 in the Victoria Hotel. Nine members were present. The following officers were elected:

Chairman.—Dr. E. P. Johnson.

Vice-chairman.—Dr. I. Affleck.

Secretary and Treasurer.—Dr. M. S. Rowley.

CHELSEA AND FULHAM DIVISION

The annual general meeting was held on June 1 at Fulham Town Hall. Lieutenant-Colonel W. L. Harnett took the chair and 12 members were present. The following officers were elected:

Chairman.—Lieutenant-Colonel W. L. Harnett.

Vice-chairman.—Dr. C. Watney Roe.

Joint Honorary Secretaries.—Drs. C. Watney Roe and D. J. Thomas.

A motion was formulated: "That some of the candidates for election to the G.M.C. sponsored by the B.M.A. should be considerably below the present average age."

DORSET DIVISION

A meeting was held at the Chest Clinic, Dorchester, on May 25. Dr. T. V. Cooper was in the chair and 19 members were present. Dr. D. G. Vulliamy gave a talk on "Enuresis."

EAST YORKSHIRE BRANCH

The annual general meeting was held on May 9. The following officers were elected:

President.—Dr. I. G. Innes.

President-elect.—Dr. L. Bellman.

Immediate Past President.—Mr. G. Griffith.

Vice-president.—Dr. C. Groves.

Honorary Secretary and Treasurer.—Dr. K. W. Beetham.

FOLKESTONE AND DOVER DIVISION

A general meeting was held on May 25 at the Esplanade Hotel. Six members were present, and Dr. Broatch was in the chair.

GLASGOW DIVISION

The annual meeting was held in the Glasgow Regional Office on March 23. Mr. John Dunbar was in the chair, and 63 members were present. The following officers were elected:

Chairman.—Mr. John Dunbar.

Vice-chairmen.—Drs. J. S. McL. Ord, Wm. S. Gardner, and J. Inglis Cameron.

Honorary Secretary.—Dr. J. Baird Forrester.

Deputy Secretary and Honorary Treasurer.—Dr. M. M. Garrey.

MOMBASA DIVISION

A meeting was held at the Pandya Memorial Clinic on May 25. Mr. C. J. Patel was in the chair, and nine members were present.

SUPPLEMENT TO THE BRITISH MEDICAL JOURNAL

LONDON SATURDAY AUGUST 4 1956

CONTENTS

Report on Health Centres -	89	Public Health Medical Officers -	92
General Medical Council -	91	Correspondence -	93
Remuneration Claim -	92	Association Notices -	96

REPORT ON HEALTH CENTRES

LONDON LOCAL MEDICAL COMMITTEE'S STUDY

Describing it as "a modest first instalment of this study" the London Local Medical Committee has sent a report on the health centres to the London Executive Council for forwarding to the London County Council. The report, which is based on information obtained on four health centres (Woodberry Down, London; Harold Hill, Essex; John Ryle, Clifton, Nottingham; and William Budd, Bristol) and a group practice of three partners working in a Victorian building converted by the group into a practice centre. The committee gives its conclusions on the facts as it sees them.

Salient Features

The report summarizes the committee's observations on the salient features of the four centres and the group practice studied.

Relation to New Housing Estates.—In each case the health centres were planned in relation to a new housing estate. At Nottingham the centre was opened by the time 10% of the houses were built, but at London, Harold Hill, and Bristol not until after the estate was completed (at Bristol, long after). The group practice premises are the site of an old-established practice in an area long completely built up.

Accommodation.—The number of G.P. suites varies—six at Bristol and London, four at Nottingham, three at Harold Hill, and two in the group practice. Each suite consists of consulting-, examination-, and waiting-rooms, except at the group practice, where a waiting-room is shared between the two suites (most of the patients are seen by appointment).

Ancillary Help.—This appears to be adequate and satisfactory in all health centres except Nottingham, where it is minimal. In the group practice the staff might well suffice for double the number of doctors and patients.

Partnership.—In two of the health centres some of the doctors are in partnership with each other, in the other two they are all in competition. Broadly speaking, in all the health centres the doctors practise independently of each other. In the group practice all three doctors are in partnership.

Other Surgeries.—All the health centres are branch surgeries; the group practice is the only surgery for the group.

Local Authority Services.—There is accommodation for these in all the health centres. In Bristol the local authority uses the general-practitioner suites; in Nottingham the accommodation is minimal; in London it is lavish. There is no local authority accommodation in the group practice premises, but the doctors hold an antenatal clinic for their own patients every week. They also give advice on infant welfare, although at the moment they do not have a fixed session for this.

Capital Costs.—Comparison of costs is influenced by certain facts. The health centres have all been built since 1948: the group practice premises are a converted Victorian house. Bristol

and Nottingham centres are housed temporarily in their present buildings: London and Harold Hill centres are permanent. In Bristol the same premises are used by the general practitioners and the local health authority, and the cost of the general-practitioner unit is the cost of the whole building.

The capital costs of the general-practitioner units are set out in the following table.

	Cost of G.P. Unit	Cost per Suite	Cost per Doctor
London	£ 57,000	£ 9,500	£ 9,500
Harold Hill	15,000	5,000	1,666
Nottingham	6,000	1,500	1,500
Bristol	16,000	2,666	1,777
Group practice	7,500	3,750	2,500

Running Costs.—The running costs per annum are compared in the following table:

	Cost of whole G.P. Unit	Cost per Suite	Cost for each Doctor	Cost to each Doctor	Cost per Attendance
London	£ 5,850	£ 975	£ 975	£ 350	s. d. 4 4
Harold Hill	4,200	1,400	466	111	4 11
Nottingham	1,400	350	350	104	2 9
Bristol	6,700	1,116	766	100	4 0
Group practice	2,900	1,450	966	966	3 0

NOTES: Cost to Each Doctor.—In all the health centres this is the cost for a branch surgery, and the doctors have other surgeries to pay for; in the group practice this is the only surgery.

Cost per Attendance.—There are no nurses at Nottingham; this lowers the cost per attendance both by increasing the number of times the doctors see patients and by the absence of nurses' salaries from the total running costs. At Harold Hill the higher figure appears to be due solely to the fact that the doctors do not attend daily.

Five Major Issues

The report refers to five major issues raised by the Minister of Health in a letter to the London County Council on the future of health centres. These are (1) reduction of capital cost; (2) association of general medical and local authority services; (3) restriction to areas of large-scale housing development; (4) reservation of sites for health centres; (5) group practice loans as an alternative to the provision of health centres.

Reduction of Capital Costs

The committee agrees that a large reduction in capital cost could and should be made. Making full use of the

rooms provided would be the most important step towards economy. For a G.P. suite to be used for approximately six hours a week is a waste of expenditure. The committee does not think that it would be possible in all cases for doctors to close their outside surgeries and practise solely from a health centre, but a doctor in a centre should expect to have a regular morning and evening surgery. Moreover, if two doctors using a health centre were in partnership they could use the same suite of rooms at different times, at all events in the mornings. Another economy in use of rooms would be effected if the G.P. suites were used for local authority clinics in the afternoons.

Association Between Local Authority M.O.s and G.P.s

The committee considers that the assumption that when two services are housed in the same building there will be co-operation between them automatically is fallacious. In the committee's view the essence of co-operation is to see that the same patient does not receive advice on treatment and advice on prevention which are contradictory, and the best way to achieve this is for the advice in both cases to be given by the same doctor.

The report goes on to say: "We think, therefore, that all general practitioners who wish to do so should hold infant welfare clinics for their own patients, at which they would be assisted by health visitors. We see no reason why these clinics should not be held in the general-practitioner suites of health centres, as they are in Bristol, but we consider that the right to hold them there should not be restricted to the doctors who practise from the centres, as it is in Bristol."

Co-operation between general practitioners who do not wish to undertake all personal health services for their patients and the local authority doctors who do this work for them, the committee states, is essentially a matter of personal contact rather than architectural planning.

Siting of Health Centres

The committee disagrees with the Minister's view, expressed in his letter to the L.C.C., that appropriate conditions for the provision of health centres exist only in areas of large-scale housing developments. In its view conditions are also appropriate where there are no suitable premises or premises that can be made suitable. This definition includes (1) certain built-up areas, and (2) areas of large-scale housing development where there are no premises at all. These latter areas are of two types: (a) new housing estates, and (b) areas of large-scale rebuilding. Different considerations apply to the two types.

New housing estates take several years to build. It would be wasteful of medical manpower to introduce, say, four doctors when at first one only was needed, let alone the great difficulty that each doctor would have in making a living. On the other hand, if doctors were introduced into the health centre as the need arose (1 for each 2,500 is the figure accepted by the Medical Practices Committee) other difficulties would arise. The doctor who started first would have an advantage over his colleagues who follow. Would they all pay the same rent?

Furthermore, while the committee does not regard it as essential that all the doctors working in a centre should be in partnership, it thinks it essential that those who use the same suite should be, since full use cannot be made of the room space unless each suite is occupied by more than one doctor. It follows that the doctor who first occupies the suite must be free to choose the partner to share it with him, and to benefit from being the senior partner. Thus some of the doctors starting practice on a new estate would benefit much more than others.

In areas of large-scale rebuilding in already built-up districts these problems would not arise. In these areas there would be established practitioners who would be losing their existing surgeries, and, if there were enough of them willing to enter a health centre and willing to co-operate, the committee thinks that a health centre could well be established.

Reservation of Sites

The only feasible way, in the committee's opinion, of solving the difficulty of sites reserved for health centres lying unused for years is by adopting what it describes as "the Nottingham plan in reverse." The Nottingham health centre was built with a view to its being converted into dwelling-houses if it was no longer required for its original purpose. In reverse, the committee suggests that the ground floor of a block of flats might be so built that the flats could be converted into health centre suites if required in future.

Group Practice versus Health Centres

In the committee's view the purpose of health centres is to achieve: (1) adequate and suitable premises for doctors to work in; (2) provision of ancillary help—nursing, clerical, etc.—to relieve doctors of work which others can do equally well; (3) bringing together general practice and preventive medicine; and (4) accommodation for several doctors to work in the same building, and to co-operate and consult together.

How far, it asks, are these purposes achieved by health centres on the one hand and group practice premises on the other? As regards premises the health centre is more costly, but probably better adapted. Ancillary help is provided in both. But in a group practice the doctors do not have the assistance of midwives and health visitors, which, the committee thinks, is wrong. As for co-operation between doctors, the committee believes that the fullest co-operation and consultation will only be achieved if they are in partnership, and in this respect the group practice is superior to the health centre. The committee summarizes its views as follows:

Group practice premises start with the doctors, nearly always in partnership, and proceed to the site and the building. Health centres start with the site and the building, and then attempt to bring in the doctors. Group practices give a more flexible approach, and much less costly results, but the local health authority is excluded from the picture. We think this is a most unfortunate result, and we hold that there is an urgent need for the erection in London of other health centres of modest proportions, where, if possible, all the doctors would be in partnership, and where they would provide preventive as well as curative services for their patients, with the co-operation of health visitors and midwives.

Attitude of Patients

The committee finds that so far patients have not shown any preference for the health centre as against the private surgery, yet the success of group practices disproves the theory that patients so prefer one doctor's private surgery that they will never take to a health centre or any other type of large central surgery. Why, the committee asks, has the group practice which it studied been more successful than any of the four health centres? The answer, it concludes, is that the patients of the group practice are receiving a better service—in the form of extended hours of consultation, in the use of an appointment system, and in infant welfare and antenatal care, all from the same three doctors—than is available at any of the four health centres. But the committee sees no reason why a group of doctors in partnership should not provide an equally good service at a health centre. Until patients have received the full services which a health centre could provide no one can say what their attitude would be to it.

The committee's main general conclusion is that up till now too much attention has been paid to buildings and too little to the people who work in them and to the people who use them.

Recommendations

The report concludes with the following recommendations:

- (1) That the initial cost of health centres should be greatly reduced.
- (2) That the scheme for the reservation of sites suggested in the report be explored by the London County Council, and, if found practicable, be immediately extended to the whole country.

(3) That health centres of modest proportions be erected as soon as possible.

(4) That doctors working in a health centre should be consulted on the appointment of their ancillary staff.

(5) That the London County Council should make available the services of health visitors at all group practices and to all other general practitioners, as far as possible, to assist in providing personal health services for their patients.

(6) That the London County Council, the London Executive Council, and the London Local Medical Committee should take steps to foster and increase co-operation between general practice and preventive medicine.

GENERAL MEDICAL COUNCIL MEDICAL DISCIPLINARY COMMITTEE

A session of the Medical Disciplinary Committee of the General Medical Council was held on July 17 and 18, under the chairmanship of Professor Sir DAVID CAMPBELL.

The case of DAVID PHILIP LEWIS-BEDGETT, registered as of Mossley, Manchester, was called on the ground of a conviction at Loughborough magistrates' court in 1951 of being in charge of a motor-car when under the influence of drink or drugs, and a similar conviction at Lancashire county quarter sessions in 1955 of being in charge of a county motor vehicle when under the influence of drink, on which later occasion he had been fined £100 and disqualified from driving for three years. The respondent did not appear before the Committee, but a letter was read from his doctor stating that he was ill and quite unfit to travel to London, and in view of the nature of the inquiry he would like to and be present in person when the case was heard. The Committee agreed to postpone the case to the next sessions.

The Committee considered a case in which judgment had been postponed in May, 1954, May, 1955, and May, 1956, against WILLIAM FRANK CRUICKSHANK, registered as of West-muir, Brechin, Angus, concerning whom it had been found that he had been convicted in 1954 at Coventry of being drunk and disorderly; that on frequent occasions from December, 1952, to February, 1953, he had failed without reasonable cause to attend at his surgery at Brechin during consulting hours or to make any arrangements for the treatment of patients attending his surgery, and that in three named cases he had failed without reasonable cause to visit or treat patients when their condition so required, and for whose treatment he was responsible under the National Health Service, in spite of requests that he should do so. In May, 1956, after two postponements of judgment, the Committee was informed that in January of that year Dr. Cruickshank had been convicted at Marylebone magistrates' court of driving a motor-car when under the influence of drink and had been fined £15, disqualified for driving for 12 months, and ordered to pay ten guineas costs.

Dr. Cruickshank was present, but not legally represented. He addressed the Committee and expressed his great regret, and spoke of his hopes for his establishment in practice in London.

The Chairman said that the Committee had decided to give him a further opportunity of considering his conduct, and to postpone judgment again for a year, until May, 1957. At that time he would be required to furnish the names of professional colleagues who would be prepared to testify from their knowledge as to his conduct in the interval.

Alleged Canvassing

The Committee considered the case of CORNELIUS O'BRIEN, registered as of Walton Breck Road, Liverpool, 4, M.B., B.Ch. 1943, N.U.Irel., who appeared on the charge that, between September, 1954, and April, 1955, he had canvassed persons living in the Millpark Estate, Eastham, Cheshire, with a view to persuading them to become his patients, and that in relation to the facts alleged he had been guilty of infamous conduct in a professional respect.

The complaint was presented by Mr. E. B. McLellan, counsel, and Dr. O'Brien was legally represented by Mr. J. Tarsh.

No witnesses were called, and the case rested upon a number of statutory declarations, from which it appeared that Dr. O'Brien had canvassed for patients on a new housing estate which was receiving an overflow population from Liverpool and other centres. Statutory declarations were also put in on the other side, some of them from Dr. O'Brien's professional colleagues, testifying to his excellent character. He was 38 years of age and happily married.

After a short deliberation in camera, the Chairman announced that the Committee had judged Dr. O'Brien to have been guilty of "infamous conduct in a professional respect," and they were unable to regard the circumstances as affording any justification for his conduct. But having regard to assurances which he had given and the testimonials produced in his favour, they hoped the warning he had received would be effective, and had not directed the Registrar to erase his name from the *Medical Register*. This closed the case.

Not Guilty of Canvassing

The Committee proceeded to consider a charge against ALLAN CHARLES ARTHUR, registered as of Lanark Road, Edinburgh, 11, M.B., Ch.B. 1945, U. Glasg.; M.B., B.Chir. 1946, U. Camb.; M.R.C.P. Edin. 1948, that since November, 1955, he had advertised for the purpose of obtaining patients, and promoting his own professional advantage by exhibiting notices outside premises at 76, Wereton Road, Audley, and 123, High Street, Halmer-end, in excess of anything reasonably necessary to indicate to those seeking his surgeries the places and times at which they were held, and further that at dates in November, 1955, and on subsequent occasions he had canvassed persons who were the patients of Dr. J. R. F. E. Jenkins, with a view to inducing such persons to become his patients, and that in relation to the facts alleged he had been guilty of infamous conduct in a professional respect.

Complainant's Case

The case was presented on behalf of the complainant, Dr. Jenkins, by Mr. L. Thompson and Mrs. M. Riseborough, counsel, instructed by Messrs. Knight and Co., solicitors, and the respondent was legally represented by Mr. Leigh Taylor, solicitor, of Hempsons.

Mr. Thompson said that Dr. Arthur in the autumn of last year replied to an advertisement by Dr. Jenkins, of Audley, for a partner in his practice. At that time Dr. Arthur was in Edinburgh. After an interview with Dr. Jenkins he said that he would like to join in partnership with him. A difficulty arose over housing accommodation, and for a time Dr. Arthur lived in a near-by house. No actual date was fixed for the partnership to come into operation, and from the advertisement it was evident that there would have to be a probationary period of six months. The usual undertaking not to establish himself in opposition to his late partner at the conclusion of the practice was required.

After a time some dissatisfaction arose and the partnership was terminated on November 26 last. It was alleged that since then Dr. Arthur, having established himself in the vicinity, had visited patients who were on Dr. Jenkins's list and had canvassed them with a view to transfer to his own. He had also exhibited notices at his surgeries which gave information in excess of what was usual in such announcements, as, for example, the telephone number at which messages would be received after a certain hour when he was no longer at the surgery. The notices were afterwards suddenly taken down, perhaps because it was realized that they were not ethically proper. It was claimed that Dr. Arthur had set out on a course of action to attract patients to the practice he had started at Audley, notwithstanding the usual undertaking in such circumstances.

Dr. Jenkins gave evidence in support of the complaint, and related the circumstances attending the negotiations for

a partnership and the final breakdown. He produced photographs of the notices which Dr. Arthur had put up at the surgeries.

In cross-examination by Mr. Taylor, Dr. Jenkins denied that it was he who was in a hurry to get a partner. Much of the cross-examination turned upon conversations and letters between the parties. Dr. Jenkins was asked whether he had ever said anything derogatory about Dr. Arthur, whether he had told patients that he was not a competent doctor, and whether he had said to one patient that Dr. Arthur was not fit to be a doctor and that he was going to get him struck off the Register. Dr. Jenkins denied both in cross-examination and re-examination that he had said anything derogatory of Dr. Arthur or decried his professional ability.

Six patients on Dr. Jenkins's list then gave evidence on conversations they had had with Dr. Arthur. One of them said that Dr. Arthur had asked whether he was satisfied with his doctor. Another was understood to say that Dr. Arthur had stated that he could do more for him than Dr. Jenkins had done. The conversations all seemed to turn on the possibility of transfer from one doctor's list to another.

The Defence

Dr. Arthur then gave evidence on his own behalf. In answer to Mr. Leigh Taylor he said that he was married and had two children. He had an interview with Dr. Jenkins with a view to partnership in September of last year. Dr. Jenkins made no complaint about his work as a partner or prospective partner, but on October 26 he received a letter from Dr. Jenkins's solicitor requiring him to move out of Dr. Jenkins's house, which he was then occupying. This was contrary to his understanding of what was agreed between them, and he had to consider his future. He had been brought into this area expecting a partnership, and he suddenly found himself without a house to which to move his family. He obtained some premises at a distance, in a district where Dr. Jenkins, so far as he knew, had no patients. With regard to the notices he put up on the premises, he did not think them improper. They contained only information on where he could be found at certain hours. He disputed the statements which the witnesses had attributed to him. His purpose in calling was in some cases to say good-bye or to give a promised certificate, and so on. He had not canvassed for patients. Dr. Arthur was altogether 3½ hours in the witness box.

Mr. Leigh Taylor, in a final speech for Dr. Arthur, said that this case seemed to have been pressed with extraordinary vigour. Slight incidents had been magnified and built up so as to suggest a canvassing campaign. But the Committee would now see both sides of the picture. Dr. Arthur had been brought into this area in the expectation of a partnership which had come to nothing. It would have been wiser if after its termination he had decided not to remain in the neighbourhood, but there was an area which he thought satisfactory and in which Dr. Jenkins had not practised. The conversations of the witnesses were capable of different constructions, including perfectly innocent ones. Accusations had been made which had not been substantiated.

After a brief private deliberation the Committee's decision was announced by the Chairman as follows:

Mr. Arthur, I have to announce that the Committee have determined that the facts alleged against you in the charge have not been proved to their satisfaction, and accordingly that you have not been guilty of infamous conduct in a professional respect. That closes the case.

TRADE UNION MEMBERSHIP

The following is a list of local authorities which are understood to require employees to be members of a trade union or other organization:

Metropolitan Borough Councils.—Fulham, Southwark.
Non-County Borough Councils.—Crewe.

REMUNERATION CLAIM DEPUTATION TO MINISTER

The following representatives of the Negotiating Committee met the Minister of Health on Wednesday afternoon: Sir Russell Brain, Dr. A. Talbot Rogers, Dr. S. Wand, Dr. J. D. S. Cameron. They were accompanied by Sir James Millard Tucker, Q.C., Mr. S. B. R. Cooke, Q.C., Professor R. G. D. Allen, with the Association's solicitor and members of the secretariat.

JOINT CONSULTANTS COMMITTEE'S PROTEST

The following is the text of a statement issued to the press on July 25 on behalf of the Joint Consultants Committee, representing the Royal Colleges, the Scottish Royal Medical Corporations, and the Central Consultants and Specialists Committee of the B.M.A.

The Joint Consultants Committee, representing the 18,000 doctors who staff the hospitals of the country, has heard with indignation of the Government's brusque refusal to consider the fair and reasonable claim put forward by the medical profession for an adjustment in its remuneration. The claim is no more than a request for a fulfilment of the solemn promises made to the medical profession when it entered the National Health Service. No section of the community in recent years has exercised greater restraint than the medical profession in asking for adjustments in its earnings to meet the falling value of money. Like professional workers in general, they are a minority in the community. That is no reason why, the value of their earnings having been whittled away by inflation, the reasonable claim they have at last been driven to make should be given this contemptuous dismissal. The Negotiating Committee presented to the Ministers a long, reasoned document which they have abruptly rejected in a few words without the courtesy of explaining their reasons for doing so.

The Committee wishes to associate itself fully with the protest against the Government's decision already made by the General Medical Services Committee (*Supplement*, July 28, p. 84), representing the 20,000 family doctors of the country. Like the General Medical Services Committee, it pledges its wholehearted support to the Negotiating Committee in whatever steps may be necessary to secure that the Government reconsiders this decision.

PUBLIC HEALTH MEDICAL OFFICERS MOTOR-CAR ALLOWANCES

To the revised motor-car allowances for public health medical officers set out in M.D.C. circular No. 29 (*Supplement*, July 28, p. 86) should be added the following lump sum allowances and rates per mile which replace those given in paragraph 2 of the enclosure to M.D.C. circular No. 15:

	Not Exceeding 10 h.p. or 1,199 c.c.	Exceeding 10 h.p. or 1,199 c.c. but not Exceeding 12 h.p. or 1,399 c.c.	Exceeding 12 h.p. or 1,399 c.c. but not Exceeding 14 h.p. or 1,599 c.c.	Exceeding 14 h.p. or 1,599 c.c.
Lump sum allowance ..	£54	£60	£66	£72
Rate per mile for first 7,200 miles per annum	5½d.	6d.	6½d.	7d.
Excess over 7,200 miles per annum ..	3½d.	3½d.	4d.	4½d.

M.D.C. Circular No. 29 refers only to England and Wales. The position in Scotland has now been referred by Committee C to the Scottish Advisory Committee and it is understood that the matter will be receiving consideration shortly.

As a result of arrangements made by the Ministry of Health in conjunction with the Department of Health for Scotland and the Ministry of Health and Local Government, Northern Ireland, with manufacturers of fluorohydrocortisone, topical preparations of this substance may now be supplied on prescription.

Correspondence

Remuneration Claim

SIR,—Our Negotiating Committee is reported as saying that doctors will be astonished by the Minister's flat rejection of the claim for increased remuneration, and that an increase of not less than 24% was sought as from April 1, 1956, this being the amount by which the real incomes of general practitioners and of hospital medical staffs have declined in value since 1951. This is the first published information on the extent of our claim, and I believe that doctors will be astonished less by the rejection than by the moderation of the claim.

Those of us present at the Conference of Consultants and Specialists on June 20 last heard the opinion stated that the claim for increased remuneration should represent what we thought we might get, rather than what we thought we really deserved. Surely the published report of the claim indicates that even this moderate opinion was further watered down in the final preparation of the claim. This present claim appears to disregard the fact that nobody—not even the Ministry of Health—pretends that the financial recommendations of the Spens Reports were fully implemented in 1951. It does, however, arise from the continuing fall in the value of money since that year. The claim should therefore be presented in the form of a year-by-year statement, covering each year from 1951 to 1956, and setting out the amount by which our advisers estimate remuneration to have fallen short of true money values (in relation to the Spens recommendations) in each of the years.

Our Negotiating Committee is composed of men who, by virtue of their seniority, experience, and attainments, are, medically, second to none. It is, however, possible that these very attributes prevent them from ridding themselves of the traditional professional distaste for arguments over money matters. I am sure that the Committee is aware of the financial embarrassment existing in a high proportion of practitioners of every category, but I cannot help feeling that the profession's financial future would be better assured by the inclusion on the Negotiating Committee of a few men whose bellies have become filled with fire for want of more satisfying material.

Whether we like it or not, we have to face the fact that the problem of remuneration by the State will always be with us. The N.H.S. is still in its childhood, and it is our present responsibility and obligation to establish financial precedents which will enable the profession to survive and to attract suitable recruits from future generations. To succeed in this, we must prepare a just claim—and press it hard. Such a claim should be accompanied by a time-limit (of, say, three months) and the statement that, within that limit, the claim must either be met or be submitted to arbitration. With presentation of the claim, the united profession should state its intentions in the event of settlement not being reached within the time-limit.

Our claim must be almost unique in that we cannot give increased productivity or efficiency in return for its being met. We can, however, offer the satisfied loyalty and co-operation without which the N.H.S. cannot survive. Although patients can receive treatment without an N.H.S., that service cannot exist without the co-operation of doctors. As the Negotiating Committee has stated, we have a claim which in justice and in logic cannot seriously be challenged. The people of this country are not slow to recognize claims of this nature which are properly placed before them: in this respect, good public relations would be of great importance.

Finally, it is to be hoped that on this occasion the Negotiating Committee will not have to compete with secret diplomacy, and that it will refuse to entertain any offer which it cannot place before the profession.—I am, etc.,

Bristol.

V. TORRY BAXTER.

SIR,—For those of us who face thirty years or more in the National Health Service the issue is simple. We must know the basis of our remuneration. Mr. Bevan, when Minister of Health, accepted the Spens report (subject to negotiations as to its implementation) as the yardstick (on December 1, 1948, in answer to a question from Sir Ernest Graham-Little in the House of Commons). If the present Minister does not now accept this as a premise, then we must withdraw our services from the N.H.S. and negotiate afresh before rejoining. I feel that the younger doctors will support me when I say that we must expect a redeployment of available funds to entitle us to a reasonable remuneration and stop this nonsense of running the N.H.S. on the sense of vocation of the medical profession.

I must couple this with the demand that we do away with the secrecy which has surrounded all negotiations with the Ministry on matters of pay. It is manifestly absurd that we, who are supposed to understand the most difficult and complicated problems in medicine, problems related to running our practices, and problems of Schedule D, should be considered by our own confreres incapable of following the progress of negotiations on our own pay. It may not be realized, but it is a fact, that the full Dankwerts Award and its detailed implications have never been published to the profession in an intelligible form. When it was announced by our spokesmen recently, in connexion with this present claim, that the net income of the average G.P. was £2,200, all expenses paid, the average doctor looked at his actual net income and laughed. This is very bad for our P.R.O., apart from making the doctor have to explain an impossible position to his friends, relations, and patients.

The way forward is plain. No secrecy and no quarter.—I am, etc.,

London, W.C.1.

J. L. MCCALLUM.

SIR,—I have read with dismay of the blunt refusal by the Minister of Health to consider an increase in our pitifully small salaries.

Sir, the Association should act strongly, decisively, and at once. I consider that the time has come when no gentlemanly action should be called for, but that the medical staff in every hospital in the country should be ordered to boycott the National Health Service. There should be a general close-down of all the routine clinics and out-patient departments, and also stop all routine hospital admissions until such time as the salary dispute is settled well in our favour—yes, settled, not just under negotiation. I trust the Association will for once act immediately and strongly, and not miss this opportunity.—I am, etc.,

Manchester. 8

G. M. M. WATTS.

SIR,—The lack of wisdom of our policy of restraint has been underlined by the Government, and its futility underlined by Mr. Horner, of the Mineworkers' Union, who said that he could not control prices but he would see that the miners' wages kept pace.

May I suggest that the B.M.A. seriously consider a whole-time service as an answer to the many ills that affect us. The scheme, run at health centres, would be in shifts, 8 a.m. to 4 p.m., 4 p.m. to midnight, and a skeleton service from midnight to 8 a.m. The advantages to the doctor would be: (1) A longer working life. (2) Opportunity to work overtime and to do private practice in his spare time. (3) The profession would be tied to the cost of living and increases in pay would be automatic. (4) The younger men and women would have no worries about unemployment and the cream would be retained in this country, to the benefit of this country. (5) The doctor's wife, if she so wished, could go out to gainful employment. (6) No worries about locums.

The disadvantages to the doctor would be: (1) An increase in bureaucracy. All countries, however, are increasingly aware of this danger, even totalitarian countries—e.g., Poland, where it was given as an excuse for the Poznan riots. No doubt in this country it would be kept under control.

(2) The small minority of doctors who exploit their junior partners and/or assistants would have to return to general practice.

The advantages to the State would be that the drug bill could be cut by at least 50%. The disadvantages to the State would be: (1) The scheme would cost three times what the general practitioner service costs now. (2) There might be a decline in quality, as in all nationalized concerns, but that is the least of a planner's worries.

In any case, let us not permit the Government to use a whole-time scheme as a bogey with which to threaten us, but let us use it as a stick with which to beat them.—I am, etc.,

London, S.W.6.

G. ROSEMONT.

SIR,—As usual, we appear to have received a polite "brush off." According to my morning paper the Minister states he cannot consider at the present time the request of the medical profession for the application of the betterment factor. The question arises, at what other time could he possibly consider it? We would have no grounds for making such a request had the value of money not deteriorated since 1951, so the implication appears to be that the *status quo* will remain indefinitely, however much the pound slides down in value.

The country as a whole is being asked to exercise restraint in its demands for wage increases, and I am sure that the medical profession sincerely subscribes to the wisdom of following such a request, but it should not be forgotten, as it is apparently by the Minister, that we are not asking for any advance on to-day's just income, but that our five-year lag should be rectified to bring us to that point at which we might reasonably be asked to exercise restraint in common with our luckier fellows.

Now, if ever, we must show firmness and unity in our dealings with the Minister.—I am, etc.,

Birkenhead.

E. G. WATSON.

SIR,—In your leading article, "The Ministers' No!" (*Journal*, July 21, p. 144), you rightly declare that "all the profession is asking for is the fulfilment of contractual obligations accepted by the Government of the day in 1946 and 1948." It seems to me that this point cannot be too heavily stressed, yet few, if any, of the lay public seem to be at all aware of it. Why? We have a P.R.Q. at Headquarters, and I believe that each Division appoints someone to deal locally with public relations. Are our spokesmen being deliberately muzzled by the whole press?—I am, etc.,

Launceston, Cornwall.

DONALD M. O'CONNOR.

SIR,—What a wonderful example our medical pseudo-legislators give at Brighton of straining at gnats and swallowing camels.

Smoking undoubtedly does harm to the small number who have become sensitive. But why should the representatives of the largest medical body in the country seek more pay, when the obvious and only way for this country to survive is for every one of us to be content with our wages and work our best and hardest for the common good.—I am, etc.,

Birmingham, 14.

J. FRASER KERR.

SIR,—I am almost stunned by the reply from the Government to our memorandum on remuneration as published in the *Supplement* (July 21, p. 71). The Government makes no mention of a meeting for discussion of what is a very vital question to so many. It seems that Spens is definitely repudiated by one side, and that side, in a way which could not be bettered by Mr. Stalin, requires only its own statement to make this incontrovertible. The other side is not asked if it agrees. In any case, agreement or the opposite have equally no weight.

The statement goes on, "Remuneration . . . must be determined . . . in the light of all relevant circumstances." Who

is to determine what are relevant circumstances, and when? Why did no meeting with the Negotiating Committee take place, as the commonest courtesy would suggest? Surely no one higher up than a junior office boy could have compiled such nuclear material. I was neutral up till now, but not any longer. Conceit and intolerance could hardly be more naked.—I am, etc.,

Middlesbrough.

J. DURIE.

SIR,—We, the undersigned medical practitioners, deprecate the attitude adopted by the Minister towards a responsible memorandum sent in by the profession. We desire the Negotiating Committee to press on with our claim with the knowledge that the profession is wholeheartedly behind it in any measure it may think fit to take, no matter how severe.—We are, etc.,

T. BRANDRETH.	A. HALL.	GUY PIMBLETT.
H. W. CHAMBERS.	D. J. HANDFORD.	A. E. RILEY.
ROBERT CLOUTING.	DENYS HORTON.	THOMAS SMALLHORN.
G. R. CUBITT.	D. LONSDALE.	C. E. A. THOMAS.
K. N. FOSTER.	R. G. NETHERY.	HOWARD WILSON.

Sleaford, Lincs.

General Practice To-day

SIR,—I have noticed the many articles and letters in your *Journal* which blame the N.H.S. for "bad" general practice. I have worked in general practice in the old private days and also under the N.H.S., and cannot see that general practice now is any worse than it ever was. It is generally admitted that lack of time to deal with individual cases is the great enemy of "good" general practice. The causes of this lack of time are to-day the same as they were 10 years ago: (1) (a) Lack of good records. Every minute taking notes of a patient will save many later on. (b) Not reading the patients' records through before treating them. Of course, some patients acquire such enormous dossiers that this is impossible, but it is well worth while occasionally to make a summary of these dossiers for quick reference. (2) Not making good use of: (a) adequate secretarial assistance, (b) the excellent district nursing service, (c) pathological services, both hospital and domiciliary, (d) mass x-ray units. (3) Bad organization: (a) Lack of a proper rota system to enable the G.P. to have adequate relaxation and keep fit for his job. (b) Being too mean to pay for adequate help and thus avoid tackling enormous surgeries on one's own to the detriment of the patient. As regards this district, the N.H.S. seems to have given a stimulus to the operation of rota systems which were never there before; and also to the taking on of partners and assistants.

Every G.P. needs the mental stimulus of some contact with hospital staffs and other G.P.s. I cannot agree, however, that it is necessary, in order to be successful as regards capitation payments, to over-use the consultant services. "Successful" as well as "good" general practice depends upon the amount of time, trouble, patience, and interest taken by the practitioner in each individual case. Failure in any of these qualities cannot be compensated by alteration in the general scheme of practice.—I am, etc.,

Wolstanton, Staffs.

ANNE M. TOMS.

SIR,—In 1953 I returned to general practice after an absence of seven years. On resuming work these were the changes I noticed most: (1) More diseases could be satisfactorily treated at home, thanks to antibiotics and other modern drugs. (2) Clinical pathology service freely available (it seems this is not so in all districts—it certainly should be). (3) Domiciliary consultations—their value to patient and G.P. cannot be overrated; I find each a postgraduate tutorial. These changes (not, of course, all directly due to the National Health Service) make it possible to treat in their homes patients who would otherwise have had to go to hospital, and make general practice more satisfying. A fourth change was the large increase in surgery attendances for trivial complaints. This was the only disagreeable

feature of general practice directly attributable to the National Health Service. If the G.P.'s status has been lowered I have not been conscious of it.

It sometimes looks as if observers like Dr. Alexander Hall (*Journal*, July 14, p. 57) compare the best of pre-1948 practice with the worst of present-day. Friends who did locums in pre-war industrial practices have macabre stories of what went on in the "good old days" (I myself did a locum in a practice of the "better sort," where no notes of any sort were kept). Dr. John Fry and others have shown what great scope there is in general practice to-day. As for the waiting-room crowded with patients with trivial complaints, I am sure we could do more to educate patients out of the bottle of medicine habit. Many of them, for instance, after the initial shock, are prepared to accept the idea that no medicine is needed for the common cold. It has often never been pointed out before.—I am, etc.,

Birmingham, 29.

PATRICIA ASHER.

Return of Goodwill

SIR,—I was much interested in Dr. H. M. R. Waddell's letter on the return of goodwill (*Supplement*, July 21, p. 73). As he says, the loss of the freedom of movement of doctors virtually imprisons a practitioner in one area for life, with incalculable disadvantages not only to his family and himself but to the community at large, by limiting medical experience. This is plainly a political matter. It arose in the first place as a piece of doctrinaire Socialism. What then can a Conservative Government do to counteract the evil?

I do not think it is possible now to restore the former procedure, when practices were bought and sold through agencies and so on. I have, however, given much thought to the matter, and offer the following solution. Let practices be bought and sold through the Ministry of Health. For example, the Ministry, or its appointed agents, could maintain a list of available practices, and any young doctor would simply buy one as before. Similarly, an established doctor wishing a transfer could use his compensation money as part of the price, as also his present practice's value. I believe the details of such a scheme could easily be worked out by any Minister who had the welfare of doctors at heart. The beauty of it from a political point of view is that the Government could obtain a percentage of the purchase price, etc., as agents. The doctors could thus move about the country as they wished, and the Government would get a rake-off. And so everybody would be happy. What about it, Mr. Turton?—I am, etc.,

Herne Bay.

C. T. H. WHITESIDE.

Merit Awards

SIR,—At the Annual Representative Meeting in Brighton a resolution was passed requesting that "Council consider the desirability of abolishing the merit award scheme for members of hospital staffs . . . and replacing it by a system allowing for responsibility payments" (*Supplement*, July 14, p. 41).

Many consultants not conversant with B.M.A. procedure, of whom I am one, do not understand the competence of the A.R.M. to make such a recommendation. There is a general impression among many that I have spoken to that such matters are the concern of the Central Consultants and Specialists Committee, an autonomous body that does, in fact, represent the consultants and specialists; and not an amorphous collection of delegates, many of whom are in no position to form a judgment on a matter which does not affect them; who do not represent any organized collection of consultants; and who may have no mandate to pronounce in the way that they do.

And what is the next step? Presumably, Council must proceed to act upon the motion? Is there any likelihood of its consulting the Central Consultants and Specialists Committee before determining its policy, or any compulsion to abide by what that committee shall decide?

I am not concerned at the moment with the merits or demerits of the hospital staff award scheme, but only with the steps by which official policy is arrived at. The publication of information on the matter might help to allay some general ignorance and disquiet.—I am, etc.,

Brighton.

H. G. MCGREGOR.

Fees for Private Operations

SIR,—I think it is high time that the schedule of fees for private operations in pay-bed accommodation in hospital was revised or abolished altogether. Except for certain slight increases for long-stay cases and specialized cases, like thoracic operations, this schedule is the same as it was in 1948.

The other alternative, of course, would be for surgeons to become once more members of the Hairdressers Union, and revert to being barber-surgeons, as we have been told in the newspapers of a well-known hairdresser being paid £2,500 to fly the Atlantic, complete with 18-carat gold scissors, to do a small surgical operation (not mentioned in the National Health Service schedule of fees) on the hair of a well-known blonde film-star.—I am, etc.,

Newcastle, Staffs.

G. GORDON CROWE.

A Pathologist's Pay

SIR,—I have discontinued my membership of the B.M.A., as I have come to the conclusion that it fails to act in the best interests of the profession. My reasons for relinquishing my membership were not entirely due to the fact that I am no longer engaged in the medical profession, and I am willing to rejoin if I can be convinced that the Association is making some effort to help my many friends who are living in straitened circumstances.

I wished to become a pathologist when I qualified in 1952, but found that at no time in the ensuing seven or eight years was I likely to earn £1,000 per annum. I therefore entered the family business, where I pay a good representative over £1,000 per annum, plus car, plus expenses. Our travellers have no technical training and their only qualification is that they can sell our goods. It seems altogether wrong that if I were to offer them the salary of a doctor with higher qualifications working as a registrar they would leave forthwith.

Most young men qualifying in medicine desire to get married, have a home, a family, security, and freedom from debt. Can you say that the work of your Association has brought them that? What hope have they got of obtaining luxuries like a car, a television set, or a public school education for the children? I would have preferred to earn my living in my profession, but I wished to marry and felt that I owed my family a minimum standard of living not obtainable as a registrar and certainly beyond the scope of a house officer. Worse still, there was precious little hope for the future, for even if I had higher qualifications what chance had I of obtaining a consultant's post?

Do not think that I am grumbling, for I am happy with my lot. I feel strongly that those in the profession whose position is secure and remunerative are continuing to be favoured at the expense of those who have little in the way of remuneration or security. The purpose of this letter is to judge whether the B.M.A. is worth supporting, and my conclusions are that it has been weighed in the balance and found wanting.—I am, etc.,

Manchester, 3.

A. S. NICHOLAS.

Crash Helmets

SIR,—Our representatives at Brighton appear to have allowed an amusing masquerade to blind them to the dangers of enforcing the use of crash helmets by motor-cyclists. The loss of valuable young lives in motor-cycle accidents is appalling. No one doubts that efficient crash helmets may reduce this loss, and Mr. A. Lawrence Abel is to be congratulated on his efforts (*Supplement*, July 14, p. 27) to have

purchase tax removed from them; any step that encourages their wider use should be supported. But to ask for legislation to enforce their use is to seek to limit the freedom of the individual to an unwarrantable degree.

Freedom to endanger one's fellows must be limited, but to limit a man's right to risk his own neck is another matter. It is true that a motor-cycle accident may involve others beside the motor-cyclist, but a crash helmet protects only the wearer and not his victims. Indeed, Mr. Abel said himself that a motor-cyclist so protected would feel safer and so take more risks. This, of course, increases, not diminishes, the danger to other road users.

Allow the principle that men must be protected against themselves, and what follows? The prohibition of rock-climbing in our mountains? Such a course has already been suggested in the press. Will some doctor stamp on to the rostrum next year in nailed boots and with a coil of rope around his shoulders to jolly his colleagues into urging a ban on rock-climbing? Every summer swimmers are drowned. Which of our Representatives will appear on the platform next year wearing bathing trunks and water-wings, in order to stop this shocking waste of young lives? It is the nature of the State to limit ever more narrowly the freedom of the individual. Such liberties as remain must be constantly fought for. Any least encroachment, however trivial, however well meant, must be resisted. A great deal was said at the A.R.M. about liberty and freedom for our profession. We should save our energies for the struggles that these involve instead of urging restrictions for others and the creation of new classes of offences.

The arguments urged in favour of crash helmets can be urged with equal validity for safety belts in cars. Perhaps safety belts in cars would be a good thing. But compulsory ones? And a policeman to stop your car to see that you have the belt fastened? And a fine if you haven't? Mr. Abel deserved his laugh; not the vote.—I am, etc.,

Ulverston, Lancs.

T. I. WATKINS.

Centralizing Pathological Services

SIR,—Bureaucrats in hospital administration are trying to centralize the pathological services in large laboratories which are staffed by several pathologists and serve several hospitals. It is claimed that this increases efficiency and reduces costs. Neither of these, I believe, result, but only harm to the service and to the profession.

Highly specialized tests, such as the W.R., animal inoculation, virology, and pregnancy tests must be sent to special centres; but I am convinced that, as far as practicable, the pathological work of a hospital should be done on the premises. A single large centralized laboratory serving several hospitals makes an artificial and harmful division between clinical medicine and pathology. It reintroduces all the defects of "postal pathology" which have been so widely condemned. Postal pathology is bad for the pathologist, because, if he is to function as a consultant medical man, he must be in constant touch with his clinical colleagues and the wards. The pathologist who does not visit the wards is like the clinician who never visits the post-mortem room; from being a medical man he soon degenerates into a technician living in an ivory tower remote from the day-to-day problems of living pathology; he cannot easily see the more interesting or puzzling of the patients; he ceases to regard them as human beings but only as cases; he automatically churns out reports on patients he rarely sees to clinicians he seldom meets; his reports are wooden, his interpretations relatively valueless. A laboratory sited away from the hospital is bad for the pathologist and for the clinician; if the pathologist is any good his clinical colleagues will value opportunities for discussing their problems, to their mutual advantage. This desire to discuss problems with the pathologist is more marked among the junior medical staff and among the young consultants, who are increasingly laboratory-minded and dependent.

Surgeons recognize the importance of close contact between the clinician and pathologist such as is only possible if the laboratory is sited in the hospital it serves.

This is exemplified in the new regulations for the F.R.C.S.(Eng.) for overseas students which lay down that the candidate be asked for details of "the opportunities for close liaison with the pathological department of the hospital in which he has worked" (*Journal*, May 12, p. 1095). There can be no close liaison if the laboratory is sited miles from the hospital.

A laboratory away from the hospital means delay in receiving the specimens and in sending reports; delays mean slower turnover of patients and so inevitably increased costs. It is a tragic commentary on our profession that a lay Minister of Health upgraded the pathologist, making him equal to his clinical colleagues; now the bureaucrats of the profession are doing their utmost to degrade him from the position of consultant medical man to that of a back-room laboratory worker. This must, I suggest, inevitably result in great harm to the status of the pathologist and to medicine in general.—I am, etc.,

Worthing.

R. AIDIN.

Credit Due

SIR,—In the *Supplement* of July 14, in the report of the A.R.M., sub-title "Cremation Certificates" (p. 47), you report "Dr. R. E. G. Smith, who is making his twenty-first appearance as a representative at the A.R.M. . . ." This should read Dr. E. Bertram Smith. As Dr. E. Bertram Smith has been such a loyal and devoted supporter of the B.M.A. for so many years, and as I am a comparative newcomer, I do feel that the credit should be given in the right quarter.—I am, etc.,

Nottingham.

GORDON SMITH.

Association Notices

ARMED FORCES COMMITTEE

Election of Direct Representatives

The constitution of the Armed Forces Committee provides for a retired medical officer from each of the following branches of the Services to be elected to it:

Medical Branch, Royal Navy.
Medical Branch, R.N.V.R.
Royal Army Medical Corps.
R.A.M.C. (T.A. or A.E.R.).
Medical Branch, Royal Air Force.
Medical Branch, R. Aux. A.F. or R.A.F.V.R.

There are six vacancies to be filled for the 1956-7 session. Members of the Association, at present serving on the active lists of each of the above branches and corps, are invited to nominate a retired medical officer (who must also be a member of the Association) of their own branch or corps as a candidate for election.

Nominations, on forms to be obtained from me, must reach me by Monday, September 3. Voting papers will be issued where more than one candidate is nominated.

A. MACRAE,

Secretary.

Meetings of Branches and Divisions

SOUTH-WESTERN BRANCH

The 111th annual meeting of the South-western Branch was held at Newquay on June 9. Lunch was provided at the generous invitation of the President-Elect, Air Vice-Marshal T. C. St. C. Morton, at the St. Rumons Hotel. More than a hundred members and their ladies were present.

At the annual meeting in the afternoon the outgoing President, Mr. K. G. W. Saunders, invested Air Vice-Marshal Morton with the President's Badge. The President then delivered his address under the title of "Tropical Disease at Home and Abroad." After an interval for tea Dr. Robert Forbes gave a spirited and witty speech entitled "Medical Litigation."

Dinner in the evening was attended by a distinguished company of professional associates and more than a hundred members and their friends.

Afterwards Dr. Michael Ward gave an illustrated lecture on the Everest Expedition, to which he was medical officer.

The social arrangements were carried out by Dr. Eric Townsend, honorary secretary of the Cornwall Division, to whom the thanks of the Branch were given for the highly successful meeting.

SUPPLEMENT TO THE BRITISH MEDICAL JOURNAL

LONDON SATURDAY AUGUST 11 1956

CONTENTS

Remuneration Claim	97	Hospitality	99
Central Health Services Council	97	Correspondence	100
Hospital Medical Staff Board and Lodging Charges	99	Association Notices	102

REMUNERATION CLAIM

As announced in last week's *Supplement* (p. 92), representatives of the Negotiating Committee met the Minister of Health and the Under Secretary for Scotland on August 2. After the meeting the Ministry of Health issued the following statement: "Representatives of the Negotiating Committee met the Minister of Health (Mr. Robin Turton) and the Under Secretary for Scotland (Mr. J. Nixon Browne) on to-day about their claim for increased remuneration on behalf of general practitioners and all grades of hospital medical staff. The meeting was adjourned pending the submission by the Committee of further particulars as to the legal aspects of their claim."

CENTRAL HEALTH SERVICES COUNCIL ANNUAL REPORT FOR 1955

The Central Health Services Council for England and Wales (Chairman, Sir Frederick Messer) has made its report¹ to the Minister of Health on its proceedings, and on those of its standing advisory committees, for the year ending December 31, 1955. A report of a special subcommittee of the council, under the chairmanship of Lord Cohen, on the medical care of epileptics² has already been published and was discussed in an annotation in the *Journal* (June 23, p. 1476).

Fluoridation of Water Supplies

In his foreword to the report the Minister of Health says that the council has helped to advance "what I am satisfied is the right policy by recording their conclusion, and that of the Standing Medical Advisory Committee, that despite many years of observation and investigation there is no scientific or medical evidence available which suggests that there is any risk in drinking water containing fluoride in the low concentration proposed."

The council discusses in detail suggestions of possible toxic effects from fluoridation. It states that, apart from the effect of acute lethal dosage, which for adults is several thousand times the proposed fluoridation dose and for children several hundred, the effects of fluoride can be divided into those seen in high-grade industrial or natural fluorosis and the possible effects of artificial fluoridation of the order of 1 p.p.m.

¹ Central Health Services Council. Report for the Year Ended December 31, 1955. 1956. H.M.S.O., London.
² Central Health Services Council, Report of the Subcommittee on the Medical Care of Epileptics, 1956. H.M.S.O., London.

U.S. Investigations

A comparative study had been made of two areas in Texas, one with a natural fluoride content of 8 p.p.m. and the other with 0.5 p.p.m. In each over 100 individuals were studied who had lived in the area continuously for at least 15 years at the start of the study. They were examined physically, radiologically, pathologically, and dentally, first in 1943 and again in 1953, when the minimum exposure to these levels of fluoride was at least 25 years. Apart from dental mottling, the only statistically significant differences between the two areas was a slightly higher rate of cardiovascular abnormalities in the low fluoride areas and some unimportant changes in the blood picture. Regarding criticism that the numbers were too small to show up differences unless these were very marked indeed, the council points out that exposure to fluoride was so much higher than that entailed in artificial fluoridation that anything to be expected at 1 p.p.m. should have been shown greatly magnified at 8 p.p.m. "The fact that there were no relevant differences than dental mottling seems to justify the conclusion that no significant changes in health are seen after 25 years' exposure to this very high level of fluoride."

It was sometimes suggested that the fluoride which is added to water supplies is not the same as that occurring naturally. Apart from the fact that the active particle is the fluoride ion, which is the same from any source, all "artificial" fluorides are prepared from naturally occurring minerals. The studies on American fluoridation projects showed that the artificial substance behaved in exactly the same way as the natural one.

The council mentions that dental caries affects 98% of the population, and even at 5 years of age children already have, on average, five to six defective teeth. It had never been suggested that fluoridation was the only means of preventing caries, but so far it has proved the most effective.

Ethical Issues

The council records that "it is the ethical issue on which opinions differ most widely—namely, the question whether an authority is justified in treating the public water supplies, as a measure of prophylaxis in the interests of public health, in view of the fact that it may be difficult or impossible for an individual to avoid using the supply, or to find an alternative if he objects to the measure." In making arrangements to demonstrate the value and the technique of fluoridation, the council felt that the safeguard for the individual's true rights lay in ensuring that any decision made by an authority was taken in compliance with proper constitutional procedure and in the light of well-informed opinion. By

accepting the recommendation of the United Kingdom Mission sent to the U.S.A. in 1952 that before any general introduction of fluoridation there should be study demonstrations in selected areas, the Government had taken steps to ensure full opportunity for the development of well-informed opinion. Without these studies it might not have been possible to produce the conditions necessary for a proper demonstration, but the authorities concerned had been left free to decide whether or not to take part in them. In each instance the proposal to introduce fluoridation had been duly considered by the health and water authority and had been the subject of a formal resolution made in the normal manner. It now remained for the studies to go forward and for individual authorities to decide, in the light of these demonstrations and the emerging results, whether or not to fluoridate their own supplies.

Smoking and Lung Cancer

In his foreword the Minister recalls the advice he had received on the question of smoking and lung cancer. After referring to his statement in the House of Commons on May 7, he adds: "I shall take such steps as are necessary to ensure that the public are kept informed of all the relevant information as and when it becomes available. This will enable every smoker and, perhaps more important, everyone who is thinking of starting to smoke, to make up his mind for himself on the evidence we have, but I do not consider that the present state of our knowledge is such as to justify my accepting the advice of the Standing Medical Advisory Committee, now endorsed by the council, and undertaking a national publicity campaign."

Medical Staffing of Mental Hospitals

Among special reports is one dealing with the medical staffing of mental and mental deficiency hospitals. "Basically the problem of medical staffing is one of numbers, but a factor of cardinal importance is quality of staff," it is stated. Mental hospitals were changing in character as the new outlook on mental illness became more widely accepted and prejudices against treatment lessened. Admission rates were climbing steeply. But these tendencies, encouraging in themselves, were developing in circumstances of great difficulty for the hospitals. Most of them were built in the last century and their design was not in accord with modern ideas of the needs of medical or social treatment. These conditions constituted a challenge alike to hospital committees and their staffs, and credit was due to them for succeeding in the face of all difficulties in improving the services available to the community.

The overall shortage of medical staff based upon the vacancies in medical establishments at March, 1954, was about 20% of establishments. The replies to a general questionnaire to regional hospital boards on the subject of medical staffing showed that the reasons commonly given for the shortage were: (1) Specialists (consultants and S.H.M.O.s): Shortage of people with the requisite qualifications and experience; limitation of hospital finance; working conditions in some hospitals; lack of housing; in the case of medical superintendents, absence of any financial inducement to assume additional responsibility; and unpopularity of the S.H.M.O. grade (regarded by some as a dead end). (2) Senior registrars and registrars: Unsatisfactory working conditions; lack of housing; varying rent charges at different hospitals; lack of training facilities in hospitals remote from training centres; difficulty and expense of extended leave to obtain training; preference for teaching hospitals; no attraction to a doctor holding the Diploma in Psychological Medicine to take a senior registrar post when he can obtain a post as S.H.M.O. (3) Junior hospital medical officers and senior house officers: Absence of or otherwise poor housing conditions; high residential charges; isolated hospitals; inadequate salary; lack of promotion prospects; no security.

Council's Advice

Advice for improving the position offered to the Minister by the council includes the recommendation that courses of training in medical administration should be instituted and priority given to provide accommodation for some members of each medical grade, both senior and junior, especially where hospitals are in isolated surroundings. The council believes that an outstanding reason for failure to recruit and retain sufficient medical staff is the shortage of houses and flats for married officers. It thinks it important that senior registrars should complete full training as such if they aspire to consultant rank. To provide the requisite number of places, the establishment for them should be expanded. It should be realized that fully trained senior registrars can be promoted to consultant rank without intermediate service in the grade of S.H.M.O. The council states that the absence of a sufficient number of psychiatric consultants is related to the insufficient number of entrants into the specialty, and draws attention to the fact that some universities have no chair in psychiatry.

The Minister in his foreword indicates that he is considering the recommendation relating to the training of medical staff: "In particular the Standing Mental Health Advisory Committee has drawn my attention to the importance of maintaining the quality of medical superintendence at both mental and mental deficiency hospitals, a matter I am considering in the light of the recommendations of the Bradbeer and Guillebaud Committees. I recognize that there is a special case for provision of accommodation at hospitals which are remote from the community. The committee also makes a number of recommendations, which I am considering, regarding the training of medical staff. Since its report, the establishment of senior registrars has been increased, and I am at present studying again the adequacy and distribution of senior registrar posts in psychiatry."

Maternal Deaths

The views of the Maternity and Midwifery Advisory Committee on antenatal care related to toxæmia are put on record. These were sent by the Minister to all local health authorities on May 25 (*Supplement*, June 16, p. 362, and *Journal*, p. 1415) for discussion locally between professional representatives of family doctors, hospital obstetricians, and local health authority medical staff. Meanwhile a committee under Lord Cranbrook has been set up to review the organization of the maternity services as recommended by the Guillebaud Committee.

It is pointed out that, while the maternal mortality rate has, since the turn of the century, been lowered from five to under one per 100,000, there still remains a substantial proportion of the present 500 or so maternal deaths each year which must be regarded as avoidable. From a Ministry of Health inquiry into the cause of maternal deaths, it was already clear that toxæmia of pregnancy was the principal cause of avoidable maternal death in this country, and it had been shown that it was also a major cause of stillbirths and neonatal deaths.

"The time seems to have come," the council states, "when a concerted effort should be made by all three parts of the maternity service of the nation to tackle the problem of toxæmia of pregnancy. This will mean not only research by specialists in hospitals into the cause or causes and the prevention of toxæmia, but also a thorough overhaul of the antenatal care provided by the general practitioners, midwives, local authority clinics, and hospitals."

Antenatal Care

The report then outlines what in the council's view constitutes good antenatal care. Among other things it says that any evidence of malnutrition, renal disease, heart disease, pulmonary tuberculosis, or other serious illness in the past, or any complications in a previous pregnancy are

reasons for seeking a hospital booking. It is desirable where practical that all primiparae over the age of 30, all multiparae over the age of 40, mothers having their fourth or more confinement, and those with multiple pregnancies, as well as all cases of social need, should have their babies in hospital. A policy on these general lines should be worked out in detail in each area and should be clearly understood.

General assessment of the mother's health and nutrition is important, especially as heart disease and anaemia still remain prominent contributory causes of maternal death. The council advises x-ray examination of the chest in all cases. Between examinations given by the family doctor, hospital, or clinic medical staff, preferably with the midwife present, the midwife should see the mother at short intervals to check blood pressure, urine, and weight. Any mother showing signs of a rising blood pressure, excessive gain in weight, oedema, or other abnormality should be referred to the appropriate doctor. It is advisable that the midwife should see her patient monthly until the 28th week, fortnightly until the 34th or 36th week, and then weekly. It is essential that there should be free interchange of information between midwife and doctor, and this should always be arranged as part of the plan for antenatal care made at the time of booking.

With regard to antenatal records, the council says that it is essential that every doctor and every hospital or clinic providing antenatal care should have an efficient filing system with good, clear records. Arrangements should be made to see that reports are exchanged between all concerned with the care of the mother, both before and during labour. Hospitals which do not do their own antenatal care should make certain they receive all information before the mother is admitted. In domiciliary practice there should be a free interchange of information between the doctor and midwife. One person, usually the midwife, should be responsible for the prompt follow-up at home of any woman who fails to attend at the appointed time for antenatal care. The council urges that the pattern of supervision a mother is to receive should be mapped out at the first visit by the hospital staff, family doctor, or midwife with whom the primary booking is made, although the plan was always subject to modification in the light of events.

Once early toxæmia and other abnormalities have been recognized there are three essentials for a good service: a constant watch on all patients, especially non-attenders; adequate numbers of antenatal beds so that treatment may be started as early as possible; and for the multipara a good home-help service so that the mother, whether resting at home or admitted to hospital, is not worried about her home and children. The number of antenatal beds should bear a relation to the needs of the population served and not to the number of lying-in beds. The number of cases of toxæmia in similar communities is likely to be similar whether the area has many or few maternity beds.

What is required, the council feels, is not so much the establishment of new services as a proper use of those already existing, and it has therefore readily endorsed the recommendation of the Standing Maternity and Midwifery Advisory Committee that the Minister should circulate to all the appropriate authorities a memorandum advising them to review and organize their services on the lines indicated.

Classification of Proprietary Preparations

The Joint Committee on the Classification of Proprietary Preparations, appointed in 1954 by the Central Health Services Council and the Scottish Health Services Council, met twice during the year and continued its work of classifying proprietary preparations into the categories recommended by the former Joint Committee on Prescribing on Form E.C.10. About 300 new preparations were classified, and the classification of other preparations was reviewed on further evidence. Where requested, the committee met manufacturers' representatives who were not satisfied with

the committee's decisions on their written representations about the classification of particular products. As a number of drugs and preparations were deleted from the *British Pharmaceutical Codex* in 1954, and from the *National Formulary* in 1955, therefore ceasing to be "standard" or "official" drugs and preparations, the committee found it necessary to review independently the therapeutic value of such products before deciding whether or not to change the classification of proprietary preparations containing them.

Joint Committee on Poliomyelitis Vaccine

In 1955 the council appointed a second joint committee with the Scottish Health Services Council, with the following terms of reference: "To advise generally on the conditions which should govern the use of poliomyelitis vaccine in mass immunization and specifically on such questions as Ministers may refer to them." It consists partly of members of the two councils and partly of outside members with special experience in the production and use of poliomyelitis vaccine and is under the chairmanship of Lord Cohen.

The Joint Committee met three times during 1955. It had recourse to information on what had been undertaken and planned in the employment of poliomyelitis vaccines in other countries, and to certain proposals for the application and use of vaccines which would become available in this country in the spring of 1956. While no formal decision was taken, the general feeling of the committee at its meeting in December favoured the use of poliomyelitis vaccine in Great Britain, to take place in May-June, 1956, on the basis of a plan prepared by the Medical Research Council's Committee on Clinical Trials of Poliomyelitis Vaccine, provided that the practical, administrative, and financial difficulties were not insuperable.

HOSPITAL MEDICAL STAFF BOARD AND LODGING CHARGES

The Management Side Secretary of Committee B of the Medical Whitley Council has written to the secretaries of hospital authorities to inform them that Committee B agreed on July 24 to amend paragraph 17 of the Terms and Conditions of Service to provide for charges to be made for board and lodging for hospital medical staff at a fixed rate according to the grade of the officer concerned.

The rates are: senior house officers, £150 per annum; J.H.M.O.s and registrars, £170 per annum; senior registrars, £200 per annum; S.H.M.O.s, £350 per annum; consultants, £400 per annum.

HOSPITALITY

A French girl aged 22 would like to spend her holidays from August 10 to August 30 with a British medical family as a paying guest. Her sisters, aged 16 and 14, would like to stay as paying guests with different medical families.

A specialist in otorhinolaryngology in Mannheim would like his daughter, aged 19, to arrange a holiday exchange for two months with the daughter or son of a doctor living in Oxford, Cambridge, or London. The British boy or girl would have the opportunity, while staying in Mannheim, of attending the University of Heidelberg.

Two Swiss doctors would like to receive U.K. doctors' daughters, aged about 18, to stay for about six months on an *au pair* basis, to help with children.

A French doctor living in Paris would like to arrange a holiday exchange for her son, aged 17½, during September. She would not be able to receive an English boy until October.

Would anyone interested please get into touch with Brigadier H. A. Sandiford, International Medical Visitors' Bureau, B.M.A. House, Tavistock Square, London, W.C.1.

Correspondence

Because of heavy pressure on our space, correspondents are asked to keep their letters short.

Remuneration Claim

SIR,—If the rebuttal of our claim to a cost-of-living adjustment was disappointing to most doctors, let it be remembered that it seems to verge on the calamitous to all except the most recently appointed registrars. Many of us have known no increment for two years, and it is common knowledge that four or six years is the least time likely to be spent in the grade nowadays, in spite of the roseate "normally held for two years" of the terms and conditions of service. It is more than high time for these outmoded gradations to be revised—objections to "dilution of consultant labour" are invalid, for consultant labour is *de facto* already diluted by superannuated trainees. If the Ministry refuses to create the necessary posts, at least those who are waiting for vacancies can be granted a fair return for their annually increasing experience and the accumulation of higher and differential qualifications.

The public are being seen, examined, treated, advised, anaesthetized, and operated upon by a large proportion of doctors who are living from hand to mouth, with little or no security of tenure, on remuneration which compares unfavourably with that of 21-year-old car sprayers, stevedores, and espresso-bar operators, to quote but three authenticated examples. The public, who place their trust in these doctors, respect them, and are thankful for their ministrations, do not know that their "specialist," some eight years qualified or more, possibly with one or more higher qualification, at least "deeply studied in physic" if not "groundedly learned," is still being moved about every two years and is still being paid as a second-year trainee.

Assuming that the work done by registrars is there to be done, and while awaiting the only real solution of the problem—the creation of sufficient consultant posts—some equitable makeshift should nevertheless be pressed for, if only for the *ad hoc* relief of hardship. Annual increments for additional years in the grade, with special increments for the higher or differential qualifications as they are obtained (as holds in other fields such as engineering and teaching), seems to be an answer to the problem. The argument that this would create a "sub-consultant" grade seems spurious, as the people who would constitute the grade already exist, and are working in a "sub-consultant" capacity already, with no early prospect of betterment apart from such a change in their grading. If this is doubted, let each consultant insist on actual supervision of the work of his registrar(s); he would soon find the need to be in two places at once; waiting-lists would grow; and we might even see the Minister volunteering the increase in the consultant establishment which is so obviously needed.—I am, etc.,

London, E.11

J. D. KEITH PALMER.

SIR,—Perhaps the recent rejection of the claim for increased remuneration will bring home to doctors their lack of strength as a negotiating body.

Let them ask themselves what safeguards exist in connexion with: (1) remuneration, (2) working hours, (3) working conditions. What is to prevent the Government from continuing to refuse any increase in pay, and in fact what is to prevent them from actually cutting that pay down? Secondly, what is to prevent demands on doctors by patients from increasing until saturation point is reached and passed? Thirdly, what possibility is there of working conditions being improved when no safeguards exist in relation to the above factors?

In six years the standard of living of the medical profession has dropped by one-quarter. Over the past 20 years the demands on doctors by patients have increased by about

250% (this figure is an estimate). If the doctors do not attempt to alter this position for themselves no one else will do it for them. The machinery is there. It needs only radical alteration in its use for it to become effective. The time for this is now.—I am, etc.,

Cheadle, Staffs.

R. DEAN JONES.

SIR,—The remuneration issue is not one for complacency. It is now more than two weeks since Mr. Turton made his utterly outrageous statement in the House of Commons. It is therefore time for our negotiators to tell Mr. Turton that he must take steps to implement Spens now or the Association will start at once to organize a mass resignation from the N.H.S. Last time we had endless delaying tactics by the Minister before Mr. Justice Danckwerts made his arbitration decision. Let us for goodness' sake "get cracking" this time.—I am, etc.,

Edinburgh, 11.

R. C. McLAREN.

SIR,—The trick of timing employed by the Minister and the letter to a popular daily newspaper claiming that doctors are grossly overpaid should sweep away the last of our illusions. We are dealing with a politician ready to take a leaf from Adolf Hitler's book and quite unconcerned with the justice of our case. Our ability to embarrass the Government by causing a breakdown in the N.H.S. is our only bargaining asset in the eyes of officialdom, since only then would the main body of the general public evince any interest in our conditions of service and remuneration.

A token strike is an excellent idea, but, if it falls short of achieving its object, what next? The answer is that we must then realize that we are fighting for our very existence and not be squeamish about employing full strike action. This would mean casualties, but such methods would only need to be used once, since future Ministers would show a marked willingness to negotiate. Remember: if we fail it will only be a few years before we are degraded to the level of hewers of wood and drawers of water.—I am, etc.,

Leeds, 16.

CLIFFORD T. ROBERTS.

SIR,—Now that some retaliatory measures are being discussed with regard to our rejected claim for increased pay, I consider it both foolish and unethical to penalize our patients, either in the form of reduced surgery hours or by refusal to sign certificates, as suggested by some of your correspondents. Surely we should "strike," but let it be against our employers—i.e., the administration.

What better method could we employ than collectively to withhold payment of part or the whole of our income tax, until such a time as our just demands are honoured. Let us see whether our masters will proceed to prosecute or imprison 22,000 general practitioners. And if they do, let us by all means face a spell of imprisonment. It may, to some of us at any rate, prove a welcome rest and a relief from running a busy general practice. And at least I do not suppose we shall get any night calls.—I am, etc.,

Tadworth, Surrey.

J. R. ELWELL.

SIR,—The refusal by the Minister to accede to the request for a 24% pay increase for doctors has already provoked indignation in your columns. Before condemning his action, let us consider this claim and its implications.

The profession, through its leaders, has said in effect that all doctors are entitled to an increase of 24% in their earnings to offset the increased cost of living. But, in general practice at least, is this true? Would a general increase of 24% in capitation fees give more money to those who need it? Would all doctors benefit? We consider that the answer is "no" in each case.

The earnings of general practitioners are extremely varied, from the small-list man whose practice expenses are a very large part of his income to the doctor with a large list and many outside sources of income, who on no reasonable standards can be said to be underpaid. If a general uniform increase were granted, the bulk of it would be absorbed in

making large incomes larger, and those doctors who are in greatest need of more money would get little. As no provision is made, either in Spens or by the profession, to better assistants' salaries, they would probably get nothing. This is a fundamental fault of the present system of distribution, and must have been obvious to the Minister, perhaps even a major reason for his decision, which in our opinion was fully justified.

We suggest that, to justify a claim for more money in the general-practitioner pool, the profession must first make clear where any increase would go, and also take steps to ensure that such money would be spent where it is needed, and not on any arbitrary betterment applied to the existing scheme, with the shortcomings of the present one thus exaggerated. A case for more money could be made out if it were to correct some of the faults of the present system which are dependent on the system of remuneration—head-hunting and competition for patients, oversize lists, and poor standards of practice.

We should like to draw attention to a recent resolution of the General Practice Reform Association calling for loading the capitation fee from zero instead of from 500. We most believe that such a loading would give help where it is most needed—that is, to doctors with smaller lists who have the highest expense ratio—and would also make entry into new practice easier by reducing the financial barrier to new partnerships. If, in addition, the maximum permitted size of list, and the size of the extra list allowed for an assistant, were reduced, the profession would be in the strong position of having made constructive proposals for raising standards of practice and helping to get into practice some of the many doctors who are badly needed but unable to obtain entry, and of asking for the funds necessary to carry out these reforms.—We are, etc.,

A. C. J. SAUDEK.

H. P. HILDITCH.

London, N.W.6.

Economy in the N.H.S.

SIR,—In recent months there have been many statements in the press by ministers, officials, and the like on the increasing bill the Government has to pay for drugs and other sectional items of the N.H.S. and Ministry of National Insurance. I am the first to admit that the bill is a high one and higher than is warranted by the needs of the population on whom the money is spent. It is most unjust that the blame for this state of affairs should be laid on the medical profession, or indeed that they should be expected to find the remedy for it.

The Government could, if it had the political courage, make these economies itself. Because it is unwilling to take the political risk is no reason whatsoever for the medical profession to take the responsibility on the Government's behalf.

If the Government wishes to economize it has only to undertake a few measures, which would, I have no doubt, be unpopular, because they would remove many of the over-inflated ideals which politicians are so fond of maintaining before the electorate. (1) It should issue a list of drugs which can be supplied to patients free of charge under the N.H.S., and any drugs not on the list would be unobtainable except by purchase. After all, why should a doctor who undertakes to give his patients the best available treatment require his patients to take some cheap, unpalatable remedy in the place of some more elegant but more expensive product? (2) While the general practice side of the medical profession is paid on the capitation basis every G.P. is to an extent blackmailed into sometimes providing treatment against his better judgment. He is in fact in a very awkward predicament: if he insists on the most stringent economies in prescribing he may lose his practice, and if he does not he is liable to fine or censure. It is quite noticeable that G.P.s practising in an area where there is little competition with other G.P.s are able to achieve much more significant economies than those in active competition. (3) A similar situation exists in regard to the ambulance service, parti-

cularly in rural areas. The Government ordains that there should be a free ambulance service, the criterion for the use of which is that a G.P. shall certify that the patient is unfit to travel by public transport. The practitioner is in a dilemma. If he wishes to keep his practice together he must err on the generous side.

I think it should be obvious that the real economy in the N.H.S. lies in realistic action on the part of the Government. If it is afraid to tell the public what has to be done, why should we? A list of drugs was prepared, some of which we were advised not to prescribe, but of course we could if we thought them to be necessary. If these drugs are too expensive for the N.H.S. then the Government should say so, and if we thought our patients required them we could tell them that they were necessary but must be paid for.

If the Government would lose its political timidity it would be much easier for the medical profession to make a very clumsy N.H.S. work economically.—I am, etc.,

Steaforth, Lincs.

H. WILSON.

Where the Money Goes

SIR,—It has just been brought to my notice that when a home help is needed, and this is supported by a medical certificate to that effect, the patient is visited by a health visitor on whose report the necessary help is furnished or otherwise. This to me seems a waste of public funds and time.—I am, etc.,

London, N.4.

T. H. K. MACLAUGHLIN.

Consultant's Contract Terminated

SIR,—We read Dr. J. M. Alston's letter (*Supplement*, July 14, p. 53) with concern, and have delayed writing about the matter until we could make some further inquiries. Having done so, we feel that it is our duty to say that we are in full agreement with the final paragraph of Dr. Alston's letter.

We trust that the Negotiating Committee will not let the matter rest but will make a vigorous protest to the Minister about the manner in which this contract was terminated, and ask that further inquiry may be made. Our chief concern is to ensure that, where medical administration is in being at any hospital, this type of administration should be clearly seen to be sound and above reproach, especially by our medical colleagues.—We are, etc.,

G. MCCOULL,
President.V. COTTON-CORNWALL,
Chairman of Council,
The Medical Superintendents' Society.

Prudhoe-on-Tyne.

Hospital Medical Staff Board and Lodging Charges

SIR,—Notification has been received from the Management Side Secretary of Committee B of the Medical Whitley Council that the Committee has agreed to amend paragraph 17 of the Terms and Conditions of Service to provide for charges to be made for board and lodging for hospital medical staff at a fixed rate according to the grade of the officer concerned. The rates are: senior house officers, £150 per annum; J.H.M.O.s and registrars, £170 per annum; senior registrars, £200 per annum; S.H.M.O.s, £350 per annum; consultants, £400 per annum.

As there is wide variation from hospital to hospital in the value of amenities of resident medical staff, it is astonishing that the Staff Side of Committee B of the Medical Whitley Council should have agreed to figures so high for the senior grades, and to assessment on the basis of a flat rate for each grade, no matter how little is received in return. This latter principle is obviously most unfair, and my own case, I think, demonstrates this point.

In the Alder Hey Children's Hospital all medical and surgical staff whose contracts require them to be resident (and this includes myself) share exactly the same amenities as regards dining-room, food, and service. Under the municipal authority the assessment of the value of these emoluments was: house officer, £100; registrar, £130; deputy medical superintendent (who has a sitting-room),

£160. As an S.H.M.O. I am paying, under the new assessment, an additional £190, although the amenities themselves have remained unchanged. I believe that this represents a gross overcharge, but am apparently without redress. My present amenities being adequate for my needs, I do not seek additional services. Why, therefore, should I be compelled to pay disproportionately more solely on account of my grade?

The new scale of charges is hardly calculated to induce senior medical staff to live in hospital if they can avoid it. Have the negotiators so long forgotten their own hospital days that they are unmindful of the value of resident senior medical and surgical staff, or is this new agreement a move to diminish their number in order that the lay authority may further progress towards totalitarian power?—I am, etc.,

Liverpool, 12.

R. J. DERHAM.

Convalescent Homes For Doctors

SIR,—I was pleased to read in the *Supplement* of July 21 (p. 56) of the carrying of a motion proposed by Dr. Joan Chappell at the Annual Representative Meeting at Brighton, asking the Council to consider ways and means by which a convalescent home or homes could be established for the use of members of the medical profession and their immediate relations.

I brought this subject to the notice of the profession in a letter which you were good enough to publish in the *Journal* of December 22, 1951 (p. 1524). In my letter I drew attention to the existence of a convalescent home owned and run by the Pharmaceutical Society of Great Britain for the benefit of their members and wives or husbands. The structure is a fine example of the smaller type of English country mansion, built of stone about 55 years ago, standing in its own grounds in a country district of Derbyshire. Various rooms have been adopted by branches of the Pharmaceutical Society, who have raised funds from their members to defray the cost of furnishings. Other branches give separate items of equipment, both for the house and for the grounds. It is under the supervision of a lady warden, and the charges are nominal—1½ guineas per week.

There are various other bodies who possess convalescent homes for the benefit of their members. Why should we be the exception? What greater pleasure and comfort could we have than the knowledge that we might, should the occasion arise, be restored to health in our own establishment, and amidst the company of our colleagues? There must be several buildings in the kingdom one or more of which could be capable of adaptation for use as a convalescent home. With wide support of this laudable object, the purchase price and cost of maintenance should be within the profession's capacity.

I sincerely trust that the idea of a convalescent home owned and conducted by and for the benefit of members of the medical profession will not be allowed to lapse, and that the Council will in due course bring this project into being.—I am, etc.,

Kilburn, N.W.6.

JOEL GREEN.

Medical Auxiliaries

SIR,—I read (*Supplement*, July 14, p. 47) that at the A.R.M. a motion was carried welcoming the proposed statutory registration of medical auxiliaries provided that (1) the medical profession maintains some control of the training standards to be aimed at and general ethical conduct, and (2) that the medical auxiliaries retain their present description and are not given independent status as belonging to professions associated with medicine. I was not present at the A.R.M. and do not therefore know anything of the discussion which took place. The following points may have been ventilated, but, even if they were, will not be known to the profession at large.

Medical auxiliaries include very diverse types, some of whom, like laboratory workers, do not "practise." They investigate and test but do not treat—that is, they have no

personal responsibility to patients. Others, such as the chiropodist, are practitioners in their own right. They treat and have a personal responsibility for their patients. Some practise in clinics and hospitals; some are private practitioners with their own surgeries; others do both. By the very nature of their work they cannot be other than "independent." The terms of the second part of the motion as applied to them make nonsense. Their training has long been "controlled" by the medical profession. Their practice is something that medical men refuse to touch (one might add it is something that most medical men know little about). Their practice deals direct with their patients. We cannot possibly deny them professional status. They have it already. The Association must think again. It has sponsored them in the past. It must support them again.—I am, etc.,

Salford, 3.

W. SAYLE-CREER.

Naming the Doctor

SIR,—The *Star*, and perhaps other national newspapers, continually advocates that the names of doctors penalized for breach of the terms of service should be made public, the reason given being that it would be doing justice to the very large majority of doctors who are not guilty of any such breach and who may be suspected by their patients as possibly being the unnamed "Dr. X."

I do not consider this to be a reasonable reason for making the names of the very few guilty doctors public. In the first place, I do not think that patients would have it in their mind that their own doctor may be the "Dr. X." Putting myself in the position of a patient, I cannot imagine myself for a moment thinking that my doctor may be the "Dr. X." Secondly, "Dr. X," if his name is made public, after paying fully the penalty imposed upon him, is in real danger of losing very many of his patients—in fact, his livelihood—nearly as much as if he had been struck off the *Register*. Such a terrible punishment would be, of course, most unfair, and such as was, of course, never intended should be imposed. A doctor who has a sum of money deducted from him as a penalty would in all probability never again, having learned his lesson, be guilty of a breach of the terms of service, and thus continue to be a valuable member of the medical profession, whereas publicity of his name would most likely ruin his practice.

I fear that, with some of the press continually advocating the publicizing of "Dr. X," public opinion may in time be so unjustifiably swayed as to bring about by an Act or otherwise the naming of doctors who are penalized for a breach of the terms of service. I therefore feel that the advocacy of the press, which is continual and persistent, should be answered by the British Medical Association by direct approach to the editors of such newspapers.—I am, etc.,

London, N.W.1.

M. D. RIPKA.

Association Notices

Diary of Central Meetings

SEPTEMBER

20 Thurs. G.M.S. Committee, 10.30 a.m.

Branch and Division Meetings to be Held

NOTTINGHAM BRANCH.—At E.N.T. Department, Nottingham General Hospital, Thursday, August 16, 8.30 p.m., meeting. Talk by Mr. E. J. G. Glass: "The Problems of Deafness in Practice."

Meetings of Branches and Divisions

SOUTH STAFFORDSHIRE DIVISION

The annual general meeting was held on May 29, 1956, in the executive council office, Wolverhampton. Mr. R. L. Benison took the chair and 28 members were present. The following officers were elected:

Chairman.—Dr. S. A. Scott.

Vice-chairman.—Mr. R. L. Benison

Honorary Secretary and Treasurer.—Dr. L. C. Rutter.

Honorary Assistant Secretary.—Dr. H. R. Chapman.

SUPPLEMENT TO THE BRITISH MEDICAL JOURNAL

LONDON SATURDAY AUGUST 18 1956

CONTENTS

Tax Assessment of Part-time Consultants -	103	Correspondence -	104
St. George-in-the-East Hospital -	103	Questions Answered -	108
Medical Practices Committee -	103	H.M. Forces Appointments -	108
Public Health Medical Officers -	104	Diary of Central Meetings -	108
Hospitality -		Meetings of Branches and Divisions -	108

TAX ASSESSMENT OF PART-TIME CONSULTANTS

SPECIAL COMMISSIONERS' DECISION

The Association, in conjunction with certain other bodies, including the three medical defence organizations, recently supported five part-time consultants in appeals against the assessment of the remuneration received from their hospital appointments and from domiciliary consultations under Schedule E of the Income Tax Act, 1918, as amended by the Income Tax Act, 1952. As a result of the assessment under this Schedule the narrow rule governing expenses applicable to Schedule E operated upon the bulk of the consultants' professional expenses.

The appeals were heard in April by the Special Commissioners of Income Tax. The hearing lasted six days, and the appellants were represented by Sir James Millard Tucker, Q.C., and Mr. John Creece.

The Special Commissioners announced on July 31 that they had allowed all the appeals and held that the consultants should not have been assessed under Schedule E but under Schedule D, both on the remuneration of their hospital appointments and on fees paid for domiciliary consultations. In the Special Commissioners' opinion the consultants' part-time hospital appointments were a necessary part of the exercise of their profession and merely incidental thereto, notwithstanding that a great deal of their time was thereby taken up.

The Crown have 21 days in which to appeal to the High Court against this decision.

ST. GEORGE-IN-THE-EAST HOSPITAL

CLOSURE DECISION

St. George-in-the-East Hospital, Stepney, is to be closed on September 30, 1956. The Minister of Health has informed the North-east Metropolitan Regional Hospital Board that he has decided to close the hospital after careful consideration of the board's proposal to do so and of the objections raised by a number of bodies against the proposal.

Following protests by the London Executive Council and the London Local Medical Committee (*Supplement*, April 7, p. 182) the board issued a statement (*Supplement*, April 21, p. 204) that its proposal was based on a shift of population away from the area and growing staffing difficulties. It said it was satisfied that the diminished demand on the hospital's services would be permanent. The board has now arranged in consultation with the Stepney Group Hospital Management Committee and the neighbouring Bow Group Hospital Management Committee, that adequate hospital and specialist services will be available in near-by hospitals for the people of Wapping and Shadwell.

MEDICAL PRACTICES COMMITTEE

AMENDMENT OF CLASSIFICATION OF AREAS

The following areas have been reclassified by the Medical Practices Committee as "designated":

Essex.—*Borough of Dagenham (except Marks Gate Estate).
Lancashire.—*Heywood.
London.—Borough of Islington: *St. Mary's and St. Peter's Wards.
Middlesex.—Borough of Enfield: *Green Street and Ponders End Wards; Borough of Willesden: *Brondesbury Park Ward.
Darlington.—*Whole of County Borough.
Preston.—*Whole of County Borough.
Sheffield.—Gleadless Valley Area (previously shown as Gleadless (Woodseats Area) and immediate surrounding districts).

The following areas have been reclassified as "intermediate":

Lancashire.—Chorley.
Middlesex.—Borough of Enfield: Ordnance and Enfield Wash Wards; Borough of Harrow: Roxbourne and Roxeth Wards.
Yorkshire (W.R.).—Urban District of Horbury; Urban District of Hoyland Nether; Parishes of Hatfield and Stainforth (Thorne Rural District); Scholes, near Leeds (Tadcaster Rural District).
Sheffield.—Attercliffe; Woodseats Area.
Wakefield.—Whole of County Borough.
Monmouthshire and Newport.—Rural District of Magor and St. Mellons.

The following areas have been reclassified as "restricted":

Buckinghamshire.—Colnbrook.
Dorsetshire.—Wareham and District.
London.—Borough of Wandsworth: Bedford Ward.
Yorkshire (W.R.).—Wetherby Rural District (except Harewood and Clifford); whole of Wetherby Rural District now restricted.
Denbighshire and Flintshire.—Abergele.

PUBLIC HEALTH MEDICAL OFFICERS

AMENDED SICK PAY SCHEME

Committee C of the Medical Whitley Council has agreed on certain amendments to the sick pay scheme applicable to public health medical officers, and has recommended local authorities to put this agreement into effect.

The present sick pay scheme for medical officers in England and Wales is the scheme set out in paragraph 10 of the Second Schedule to the Memorandum of Recommendations of the Joint Negotiating Committee for Chief Officers of Local Authorities, dated September 12, 1950. Committee C has agreed that the sick pay scheme for public health medical officers should be amended to incorporate amendments which have been made to the sick pay scheme for chief officers of local authorities since September, 1950.

The revised scheme is set out in M.D.C. circular No. 30. Medical officers of health should have a copy of this circular.

HOSPITALITY

A Belgian doctor's daughter, aged 20, and son, aged 17, would like to arrange holiday exchanges, preferably with families near London or in the south of England. The daughter would stay with a medical family on an *au pair* basis and help with children if an exchange is not possible.

A French doctor's son, aged 24, would like to stay as a paying guest with a medical family living in the London area. He wishes to stay 6 months, arriving in August.

A young French E.N.T. specialist would like to stay with a medical family as paying guest for the month of September in order to improve his English.

A French girl would like to stay on an *au pair* basis during October with a British family living in the London area.

A British doctor living in Lausanne would like to exchange flat with a doctor in London from September 10 to October 10. He would require bedroom, sitting-room, bathroom, and kitchen. Flat in Lausanne accommodates three adults and one child.

A French doctor's daughter would like to visit a British medical family for one month between August 23 and September 23 on an *au pair* basis or as a paying guest.

Would anyone interested please get in touch with Brigadier H. A. Sandiford, International Medical Visitors' Bureau, B.M.A. House, Tavistock Square, London, W.C.1.

Correspondence

Because of heavy pressure on our space, correspondents are asked to keep their letters short.

Remuneration Claim

SIR,—I have read with amazement the leading article published in *The Times* of August 9 on doctors' pay. No mention is made that much of this so-called increase will simply recompense us for the severe reduction in our incomes due to the increase in our expenses over recent years.

May I express the personal opinion that since the N.H.S. I have had no time to keep up with the Joneses? What concerns me is simply that rising costs have left me with a reduced income to meet them, and in this respect our profession is almost unique. Had there been no N.H.S., of course, our fees would have been raised to meet these increases. The Spens reports guaranteed the protection of the profession against a loss of freedom in a National Health Service to maintain its own status by adjusting fees, and it was because the Government accepted these reports that a reluctant profession was persuaded to enter the Service. The Government is not being asked for money to keep pace with the Joneses, but to compensate for our inability to raise fees.

However, surely it is not too late. The country can apparently no longer afford us. Let both sides be frank. Let the profession therefore no longer be a burden to the Government but return to the old system, and then disputes need never again occur. To most of us the N.H.S. has meant loss of freedom, increased work, interference by unqualified persons, loss of status, and a feeling of insecurity about our financial future which we should never have had while we could charge for our services on a supply and demand basis.—I am, etc.,

Southall, Middlesex.

C. A. PRAGNELL.

*Comment on *The Times* article will be found at p. 406 of the *Journal*.—Ed., B.M.J.

SIR,—Stung by the leading article in *The Times* of August 9, I write to suggest that it is high time our case received better publicity. The general public is abysmally ignorant of a doctor's life and conditions of work; the popular press seems to think we are more than adequately paid for a cushy job, and now *The Times* comes forth with the opinion that we are the spoilt darlings of the professions, having already been awarded an increase in pay well in excess of others, that we are leading handsomely in the race for increases and still want more, and that it is time that the whole system of payment as based on Spens should be reviewed. This may seem all very well from the remote, comfortable fastnesses of Printing House Square, but before such lofty sentiments are expressed the author should try the hurly-burly of general practice for a little while. Meantime, to be going on with, here are a few matters he might ponder over.

The doctor, after a long and expensive training, at the age of about 25 or 26 starts earning the princely salary of about four or five hundred pounds a year. This continues until he is lucky (?) enough to land a job as an assistant, when at the age of say 28 or 30 he might get £1,000 per annum—about what a window-cleaner gets for a five-day week. After a few more years he may be appointed to a practice vacancy, but it will probably be a long, long time before he achieves the so-called average net income, after expenses, of £2,222. As the expectation of life of a doctor is one of the shortest, he will probably die early, and will thus have had a relatively brief earning period in which to make provision for his dependants.

During his short career he will have the privilege of being on call, day and night, seven days a week, 365 days a year. His evenings will be disturbed with monotonous regularity—and in any case his evenings do not start until late—often 8 p.m. He will be called from his bed on icy nights. Unless he is lucky enough to join a rota, he will never have a week-end off. For his holidays, if he can afford any, he will have to pay a locum, caretakers, and provide board and lodging for them all, and a car for the locum. His unfortunate wife will share this "cushy" life. Domestic help, even if he could afford it, is practically unobtainable. His wife, therefore, will be an unpaid slave, tied to the house and the telephone, lucky if she gets a few hours' fresh air in the week. Unlike the wives of other men, she will be precluded from getting a job to augment the family income.

For this responsible and arduous life he will be paid the magnificent sum of fivepence gross per week per patient—the price approximately of two cigarettes, or one and a quarter packets of potato crisps, or two "iced lollies," or a quarter of a pint of beer, or two local telephone calls, or the cost of posting two letters. Such, in terms of everyday things, is the value placed upon our services. Now, the increase asked for by general practitioners is about 16 million pounds, of which about five millions would go back in tax, costing the Exchequer therefore about eleven million pounds net. Eleven million pounds represents about one penny per head of the population per week.

It should not be forgotten that out of his gross pay the doctor has to provide and maintain a larger house than would be needed for purely residential purposes. Two rooms have to be set aside for surgery and waiting-room, and these must be kept in a condition which meets with the approval of the inspecting squad when it comes round. Heating and lighting must be provided, a reliable car kept, telephone laid on, instruments renewed. Having been delivered, bound hand and foot, into the hands of the Government, doctors cannot, as can other professions, increase their charges to meet their ever-increasing expenses. They must rely on the tender mercies and good faith of the politicians, notable in all times for their evasiveness and their broken pledges.

From letters and comments in the daily press it is apparent that there is little public sympathy with our claim. I believe this is due largely to ignorance on the part of the general public, most of whom seem to think that the whole of their National Insurance contributions go to "the doctors," and that they have bought us body and soul. I submit that the

AUG. 18, 1956

CORRESPONDENCE

SUPPLEMENT TO THE
BRITISH MEDICAL JOURNAL 105

time is ripe for a publicity campaign. Let us forget for a time our "noble ideals" and hire a full page in, say, the *Daily Express* and the *Daily Mail*, and state our case. Or perhaps we could have a mass meeting at the Albert Hall, and all have a day off to attend. We should then see how the public would like, even for one day, the absence of their normally always available family doctors.—I am, etc.,

H. T. CHILTON.

London, N.18.

SIR,—Surely there is more to this than a mere refusal on the part of the Minister to put a few extra pounds into our pockets, after the Chancellor has had his cut. The battle would appear to centre round the legal implications of the Danckwerts award and the findings of the Spens Committee, but the real issue must lie in the attitude of the Government to the professional classes. While the two main political parties remain so equally balanced, the majority of the electorate will be wooed, and the minority burden on the minority will be introduced infrequently and with reluctance. We cannot put our trust in the politicians. Their every action is governed by the recurrent nightmare of a fall from power, or, in the case of the Opposition, by the glowing prospect of becoming the masters again. Dr. Edith Summerskill was quick to plead our case in Westminster last week. Does it require any great stretch of the imagination to see the same good lady rejecting a future claim out of hand, and without discussion, with an indignant Mr. Turton on the Opposition benches condemning her cursory treatment of "a noble profession"?

As a Government-employed professional body, we run a grave risk of becoming a political football, to be kicked and willy-nilly from Westminster to Whitehall and back, and the more obvious that tendency becomes the more will we have ourselves to blame. And by ourselves I mean each individual practising doctor. There is nothing to be gained at this time by throwing brick-bats at the B.M.A. and resigning membership as a token of no confidence, as Dr. A. S. Nicholas decided (*Supplement*, August 4, p. 95). On the contrary, never was it more vital than now that each and every doctor give full and active support to his representative body. No battle was ever won from an arm-chair.

We are traditionally individualists and politically disinterested. I suggest we can no longer afford to be described as such. We live in the trades union era, and if we choose to shun their methods we must suffer the consequences—namely, loss of status, professional, social, and economic. If we lose this fight, Heaven help us. The next one will be infinitely tougher, and bloodier.—I am, etc.,

LOGAN MITCHELL.

Leicester.

SIR,—Legally I think there is no doubt about the justice of the doctors' claim for their 24% increase in remuneration, though successive A.R.M.s have realized that such claims were inconvenient for the Government, and never more so than to-day. We do not know what the Negotiating Committee is doing, but it is noteworthy—though so far it has not received notice—that the Minister's reply was not a blank negative but the refusal of a "general increase in medical remuneration."

It would, in fact, be difficult in present circumstances to justify a flat increase all round, but Spens does not require that either. It has been realized from the beginning that the capitation fee was not an ideal method of payment, and before opinion hardens on a flat increase of 24% some thought should be given to methods which might with benefit supplement the capitation fee without diminishing its advantages. This might enable doctors to make interim proposals more acceptable to the Government and more beneficial to the service. Indeed, now is the time for some real hard thinking, because in July, 1958, a large number of doctors will become pensionable and many will certainly retire from the Service, thus altering drastically the whole man-power problem in general practice anyhow.

So let us start with the doctors near retiring age. Their pension depends entirely on how much they receive in the first ten years, and the fall in value of the pound is for them a most serious matter and makes retirement look bleak for them or their widows—which I am sure is not what their patients would wish. At the same time few if any of them are really in immediate need, and probably most of them would be willing to forgo the 24% increase for the next two years if given a firm promise that when they do retire the income on which their pension will be paid will notionally be grossed up to make allowance for the reduced value of the pound each year since the Danckwerts award. The compensation fee payable should be similarly adjusted. This would be a voluntary sacrifice by the doctors concerned, but it seems justifiable in view of the present strenuous efforts to stop inflation, and it should help the Government very considerably.

In actual fact the final cost to the Exchequer will probably not be as much as if they were dealing with non-medical pensioners. I, in common with a number of my contemporaries, spent several weeks in hospital last year—a clear indication that though my parents were octogenarians I am unlikely to last so long, the result of two world wars and living nearly thirty years at the end of a telephone for 24 hours a day. This steadily wearing pace is not good for doctors or for their doctoring, though it diminishes their chance of drawing pensions, and, while quite a number of doctors are relatively comfortably off, a large number do really find life a struggle. If, as the Minister states, a "general increase" could not be considered there is a very strong case for help where it is most needed. I suggest that a really useful payment of, say, £200 to £300 per annum for each dependent child would go a long way to meet this need and be a biologically sensible way of exercising the flexibility which the Spens formula allows. It would, incidentally, be in line with much social and industrial thinking. It would, of course, apply to all those in medical practice, G.P.s, M.O.H.s, consultants, professors, etc.

Thirdly, any increased payments should do something to raise the standard of practice, for at present the highest incomes bear no relation to the best work. Here I suggest that the new College of General Practitioners might help in the way I propounded when it first started. Membership or Fellowship of the Royal Colleges is not paid for, but is, in fact, the passport to higher-paid appointments. If a general practitioner from his thirties to his fifties got an extra salary he would probably spend it on his family and its bearing on his standard of practice would be negligible. I suggest that a somewhat modified membership of the College of General Practitioners—in time I hope a Royal one—should carry with it the right that his executive council would pay £100 to £200 each year (preferably twice that sum in a two-year period) on any project which was approved by the College. This would enable him, without feeling that he was depriving his family of a penny, to engage in special courses of study, foreign travel, attend conferences, or, if he knew how to use them, purchase expensive equipment such as x-ray plant or electrocardiograph. This would involve friendly supervision by the College of its members, and the possibility that if a member did not attend his membership might lapse, but at least the money spent would definitely improve his capacity to serve his patients. For the fellows, who would be a smaller and senior group, I suggest a straightforward emolument of £1,000 per annum or more, which would help them to take assistants or partners, give them time to think and opportunities of meeting their equals in the other branches of medicine, passing on any ripe wisdom they may have obtained and bringing back to meetings of the College anything they can learn. The actual cost to the Exchequer of some such system would be only a small fraction of the cost of the Health Service, probably less than £500,000, but its value in raising the standard of medical practice throughout the country would be inestimable and continuing.

These three suggestions would, I think, go far to enable the Government to meet the doctors' demands at the present

time without too great an immediate call on the national finances. They would improve the service and thereby help the public. They would be interim proposals to help the Government in its present policy of controlling inflation, offered without prejudice to the justice of our demands for the full implementation of Spens and in the realization that with the exit of many doctors in two years' time conditions will alter considerably.—I am, etc.,

Winsford, Cheshire.

W. N. LEAK.

SIR,—Never in the history of this country has a just application been turned down in such a dictatorial way. That it should be so done to an "honourable profession" shows the decline we have in the type of men now in power in our country.

We shall doubtless hear, during the next few weeks, many public statements about the dictatorship of Colonel Nasser and his failure to stand up to agreements, and yet here we have our Government acting in the same way at home. As we are now using strong-arm methods on Nasser, why do the medical profession (who, if so minded, could cripple this country in three days) not take strong action in some of the various ways suggested in the *Supplement* of July 28, many of which would be effective.

At the Conference of Local Medical Committees in June, the Minister appeared and asked for the co-operation of the profession, and within a month he has shown us that he himself is not willing to co-operate, but he still goes on allowing large amounts of money to be squandered on projects put up by county councils and the health authorities, many of which in our eyes are unnecessary, or at least could wait until better times. One can foresee in these things that the day is not long distant when we shall be entirely controlled by the Minister of Health rather than the B.M.A.

Now is the time for great leadership in the B.M.A., and in the re-election of Dr. Talbot Rogers as chairman of the G.M.S. Committee I, for one, can feel the greatest confidence that the outcome will be successful.—I am, etc.,

Bilford-on-Avon,
Warwickshire.

M. V. MURRAY.

SIR,—The following resolution was passed unanimously at a special meeting of the Blackburn Division on August 3: "That this meeting of the Blackburn Division of the B.M.A. wishes to express its deep indignation at the Minister's flat refusal to consider the just claim of the profession for implementation of the Government's promises in respect of remuneration. It pledges its full support to the Negotiating Committee and urges that the strongest possible measures be adopted to secure the just settlement of our claim."

We trust that other Divisions throughout the country will be quick to follow our example.—I am, etc.,

Blackburn

T. J. BURKE,
Hon. Public Relations Officer,
Blackburn Division, B.M.A.

SIR,—By what means can so large and important a body of men and women as the medical profession make the Government and public at large aware of the deep resentment they feel at the summary rejection of their moderate and just claims, claims made only after a prolonged period of exemplary self-restraint?

It is time now to start immediately to determine what action we should take and to prepare for such action. We should study, too, the probable effects of such action upon the doctors and upon their patients. We could, by careful preparation in good time, do a lot to mitigate any ill-effects and a lot to demonstrate any benefits that are likely to accrue. It is very likely that refusal by us to comply with certain important terms of service for a sufficient period of time will be sufficient to convince the Government that we mean business. It is possible, however, that we may have to resort to mass resignation from the Health Service. It is even possible that the Minister of Health will accept our resignations. We cannot start preparing too early.

There are thousands of younger medical men and women who have had no experience of private practice, and who look upon the possibility of having to resort to such with doubt and trepidation. We should take steps to deal with such doubts and fears well in advance and to demonstrate some of the undoubted benefits of universal private practice both to the doctor and the patient. The time for useless recrimination and for letters of shocked indignation is past. Let us start to prepare now for all eventualities and, by so doing, show the Minister of Health that we have learnt the lessons of the past.—I am, etc.,

Salford.

F. M. RIFKIN.

SIR,—I received to-day a letter from my M.P. stating that the doctors' claim could not be met because of the "effort to stabilize prices and prevent further inflationary pressures in our economy." To-day I also heard that the salaries of the senior Civil Servants are to be increased by £900-£1,500 per annum.

I expect the Negotiating Committee will be faced with similar arguments when they meet the Minister and hope they will ask him to comment on the above-mentioned pay increase.—I am, etc.,

Bishop's Stortford

I. D. PATERSON.

SIR,—Now the Government has refused our claim, we are at a vital crossroads in medicine, and if we show the same apathy as in 1948 then our position must steadily decline from now on. If the Government can repudiate its side of the agreement then we can justifiably repudiate ours. The only way to do this is for all general practitioners to resign. At the moment we all render an average of five to six items of service per patient per year for a gross 3s. per item—less tax and expenses, and we are almost at the "bob-a-job" level. With the high incidence of coronary thrombosis amongst doctors I feel this situation is intolerable.

I suggest we offer the same services as at present for an annual premium of £5 per patient (or 9s. per month or 2s. 6d. per week), payable by the patient direct to us—not an exorbitant sum remembering doctors' "clubs" were run for 1s. per week before the war. With lists reduced to 1,500 to 2,000 this would give a gross income of £7,500 to £10,000. We could pay the chemists direct monthly, and, from the present national drug bill, this would work out at at least £1,800 to £2,400 for the size of lists suggested. We could all have full-time nurse secretaries, which would cost at least £600 per annum. We should all have two sessions of two weeks each postgraduate study, the cost allowable as legitimate expenses. Add to this our present expenses and we should be left with a taxable income of £4,000 to £5,000. We should then be able to afford better equipment (even portable x-ray or E.C.G. apparatus for those interested), have time for complete overhauls of patients, for minor surgery, and for all preliminary investigations. This is bound to relieve the strain on hospital out-patients.

For the whole population this scheme costs about £250 million—about £50 million more than at present, but a large proportion of this extra amount would come back to the Government as extra taxation. Therefore a part or the whole of each person's premium could be returned by the Government by existing machinery (decreased insurance contributions, increased family allowances, and increased old age pensions). No Government preaching social service could refuse to make some compensation, and in one fell swoop would go this nonsensical idea of a "free" medical service, and we would be for ever lifted out of the political arena.

This is not against the recent idea of a united action in the profession, because general practice would once more be a really worth-while job, and the hospitals would be hard put to find staff unless the Government was prepared to pay competitive salaries. A wider dissemination of the knowledge of the British United Provident Association would help our part-time consultant colleagues. On a given date—say January 1—there could be a smooth change-over

with no question of a strike and no necessity to withhold certificates. If we had all resigned from the National Health Service the public would have no option—treatment would continue, but on our terms. With courage and united action we could lift ourselves out of this futility into which we have allowed ourselves to drift.—I am, etc.,

Tunbridge Wells.

A. E. LODEN.

SIR,—At a meeting of the Kesteven Division of the British Medical Association, held on August 6, 1956, the following resolution was unanimously adopted:

That full support be given to the Negotiating Committee in their endeavours to impress on the Minister of Health the fact that the profession insists on the full implementation of the Spens Report, since the Minister's acceptance was one of the main conditions that persuaded a reluctant profession to enter the Health Service.

It was strongly urged that the Association have in readiness plans for action if the Minister should prove to be recalcitrant in this matter. All present were in favour of resignation if the Minister failed to implement the Spens Report.—I am, etc.,

Grantham.

F. J. JAUCH,
Hon. Secretary,
Kesteven Division.

SIR,—When, some months back, the Joint Negotiating Committee informed the Government a claim was pending to compensate for the fall in the value of money in recent years, *The Times* commented that such a development was "inevitable." In the leading article of August 9, although there is confirmation of Governmental acceptance of the two Spens Reports proposals, the writer goes on to say: "It [the pledge] should never have been given in so unconditional a form and with so little regard for its implications."

Without such "pledges" it is certain that the profession would not have entered the Health Service and co-operated as has happened. This leading article implies that undertakings which subsequently prove inconvenient should not be binding. The one redeeming feature is the suggestion in the last two sentences that "some more practical and durable method of reviewing remuneration from time to time is required." Under our existing "treaty" with the Government a good case has been made out for an increase of 24%, much of which should be back dated far beyond the April 1, 1956, suggested.

This claim should be pressed, and any counter proposals considered on their merits. Should it be possible to obtain a somewhat lower immediate payment in return for an undertaking to review the cost of living adjustment automatically at, say, three-year intervals, and outside the sphere of politics, it would then be up to the profession to accept or reject the offer. Unless acceptable negotiations result within three months a united profession should demand arbitration on the "pledges" as they stand and take whatever steps prove necessary to secure that arbitration is granted. I do not remember the days of 1946 and 1948 as "wildly optimistic" (*Times* wording), and, however much statistics and arguments may cloud the issue, the middle class has had a raw deal ever since 1939. As a profession doctors did not seek nationalization, and do not see why, when wages have increased faster than the cost of living, the premises on which they agreed to enter the Health Service should now be deemed "unrealistic." We have endured inflation with patience since 1952. Events may prove Mr. Turton's blunt refusal not only unjust but the start of the landslide of his party. Let us hope he will think again, and soon.

The Health Service, as it stands, is a success. With a profession smarting under a sense of injustice it could not remain so. The whole economic future of doctors is now at stake. Degrees of hardship may vary, but let us not be fobbed off with placebos for the hardest hit. Upward adjustment must apply to all.—I am, etc.,

Dorchester.

T. V. COOPER.

A Pathologist's Pay

SIR.—Dr. A. S. Nicholas's conclusion (*Supplement*, August 4, p. 95) that the B.M.A. "fails to act in the best interests of the profession" appears entirely justified so far as the registrar grades are concerned. At no time before the recent general claim did the Association press for their salaries to be raised to a minimum of £1,000—surely not an unreasonable demand for a professional man some ten years after commencing his training. Nor, to the best of my knowledge, has it fought very vigorously for an alteration in the iniquitous ruling whereby doctors in hospital practice are not allowed textbooks and journals as expenses for tax purposes, quite apart from the question of a car allowance.

It is small wonder that most of the younger doctors feel that the Association is not particularly concerned with their interests, and is run by and for the established practitioners. In fact, I doubt whether many members of Council could detail accurately off-hand the present rates of hospital pay. When the Minister of Health stated recently in the Commons that the average remuneration of general practitioners is £2,222 per annum net, this figure was widely publicized in the national press. The fact that many doctors earn less than half this amount appears to have been conveniently forgotten.—I am, etc.,

Liverpool, 18.

M. GOLDMAN.

SIR,—Dr. A. S. Nicholas's account of why he left the medical profession (*Supplement*, August 4, p. 95), so widely publicized by the daily press, is a misfortune for all of us, the more especially as our claim for adjustment in pay is still at issue.

However much may be said about Spens and contractual obligations, the only true justification for our recent claim is that many of the younger members of our profession are suffering real hardship as they gamely struggle up the medical ladder. Dr. Nicholas contrives to give a totally different impression—namely, that doctors are dissatisfied because they cannot get rich quick, and are not so well rewarded as the business man. The general public, their minds firmly fixed fifty years behind the times and convinced that all doctors are grossly over-paid, will be more unsympathetic than ever to us. Without public support, our cause is a hopeless one. What a disservice Dr. Nicholas has done us! —I am, etc.,

Stockport.

G. SCLARE.

Board and Lodging Charges

SIR,—Many honorary secretaries of Branches and Divisions must feel, like myself, unhappy both about the decision of Medical Whitley B Committee on board and lodging charges and the manner in which the announcement of the decision is made. The British Medical Association is, as usual, being blamed, and the hospital resident staff, especially the juniors, are saying once again that the B.M.A. is not interested in their welfare and only cares about established consultants and general practitioners.

Although the B.M.A. at its Annual Representative Meeting has reaffirmed the autonomous powers of the Central Consultants and Specialists Committee and that body in turn has delegated the duties of negotiation for hospital staff to the Joint Negotiating Committee, the Branches and Divisions of the B.M.A., and of course the Council, must accept some responsibility for the action of the Staff Side of Committee B and ought to feel concern that that body has agreed to the principle that the hospital resident staff be charged for their board and lodgings on the basis of their salaries and not on the accommodation provided. At the Annual Conference of Honorary Secretaries, both last year and the year before, there was general agreement that lodging charges should be linked with accommodation provided, some of which is definitely bad, and that generous allowance should be made for the benefit to the hospital of having medical staff living in. I for one thought that at this

year's conference an assurance had been given that the Staff Side of Whitley B accepted this principle and had it constantly in mind in their negotiations. The result of these negotiations, as announced in the *Supplement* of August 11 (p. 99), makes curious reading in the light of that assurance.

With regard to the manner of the announcement, one must feel even greater disquiet, for it is symptomatic of the way negotiations are carried out on our behalf. The Staff Side agreed on July 24 to changes being made on August 1, and the announcement of the change first appears in the medical press on August 11, those affected having been already notified by lay administrators of the change at the end of July. Surely our representatives should keep us informed of what they are doing on our behalf and not leave us to get the information first from others.

One final but important point is that when negotiations are being carried out, and the negotiators themselves are not personally affected, representatives of those who will be so affected should be consulted by the Staff Side before accepting any decision.—I am, etc.,

Liverpool, 9.

V. COTTON CORNWALL.

Stamped Prescription Forms

SIR,—It was usual, when doctors wrote prescriptions, to put the address of origin at the top and a signature below the document.

But now that these unimportant details are to be added to the forms for selecting treatment from the *N.F.*, we find them relegated to the back of the note as an addition to the "general information" (wash the bottle: take this anywhere you like), pride of place on the front being held by "Form E.C.10," and "— Executive Council."—I am, etc.,

West Bromwich.

A. C. V. JONES.

Merit Awards

SIR,—Your correspondent Dr. H. G. McGregor (*Supplement*, August 4, p. 95) does not appreciate the great interest and wide implications that attach to the merit award system. Its application to the pay of consultants must be regarded merely as a pilot scheme. If this ingenious idea—the fine flower of Lord Moran's subtle genius—is a success, its benefits must in equity be extended to the whole profession. From a nationalized profession to other nationalized undertakings, and indeed to the whole field of industry is an inevitable progression. Like automation, Lord Moran's plan—at once so simple and so imaginative—may well herald a new era in industrial relations. The institution of secret committees for individual industries empowered to distribute Government money to anonymous employees (without public accountability) should serve to maintain a new and salutary discipline among industrial workers.

Dr. McGregor does less than justice to the Annual Representative Meeting in calling it "an amorphous collection of delegates, many of whom are in no position to form a judgment on a matter which does not affect them." The question is not one of technicalities but of simple ethics. The principle involved is so well defined and its implications of such far-reaching importance that many consultants will be profoundly grateful for the considered opinion expressed by the A.R.M.

There can be no possibility of compromise. This remarkable system is either brimful of the most exciting potentialities or else it is inherently vicious and demoralizing. If the latter, then it should be scotched before it spreads its clammy tentacles too far.—I am, etc.,

Sudbury, Suffolk.

H. BATHURST NORMAN.

SIR,—Dr. H. G. McGregor, in his letter on merit awards (*Supplement*, August 4, p. 95), states that the delegates at the B.M.A. conference were "an amorphous collection . . . many of whom are in no position to form a judgment on a matter which does not affect them." He errs grievously.

It affects them in two ways: (1) as taxpayers they have every right to resent the secret doling of public money; (2) as representing a profession they have a duty to protest against one section of it receiving secret pensionable sinecures.

In your account of the debate on the relevant motion (*Supplement*, July 14, p. 41) several consultants spoke, but it is not stated whether they disclosed if they had a personal monetary interest in the matter, nor does Dr. H. G. McGregor disclose whether he has such an interest. I can see no reason why in financial matters medical debates should not conform to the legal requirements of municipal and parliamentary debates. As to the clandestine central committee with this enormous patronage in its hands, with its secret agents and dubious methods, it is high time that its activities were investigated by a judicial body and a small section of the community was subjected to the disciplines of orthodox finance.—I am, etc.,

Beckley, Rye.

C. G. LEAROYD.

Conduct of Patients

SIR,—In view of the fact that no regulations or sanctions can be applied to patients whose behaviour is unsatisfactory, because lapses in good manners manifested by impertinent, uncollaborative, or inconsiderate behaviour are not illegal, surely the remedy for our troubles lies in a return to the old robust customs of ordinary society. If two people cannot get on, provided they do not endanger the Queen's peace or infringe the law of the land, the business or professional association ceases. It is childish, and a reflection on the lack of stamina in the population, that if a doctor is in fact rude, or is thought to be rude, the patient has the right of complaint to a committee. This right should be removed and restricted to serious matters. If doctor and patient cannot patch up a squabble due to fatigue or irritability on either side, the patient should select another doctor and that should be an end of the matter. It is quite preposterous that a doctor can be reported and fined for bad manners, especially as we all endure bad manners in one form or another every day. Incidentally, any attempt at reprimanding a patient for tiresome conduct is at once seized on as "rudeness." We do not want more regulations for patients, but fewer of these impositions for doctors.—I am, etc.,

Reigate, Surrey.

L. DULAKE.

Maternal Deaths.—The Ministry of Health points out that in its summary of the report for 1955 of the Central Health Services Council the reference to the maternal mortality rate should have read: "the maternal mortality rate has, since the turn of the century, been lowered from five to under one per 1,000" (not "per 100,000").

Association Notices

Diary of Central Meetings

SEPTEMBER

- 5 Wed. Coal Gas Poisoning Subcommittee, Science Committee, 2 p.m.
- 19 Wed. Emergency Call Subcommittee, G.M.S. Committee, 2 p.m.
- 20 Thurs. G.M.S. Committee, 10.30 a.m.

Meetings of Branches and Divisions

MERSEYSIDE BRANCH

The annual general meeting was held on June 6 at the Liverpool Airport Hotel, Speke. Members were entertained to lunch by Evans Medical Supplies Ltd.; Dr. D. Riding, medical director of the Evans Biological Institute at Runcorn, presided. After the meeting members visited the factory at Speke. The day concluded with tea at the Liverpool Airport Hotel, where members were joined by their ladies, who had been entertained at Speke Hall by the Automatic Telephone and Electric Co. The following officers were elected:

President.—Dr. P. J. Gibbons.

President-elect.—Dr. L. Crawford.

Vice-presidents.—Mr. D. R. Owen and Dr. C. W. Warner.

Honorary Secretary and Treasurer.—Dr. V. Cotton Cornwall.

SUPPLEMENT TO THE BRITISH MEDICAL JOURNAL

LONDON, SATURDAY AUGUST 25 1956

CONTENTS

Tax Assessment of Part-time Consultants	109	Diary of Central Meetings	114
Supplementary Ophthalmic Services	109	Branch and Division Meetings to be Held	114
Correspondence	109	Meetings of Branches and Divisions	114

TAX ASSESSMENT OF PART-TIME CONSULTANTS

CROWN APPEAL

The Crown has appealed against the decision of the Special Commissioners of Income Tax on the assessment of the remuneration of five part-time consultants (*Supplement*, August 18, p. 103), and the appeal will be heard in due course by a judge of the High Court.

SUPPLEMENTARY OPHTHALMIC SERVICES

FLAT LENSES

The following is the text of a letter (E.C.L. 49/56) from the Ministry of Health to clerks of executive councils.

I am directed by the Minister of Health to refer to the provision of the Statement of Fees and Charges that flat lenses are to be supplied for reading glasses unless curved lenses are prescribed as necessary, or are supplied at the applicant's request on an additional payment by him.

The Minister has been informed that a large part of the present manufacture of flat lenses will cease in the near future, and he is considering whether this will involve provision in the Statement of Fees and Charges for the supply of curved lenses for reading glasses without limitation. In view of existing stocks of flat lenses, which are less expensive than curved ones, he does not, however, propose to alter the present provisions immediately on the cessation of production, and I am to emphasize that the requirements about supply of flat lenses with reading glasses should be observed unless and until they are modified. It is most undesirable, for the sake both of fairness between patients and of use of existing stocks of lenses, that any tendency should develop among prescribers of prescribing as a matter of course curved lenses for reading glasses as "necessary." If, therefore, the Ophthalmic Services Committee have reason to think that such a tendency is developing either generally or on the part of individuals, they will no doubt approach the persons concerned and explain, in so far as the change in procedure appears to be connected with an expectation that flat lenses will go out of use, that a change of practice on such grounds is not in accordance with a reasonable interpretation of the prescriber's current responsibilities under the Statement of Fees and Charges and is unfair to other prescribers and their patients, and that the Committee are informed that stocks of flat lenses are ample for the time being.

Should there be any signs of a general tendency to prescribe curved lenses as necessary for reading glasses, the Ophthalmic Services Committee should consider sending a circular letter to prescribers explaining the position and, where opticians are concerned, of enlisting the help of the local optical committee.

Correspondence

Because of heavy pressure on our space, correspondents are asked to keep their letters short.

Keeping Up With the Times

SIR,—Frederick Scott Oliver is a safe man to quote, and *The Times* is to be congratulated upon going to this source for the conclusion of their leading article on Suez. You, Sir, are to be congratulated and thanked for repeating it (*Journal*, August 18, p. 406).

I wonder if your readers are familiar with another quotation from F. S. Oliver, which at the present time seems more appropriate to our own professional troubles. It runs as follows: "When lawyers monopolize political power—even when they merely preponderate, as of late years they have seemed to do more and more in all democratic countries, whether of the monarchical or republican type—they invariably destroy by insensible gradations that which is most worth preserving in man or State, the soul. Their method is to strangle slowly like ivy."—I am, etc.,

Selby, Yorks.

JOHN C. GILLIES.

Remuneration Claim

SIR,—Unlike some of my colleagues who have written to the *Journal* recently regarding remuneration, I am neither surprised nor dismayed by the rejection of our claim. I am not surprised, because the Government is at long last supposed to be trying to do something positive to halt inflation: extra-special appeals for restraint are being made, and, though these will be ignored by trade union leaders, it would be impolitic to grant an increase in remuneration to doctors with all the publicity that this will entail. In this regard the B.M.A. is much to blame. It held back, with its mistaken policy of restraint, when claims were being made by other professions, and being granted.

Neither am I dismayed by the Minister's rejection. What I expected from a politician, and what would have dismayed me, would have been the embarkation upon prolonged negotiations which would have gained for us some derisory increase in 1960 or maybe 1961. Now at least we know where we stand. I expected some sort of declaration and lead from the B.M.A. before this time. Is the B.M.A. waiting for our indignation to subside? Are we going to plead with the Minister that we should at least be allowed to start negotiations? If we do start negotiations there must be a definite foreseeable date by which time they shall be

complete, and there must be no equivocation about the amount of the claim. If negotiations are not completed by a certain date the arrangements must have been made by that date for a mass resignation. The public will suffer, but that is one of the reasons why pay claims are settled quickly.

I am reminded of a pay claim by nurses in a mental hospital in, I think, Brisbane. Negotiations dragged on for two years, until one day the nurses did not turn up for work. The Minister of Health visited the hospital and agreement was reached in two days. There is a moral in that somewhere.—I am, etc.,

London, W.1.

A. W. BEARD.

SIR,—I am in full agreement with the proposals put forward by Dr. A. M. Goldthorpe and Dr. S. T. Pybus (*Supplement*, July 28, p. 87). These letters have had some publicity recently in the lay press. There are many aspects of the Service which are contradictory to the glowing Guillebaud report. For example, recent statistics show that by far the greatest number of Health Service patients seek their family doctor's care for antenatal treatment. Public health authorities are rather "alarmed" about these facts. It is obvious that the vast sums of money squandered on public authority antenatal clinics might be at least curtailed. Other examples can easily be cited where facts prove that there is a great deal of unnecessary expenditure in the administration of the Service. How long is the doctor and his family to suffer our collective "kid glove" tactics with a Ministry persisting indefinitely in the Alice in Wonderland role? The B.M.A. will certainly have to reassess its powers (if these are not in its present constitution) to withdraw services and to plan for this type of action. Certainly the present situation warrants this all the more, and future troubles with a lay Minister may well make this an imperative decision. It is up to every medical practitioner to support B.M.A. action, and more especially is it true that every young graduate should seek its membership. It is very urgent indeed that the B.M.A. presents a tougher attitude to cavalier treatments and willy-nilly attitudes of Ministers, who are essentially, at any rate, party politicians. And is not the whole tempo of the N.H.S. (as we have come to experience it) in its gross inefficiencies due mainly to the considerations of party politics?—I am, etc.,

Birmingham.

J. J. BROOKS.

SIR,—It is a pity that Drs. A. C. J. Saudek and H. P. Hilditch (*Supplement*, August 11, p. 100) should choose to stir up internal controversies at a time when it is vitally necessary for the profession to be completely united. It might have occurred to them that such unity is not likely to be achieved if thousands of those concerned are to be excluded from any benefits that may accrue from a successful fight on the remuneration issue. It is, of course, nonsense to suggest that the Minister's attitude is being determined by the methods that the profession chooses to distribute the available money, and any attempt at this point to forward sectional interests could only end in defeat for us all.

There are a number of fallacious statements in their letter which, through constant repetition, may be accepted as true unless they are actively contradicted. First, let it be firmly stated that large-list doctors do not, for the most part, have large incomes; relatively large maybe, but still small compared with those earned in other professions and in business. Most of them have commitments proportionate to the level of their incomes, and the inflation of recent years has placed many in a difficult financial position. Furthermore, they have not obtained their status by "head-hunting and poor standards of practice," but by hard work, ability, willingness to practise in undesirable areas, and reputations built up through the years. Finally, young doctors must realize that there is nothing new in having to make do on a small income in one's early years of practice. This was certainly the case when I first started; however, in those days it was the custom to get established first and get married afterwards, so that we did not suffer so much hardship.

Surely the thing to realize is that all of us, young and not quite so young, general practitioners and consultants, established and unestablished, are all relatively hard up, and that we must concentrate all our energies and thoughts to the common good. Otherwise we shall certainly get nowhere at all and we shall have to consider giving up medicine for some more remunerative occupation or, at any rate, taking good care that our sons do not follow in our footsteps.—I am, etc.,

Margate

M. CURWEN.

SIR,—Our profession appears once again to be meekly accepting the adroit handling of the Minister of Health, aided and abetted by his lay staff. The Negotiating Committee, having talked of firm action, is now in conclave working out legal arguments which should provide the Minister with debating points for many months to come. Further, it is holiday time and Parliament does not reassemble until October, so why rush? Our esteemed *Journal* even tells us to enjoy our holiday. Among associates one begins to detect an attitude of "The Minister has done it again, and wangled out of commitments as in previous times." This easy acceptance, surprisingly enough, comes from practitioners who are the first to grumble about their compensation and the many inadequacies of the Service but once more seem to be mildly bending their heads to the ministerial yoke.

I suggest we decide whether, in the light of present conditions and previous authoritative promises, we consider increased remuneration justifiable and necessary. If the answer is yes, then we should not allow the Minister to dilly-dally but should tell him we insist on a proper scale of payment being made. This must date from April, 1956, and must be accepted within one month. If the Minister is on holiday then his staff, who answered so off-handedly before, can do his thinking for him and implement our proposals. If we are not united in this purpose then we waste our time, but if we are then we should have a definite line to follow to ensure results. The British Medical Association should advise all area secretaries to call branch meetings in September, and, again provided the profession considers its claim reasonable, I suggest the following points be voted on: (1) The profession should give one month's notice of their intention to stop issuing National Insurance certificates. (2) If after one month of refusal to issue certificates our claim has not been met the profession should give a stated time, say four months, after which there should be mass resignation from the Service. In the meantime the public be warned of this likelihood and insurance companies approached to try to work out some insurance scheme for general health purposes. There would be no question of refusal to treat anyone who was ill.

The opportunity should also be taken to make the Minister and his Civil Service advisers realize that the profession are the important workers of the Health Service, and that, while the public is the first consideration, the profession comes next, and the ministerial staff a very low third. In this way we can control our own affairs and make sure the doctor knows of any advances, schemes, or changes before the public. We do not begrudge the Minister his television appearances, but we should control them when medical matters are involved.

I agree that many improvements are necessary in the general running of the health scheme, and also in the method of remuneration, but our first consideration at present should be the implementation of our claim and the insistence on control of the working of the scheme. Any alterations in the present National Health scheme system can then be made by a united profession striving to reach an efficient peak of service, both from the doctor's and from the patient's point of view.—I am, etc.,

Luton, Beds.

ANDREW JACKSON.

SIR,—The newspapers and our own P.R.O. tell us that we, as G.P.s, receive an average net income of £2,222. Some of us are mystified, as we only have the evidence of our

quarterly cheques to guide us, and they seem to tell a different story.

In front of me I have a quarterly statement from our executive council concerning a colleague, not in my partnership. His figures read as follows:

	£	s.	d.
List of 2,164 at 4s. 3d.	459	17	0
Loading	125	0	0
Superannuation	37	8	10
Temporary residents	11	1	0
Total	633	6	10
This equals £2,533 7s. 4d. per annum gross.			

The practice expenses incurred are not likely to be less than 30% of this figure, which gives a net income of roughly £1,774. Now the point of interest to all of us is: What happens to the very substantial difference? Most of us in working-class practice have no private work.—I am, etc.,

J. W. SIMPSON.

Harrow.

SIR,—I noticed in Sir Anthony Eden's broadcast he mentioned the sum of £70 million compensation that Colonel Nasser had promised to pay to the Suez Canal Company when he nationalized the canal. The Prime Minister has no faith in this being paid. I do not think he has much to criticize on this score when you consider the £66 million still due to the medical practitioners after 10 years of nationalization. All we get is a meagre 2½% interest, and income tax is deducted from this. It would appear that the Egyptian president is taking a leaf out of the Government's book. I suggest that the Prime Minister should clear his own debts before criticizing others.

I hold no brief for Colonel Nasser, as I dislike Fascists and Communists as much as any other man, but I did want to draw your attention to Sir Anthony's statement. Maybe some use could be made of it in the negotiations.—I am, etc.,

H. W. DAVIS.

Huddersfield.

SIR,—Each week the letters in your columns regarding the remuneration claim stimulate many of us to almost fighting pitch, but frustration follows when no action results. I suggest that the B.M.A. forms an "action committee" which must decide on some form of token strike—e.g., refusal to sign National Insurance certificates. Ballot forms should be sent to all doctors concerned, and, if the method is approved by the majority of us, it should be implemented without delay. It seems that some form of token strike is needed and many of us are only awaiting a decisive directive as to how and when. Let the B.M.A. give it soon.—I am, etc.,

C. R. LYNN.

Harold Wood, Essex.

SIR,—The Minister of Health and his Scottish colleague appear to have timed their reply to our claim (if such it can be dubbed) with some care, so as to postpone the inevitable clash between the profession and the Government. Is it not possible for us to turn the Ministers' dilatoriness to our advantage? I submit that, by affording us more time, the Ministers have offered us the opportunity of strengthening our case, and that we would be most ill-advised not to take advantage of this.

In the first place, we can now launch a vigorous national publicity campaign disabusing the public of the widely held view that we are already well off and only making an unnecessary and unjustifiable fuss. This should be conducted through the media of press, radio, and television. We could also strengthen our bargaining position in two ways. We could, in the next two months, make a formal and urgent approach to the representative bodies of other professions, with a view to bringing into play collective pressure in excess of that possible with our meagre numbers, pledging mutual support between the professions; and we could initiate a nation-wide effort to become somewhat less dependent on the Government for our livelihood (and there are ways of achieving this which are perhaps best left unpublished at present).

Finally, we can prepare a definite, albeit flexible, schedule of measures to be brought into play in its entirety or piecemeal, as the Ministers' attitude demands, each measure applicable to an anticipated obstructive manoeuvre on the part of the Government. As I see it, without such a plan we are doomed to being out-generalled by Ministers who have at hand not only the big guns but the inclination to turn them on us.

Is it not possible, Sir, for the Council of the B.M.A. to consider these with the other suggestions that have been made, to institute immediate emergency action, and, above all, to inform the profession what manner of additional armaments it has been possible to muster, before joining battle in October? Failure to seize this opportunity now cannot but jeopardize our negotiating committee's position in two months' time.—I am, etc.,

JOHN K. PATERSON.

Union, Hunts.

Emergency Call Service

SIR,—Recently the Duke of Edinburgh, when he opened the Study Conference on Human Problems in Industry, said: "It may not be very easy to decide what we are aiming at in this modern world of ours, but whatever the target we must take into account that all people are primarily citizens, and not just workers with a bit of private life."

The present-day G.P. is a worker with about as much private life as a battery hen. Our patients also are not over-contented with things as they are. How often does a patient get "tided over for the night" with some tablets, when he would have much preferred a visit? Since the G.M.S. Committee has condemned the Emergency Call Service, I wonder if an alternative scheme would be acceptable. The public health services have been evolved to meet the needs not met adequately by other agencies, and until recently were always in a constant state of extension and development. A salaried night service, run by the public health authorities, would no more be in competition with the family doctor than the present school medical service. Indeed, it might well be initially recruited from doctors in the school medical service assisted by the health visitors.

Why cannot the London Emergency Call Service be regularized and expanded on the above lines, and the whole country enjoy its advantages?—I am, etc.,

D. S. PORTER.

Caterham, Surrey.

Health Centres

SIR,—I would like to express my pleasure at the report of the London Local Medical Committee (*Supplement*, August 4, p. 89), for I am in complete agreement with their conclusions. In my opinion the only intelligent method of conducting general practice these days under the National Health Service is from a health centre. It is only in this way that our full potentialities in the realm of preventive medicine—surely our ultimate aim—can be realized.

Most of the recommendations in the report are already in effect at the William Budd Health Centre, which was built by the Bristol local health authority and has been running since July, 1953. Here I must say that, despite some early misgivings from our colleagues, we have had every help and encouragement from the local authority and especially from the medical officer of health, Dr. R. C. Wofinden. The building is of modest proportions, doctors are consulted over all staff appointments, and they work in close co-operation with the health visitors and other local authority workers who use the consulting-room suites in the afternoons. The doctors hold their own infant welfare and antenatal sessions at the centre. The reason why doctors outside the centre are not invited to share in these facilities is quite simple. The centre is fully occupied daily from 8 a.m. to 8 p.m., and it would just not be possible to hold any further sessions. The answer is for outside doctors to get together and agitate for more health centres.

Group partnerships in which there is a limited amount of specialization have their advantages, but at the William Budd the absence of such a partnership is not found to be

in any way a drawback. Doctors do see each other's patients in emergency and call each other into consultation over puzzling or interesting cases.

Under the National Health Service Act the health centres, of course, must be provided by the local authority. I am afraid that the loan scheme for group practice will not attract more than a few groups of doctors. After all, we have to buy our own houses, and that means a capital investment of between £3,000 and £4,000, and I feel sure most doctors would be unwilling or unable to invest any more money into group practice buildings. On the other hand, the local authorities could take over and convert large houses in built-up areas at minimal expense.

The doctors at the William Budd pay only a nominal rent, and that, in my opinion, is as it should be. We are not engaged in "business" nor does the better service we provide increase our remuneration, although it takes up far more of our time. Physicians and surgeons working in hospitals do not pay for their consulting-rooms, theatres, and so on. Unfortunately we are too often bedevilled by the question of costs, and yet the balance sheet can be most misleading. The William Budd on that score looks expensive to run, but the money is spent for the most part on wages and salaries of people who would be doing that work anyway, and in premises which would otherwise be empty for many hours each day. The allocation of costs between the general practitioner and local health authority branches of the service is purely nominal on a two-thirds to one-third time-user basis, but in fact is quite unrealistic, for such is the integration achieved that it is impossible to separate the two on a proper actuarial basis. It is also impossible to assess the benefit to the patients from what is undoubtedly a higher standard of medical service.—I am, etc.,

Bristol, 4.

J. SLUGLETT.

Subsistence Allowances

SIR,—Will you allow a very old member to comment on the recent A.R.M.? I have read the accounts of the meeting with interest, but regret some of the decisions come to, and particularly the vote in favour of subsistence allowances (*Supplement*, July 14, p. 15). Some of the arguments put forward in support are far from convincing. I cannot think that the quality of representation, or the democratic foundation, is threatened. The meeting itself contradicts any such fear, for there is said to have been keenness on the part of representatives, both young and elderly, and the speaking was on a high level. This does not suggest difficulty in enlisting suitable representatives, or any reluctance to serve. The chairman of the Organization Committee spoke of many men and women ready to sacrifice their time and energies in the work of the Association, and this applies to representatives as well as to those engaged in other activities; and may this happy position long remain.

I ask: Is it necessary to upset the finances of the Association by this new expense? So as not to seem entirely obstructive I suggest that a Division wishing to contribute towards its representative's expenses could do so through a local voluntary fund, many of which already exist. One speaker proposed an allowance of two guineas per day, and on the present basis of representation that means less than 5s. per member, which should be willingly subscribed.—I am, etc.,

Sheffield.

HENRY BROWN.

Board and Lodging Charges

SIR,—Recently the appropriate Medical Whitley Council has agreed that board and lodging charges for resident medical officers be standardized at all grades throughout the country (*Supplement*, August 11, p. 99). For senior house officers—of which I am one—the sum is £150 per annum.

I further understand that no abatement is allowable on account of annual leave. In spite of this, in some hospital groups the residents are rebated while on holiday. I have benefited from this in the past. Now I am in a group where

the rebate is not allowed. This is according to regulations, and one cannot object. However, I do query the fact that locumtenents are also having their board and lodging subtracted. This means that this hospital is not only taking from each S.H.O. post at £150 per annum but an extra £15 from the locum—a total of £165. If by chance the senior house officer decides not to take a holiday I wonder how the hospital explains that it has only extracted £150 from the post—or if he does take a holiday and gets a locum, does the extra £15 go down as "capital gains"? At any rate, it does not seem to me to be a "fair deal." I would be very grateful if anyone can enlighten me.—I am, etc.,

London, N.W.1.

W. M. E. TWEED.

A Pathologist's Pay

SIR,—Dr. A. S. Nicholas (*Supplement*, August 4, p. 95), who entered his family business instead of trying to specialize, chose the better part. He was lucky to have so readily available an alternative to the prospects of the registrar grades. His analysis, made in 1952, remains accurate, with the amendment that the decline in the purchasing power of our salaries has accelerated since then.

The position of a registrar in any specialty is grim. Pathology, at one time one of the least crowded, is now rapidly filling up, and the position in general medicine and surgery should be too well known to require re-emphasis. Many of us, by the time we reach senior house officer or registrar status, desire to marry, and some are so rash as to have children. The married registrar must face life in rented accommodation for several years, as moves are too frequent to make house purchase practicable, even if the capital can be borrowed. Such accommodation is hard to find in our larger cities, often unsuitable for young children, and ruinously expensive. In addition, the family must face at least three moves, for a change of post often involves a change of residence.

Prospects of ultimate advancement do not compensate for these immediate hardships. That of achieving consultant status is poor, and is governed by a sum so simple that it does not seem to have entered the calculations either of the Ministry, which is only to be expected, or of our own Association, which might be presumed to give some thought to its younger members. Each consultant has an assistant, of one or other of the trainee grades. It takes at the most ten years to pass through all the trainee grades and attain the recommended age for consultant status. But most consultants can be expected to hold their posts for thirty years, from age 35 to 65. Therefore, each consultant is training three successors for his own post. I have yet to hear any credible explanation of what happens to the other two.

The favoured position of Dr. Nicholas and our other contemporaries "in business" needs no emphasis. They have their expense accounts and "company" cars, and often assistance with removal expenses and financing of house purchase. Some even get assistance with their children's school fees. It is obvious that the young doctor is valued by the community at less than the commercial traveller, and much less than the production engineer. The corollary is also obvious; in a few years' time there will be a lot more competition for the post of commercial traveller, and a lot less for that of trainee specialist. The first-class men will not be content to subsist, and see their families subsist, at a lower standard of living. Medicine will not attract first-class men to second-class pay and third-class prospects; a worth-while, interesting job, and service to the community, are satisfying things, but they do not pay the rent, let alone for a car.

There seem to be two ways out of the impasse; out of the profession for which we have been trained, or out of the country. Dr. Nicholas has testified to the former, and a large number of your correspondents during the last two years have borne witness to the latter. Many of my contemporaries have been in the latter group, and next month I am taking their advice and emigrating to Canada. I

Association Notices

SIR CHARLES HASTINGS AND CHARLES OLIVER HAWTHORNE CLINICAL PRIZES, 1957

The Sir Charles Hastings Clinical Prize Competition is established by the Association for the promotion of systematic observation, research, and record in general practice. The competition has been extended by the addition of a second prize known as the Charles Oliver Hawthorne Clinical Prize. The following are the regulations governing the awards:

1. The Sir Charles Hastings Clinical Prize, consisting of a certificate and £75, will be awarded for the best entry.
2. The Charles Oliver Hawthorne Clinical Prize, consisting of a certificate and £50, will be awarded for the second best entry.
3. Any member of the Association who is engaged in general practice is eligible to compete for these prizes.
4. The work submitted must include personal observations and experiences collected by the candidate in general practice, and a high order of excellence will be required. If no work entered is of sufficient merit no award will be made. Candidates in their entries should confine their attention to their own observations in practice rather than to comments on previously published work on the subject, though reference to current literature should not be omitted when it bears directly on their results, their interpretations, and their conclusions.
5. Essays, or whatever form the candidate desires his work to take, must be sent to the Secretary, British Medical Association, B.M.A. House, Tavistock Square, London, W.C.1, not later than December 31, 1956.
6. A prizewinner in any year is eligible for an award of either of the prizes in any subsequent year. A study or essay that has been published in the medical press or elsewhere will not be considered eligible for a prize, and a contribution offered in one year cannot be accepted in any subsequent year unless it includes evidence of further work.
7. If any question arises in reference to the eligibility of the candidate or the admissibility of his or her entry the decision of the Council on any such point shall be final.
8. Preliminary notice of entry for this competition is required, on a form of application to be obtained from the Secretary.
9. Each entry, which should be unsigned, must be typewritten or printed on one side of the paper only and accompanied by a note of the candidate's name and address.
10. No definite limits are laid down as to the length of the work submitted, but the Council anticipates that for this competition 3,000 to 10,000 words would be suitable.
11. Inquiries relative to the prizes should be addressed to the Secretary.

OCCUPATIONAL HEALTH PRIZE

The Occupational Health Prize was established by the Association for the purpose of encouraging interest and research in the field of occupational health. The Council of the British Medical Association is prepared to consider the award of this prize, which consists of a certificate and £50, in the year 1957. Any member of the Association who is engaged in the practice of occupational health, either whole-time or part-time, is eligible to compete for the prize. Candidates may select their own subject.

Entries should be submitted in a form suitable for publication and must include personal observations and experiences collected by the candidates in the course of their work. If no entry is of sufficient merit no award will be made. Candidates should confine their attention to their own observations rather than to comments on previously published work on the subject, though reference to current literature should not be omitted when it bears directly on their results, their interpretations, and their conclusions.

Essays, or whatever form the candidate desires his work to take, must be sent to the Secretary, British Medical Association, B.M.A. House, Tavistock Square, London, W.C.1, not later than January 31, 1957. No study or essay that has been published in the medical press or elsewhere will be considered eligible for the prize, and a contribution

understand that in the Dominion the conscientious practice of medicine is rewarded by a standard of living not widely different from that of the average commercial traveller.—I am, etc.,

Birmingham, 15.

H. E. EMSON.

Economy in the N.H.S.

SIR,—I hope that the advisers to the Minister of Health and the Secretary of State for Scotland will take note of the excellent advice given by Dr. H. Wilson (*Supplement*, August 11, p. 101).

Why should we, as doctors, be trammelled with the responsibility of saving Government money? Why should we be obliged to make ourselves unpopular for the sake of the Government? Our concern must be with therapeutics. The cost involved is a matter which should be arranged between the patient and the State. In other words, it is a political problem.

Several years ago, in a letter in your columns, I advocated that a list of essential medicines should be drawn up and that only those drugs should be supplied free. A doctor would prescribe what he thought fit, but the patient would pay for anything not on the list. The list of free drugs would be reviewed frequently and revised according to current opinion. A scheme such as this would create no real hardship and I feel sure would be willingly accepted by the people. Local medical committees would be relieved of the need to scrutinize their fellow practitioners' prescriptions and would apply themselves rather to the constructive work of recommending to the central committee which drugs should be added from time to time to the "free list." This would evoke stimulating discussions on practical therapeutics in place of the unrewarding, exasperating, and often futile investigation of high prescribing costs.

Much the same can be said of the ambulance service. Prior to 1948 our local nursing association financed an ambulance and car service. It was not abused, because the committee defined clearly which type of case should have free ambulance or car. Doubtful cases were brought before the committee and rulings were established for subsequent usage. The service given was efficient and economical. Nowadays cars are not used for transporting patients in my area. If a patient requires transport an ambulance must be used, although we all know that a car is often suitable and always more economical; and yet, at the same time, we are constantly exhorted to economize.

The shilling tax and the Cohen Committee reports have both failed in their intended purpose, but they clearly indicate that the Government no longer accepts the "free for all" principle in the National Health Service. The way for all is clear for another step along the lines suggested. I am convinced that this would bring economy as well as a worth-while improvement in the Service.—I am, etc.,

Fire.

JAMES B. FLEMING.

Charging Each Other

SIR,—In a letter received some weeks ago from the British United Provident Association there occurs this statement: "In the conditions of to-day, however, we find that medical men often receive accounts from their colleagues, more particularly where services are rendered to dependants." Elsewhere in the same communication one notes that "dependants" are defined as (1) wife or husband, (2) all children under 18.

A few years ago when I offered a fee to a specialist he said with some show of indignation: "It has come to some-thing if we have to make a living out of each other." And it is indeed deplorable if we have now come to that. One would like to think that this business of charging each other fees, which is akin after all to making a living by taking in each other's washing, is only practised by some of the younger members of the profession who have little respect for what one has always regarded hitherto as part almost of the Hippocratic Oath.—I am, etc.,

Brighton.

G. L. DAVIES.

offered in one year cannot be accepted in any subsequent year unless it includes evidence of further work. A previous prizewinner is not precluded from entering. If any question arises in reference to the eligibility of the candidate or the admissibility of his or her essay, the decision of the Council on any such point shall be final.

Preliminary notice of entry for this competition is required on a form of application to be obtained from the Secretary. Each entry must be typewritten or printed on one side of the paper only, and accompanied by a note of the candidate's name and address. No definite limits are laid down as to the length of essays, but the Council anticipates that, for this competition, essays should consist of between 3,000 and 10,000 words. Inquiries relative to the prize should be addressed to the Secretary.

PRIZE ESSAY COMPETITION FOR PROVISIONALLY REGISTERED PRACTITIONERS, 1957

The Council of the British Medical Association is prepared to consider the award, in 1957, of prizes to provisionally registered practitioners for essays submitted in open competition. The subject of the essay is: "Medicine is an Art as well as a Science."

In awarding the prizes due regard will be given to evidence of personal observation and experience. No study or essay that has previously appeared in the medical press or elsewhere will be considered eligible for a prize.

Any provisionally registered practitioner in the pre-registration year at the time of submission of the essay is eligible to compete for a prize. If any question arises in reference to the eligibility of a candidate or the admissibility of his or her essay, the decision of the Council of the British Medical Association shall be final. Should the Council decide that no essay entered is of sufficient merit, no award will be made. At least one prize of £50 is offered. In determining the number of prizes to be awarded, the Council will take into consideration the number and standard of essays received.

Essays must not exceed 5,000 words, and must be typewritten or legibly written in the English language on foolscap paper, on one side only, must be unsigned, and must be accompanied by a note of the name and address of the entrant. Notice of entry for this competition is necessary and a form of application can be obtained from the undersigned.

Essays must be forwarded so as to reach the Secretary of the British Medical Association not later than January 31, 1957. Inquiries relative to the competition should be addressed to the Secretary, British Medical Association, B.M.A. House, Tavistock Square, London, W.C.1.

KATHERINE BISHOP HARMAN PRIZE

The Council of the British Medical Association is prepared to consider an award of the Katherine Bishop Harman Prize in the year 1957. The value of the prize is £75. The purpose of the prize, founded in 1926, is the encouragement of study and research directed to the diminution and avoidance of the risks to health and life that are apt to arise in pregnancy and child-bearing. It will be awarded for the best contribution submitted in open competition, competitors being left free to select the work they wish to present, provided this falls within the scope of the prize. Any registered medical practitioner in (a) the British Commonwealth and Empire or the Republic of Ireland and (b) any member of the British Medical Association wherever resident is eligible to compete.

Should the Council of the Association decide that no contribution submitted is of sufficient merit, the prize will not be awarded in 1957, but will be offered again in the year next following this decision, and in this event the money value of the prize on the occasion in question shall be such proportion of the accumulated income as the Council shall determine. The decision of the Council will be final.

Each contribution must be typewritten or printed in the English language, and must be accompanied by a detachable slip bearing the candidate's name and address. The Council anticipates that contributions should be between 3,000 and 10,000 words, although no definite limits are laid down. Preliminary notice of entry is required and a form for this purpose can be obtained

from the Secretary. Entries must be forwarded so as to reach the Secretary, British Medical Association House, Tavistock Square, London, W.C.1, not later than December 31, 1956. Inquiries relative to the prize should be addressed to the Secretary.

PRIZE ESSAY COMPETITION FOR MEDICAL STUDENTS, 1957

The Council of the British Medical Association is prepared to consider the award, in 1957, of prizes to medical students for essays submitted in open competition. The subject of the essay is: "The Medical Student and Research—Past Achievements and Present Opportunities."

Any medical student who is a registered member of a medical school in the United Kingdom, Commonwealth and Empire, or the Republic of Ireland at the time of submission of the essay is eligible to compete for a prize. Previous prizewinners are eligible for a second award. If any question arises in reference to the eligibility of a candidate or the admissibility of his or her essay, the decision of the Council of the British Medical Association shall be final. Should the Council decide that no essay entered is of sufficient merit, no award will be made. The prizes offered will normally be of the value of £25, but, in determining the number and exact amount of prizes to be awarded, the number and standard of essays received will be taken into consideration by the Council, which reserves the right to vary the number and amount of the prizes.

Essays must not exceed 5,000 words, and must be typewritten or legibly written in the English language on foolscap paper, on one side only, must be unsigned, and must be accompanied by a note of the name and the medical school of the entrant. Notice of entry for this competition is necessary and a form of application can be obtained from the undersigned.

Essays must be forwarded so as to reach the Secretary of the British Medical Association not later than January 31, 1957. Inquiries relative to the competition should be addressed to the Secretary, British Medical Association, B.M.A. House, Tavistock Square, London, W.C.1.

A. MACRAE,
Secretary.

Diary of Central Meetings

SEPTEMBER

- 5 Wed. Coal Gas Poisoning Subcommittee, Science Committee, 2 p.m.
- 12 Wed. Occupational Health Committee, 10 a.m.
- 19 Wed. Emergency Call Subcommittee, G.M.S. Committee, 2 p.m.
- 20 Thurs. G.M.S. Committee, 10.30 a.m.

Branch and Division Meetings to be Held

SOUTH WARWICKSHIRE DIVISION.—At Board Room, Warneford General Hospital, Leamington Spa, Thursday, August 30, 8 p.m., annual general meeting.

Meetings of Branches and Divisions

SALISBURY DIVISION

The annual general meeting was held at Salisbury Infirmary on June 22, 1956. The following officers were elected:

- Chairman.—Dr. J. C. Brown.
- Vice-chairman.—Dr. A. L. Leigh Silver.
- Secretary.—Dr. I. E. Jameson.
- Treasurer.—Dr. P. S. Allenby.
- Public Relations Secretary.—Dr. G. W. Newton Dunn.

SOUTH ESSEX DIVISION

The annual general meeting was held on June 1 at the White Hart Hotel, Romford. Dr. W. J. Smither was in the chair. The following officers were elected:

- Chairman.—Dr. W. J. Smither.
- Vice-chairman.—Dr. P. S. Steen.
- Honorary Secretary and Treasurer.—Dr. J. Fife.

Correction.—The report in the *Supplement* (May 12, p. 280) of the Award by the Industrial Court of an increase of £75 in the remuneration of S.H.M.O.s should have stated that it was operative from April 26, 1956, the date of the Award, not, as stated, from April 13, the date of the hearing by the Court.

SUPPLEMENT TO THE BRITISH MEDICAL JOURNAL

LONDON SATURDAY SEPTEMBER 22 1956

CONTENTS

Medical Manpower	133	Hospitality	135
Public Health Medical Officers in Scotland	134	Correspondence	135
Was it a Drug?	134	H.M. Forces Appointments	137
Questions Answered	135	Association Notices	138

MEDICAL MANPOWER

FUTURE RECRUITMENT OF THE PROFESSION

The British Medical Association submitted a memorandum of evidence to the departmental committee (the Willink Committee) appointed by the Minister of Health and the Secretary of State for Scotland to estimate on a long-term basis the number of medical practitioners likely to be engaged in all branches of the profession in the future and the consequent intake of medical students required. For this purpose the Council of the Association set up a special committee consisting of the principal officers and the chairmen of all interested committees.

At the outset an important caveat is entered. The Association feels that any decision about the future size of the profession should evolve largely from conditions of supply and demand. The size of the profession should be self-adjusting through the maintenance of a high standard of general education, or scientific training, and of personal qualities. The interest of the Minister in medical recruitment is limited to the provision of doctors for the National Health Service, which is only a part—although a large one—of the activities of the profession.

In 1910 the population of Great Britain was 40.5 million. It has increased since then by 10 million, or 25%, and, what is perhaps more important from a medical point of view, it has increased disproportionately in the older age groups. Of the present population of 49.63 million, 6.89 million are males over 65 or females over 60. In 1964 the Government Actuary estimates that of a population of 50.86 million, 7.75 million will be in that over-65 or 60 category, and in 1979, with a population of 52.23 million, the number will be 9.5 million.

Doctors Available

While the population has increased by about 25% since 1910, the number of medical practitioners has risen by nearly 80% (from 34,000 to 61,000), though by no means all the doctors on the *Medical Register* are fully occupied in the doctors' practice in this country. This increasing number of active practice in the Association's view, the higher standard of service provided and a greater demand for doctors' services. Calculations, which must be treated with reserve because some unknown factors enter into them, suggest that the number of doctors actively engaged in general practice is 23,100; in consultant work, 8,849; on hospital staffs, 10,057; and in the public health service, 2,490.

In general practice many older practitioners who entered the National Health Service in 1948 will be eligible for a pension in 1958, but the number who may retire immediately can only be conjectured. It may well be smaller

than might be supposed because the pension will not be large and the value of the compensation for loss of goodwill of former practices which they receive on retirement will have fallen with the decline in money values. It must be expected, therefore, that many practitioners will continue to work after 65.

Whatever the result of the arithmetical calculations, the Association would be opposed to the setting of an upper limit to the number of entrants to the profession. Sufficient doctors must be available to meet a changing and expanding service and the possible shifting of balance between the different branches of practice. Advances in therapy, the possible appearance of new specialties, the emphasis in modern medicine on prevention and detection of disease in the early stages, the early recognition of deviations from mental health, the treatment and aftercare involved in the new concepts of social medicine, the rapid developments in occupational health—all these factors call for consideration, and a further important factor is that the doctor should be given time to keep abreast of modern knowledge and methods. A ceiling for medical entry is therefore undesirable or even out of the question.

No Substantial Unemployment

It is believed that any allegation of substantial unemployment in the medical profession is unfounded. The overcrowding which is sometimes alleged is fictitious. It is true that appointments in surgery and medicine are not easy to obtain, but there is believed to be no shortage of vacancies in anaesthetics, psychiatry, and radiology. Medical men are badly needed in the medical branches of the armed Forces and in the Oversea Civil Service.

The trend for many years until 1954 had been for the numbers of general practitioners to fall while the population rose. During the first seven years of the post-war period doctors who would have liked to enter general practice were deterred by what they considered inadequate financial reward, especially as it became clear that the Spens recommendations were not in fact being fully implemented. The Association holds the view that during the next ten years an increase in the number of general practitioners will be necessary.

It is also impossible to estimate how far future advances in medicine will affect the character and scope of hospital practice. Among other things the memorandum points out that greater provision should be made for the employment of suitably trained and experienced general practitioners in hospitals. It is emphasized that the field of specialist practice should be considered as a whole rather than the different specialties in isolation. Taking everything into consideration

tion, the following rough estimate of the total number of hospital staff in the consultant and S.H.M.O. grades likely to be required in the next ten or twenty years is given in the memorandum:

	Whole-time Equivalent	Whole-time and Part-time
Present establishment (1954)	7,124	9,708
Estimated future requirements	9,435	12,974

While bearing in mind the possibility of alterations in the public health service, it is felt that the total number of medical officers required is unlikely to be altered materially, unless the Government envisages a complete reorganization of the service as a whole.

Between 600 and 700 general practitioners are believed to be engaged predominantly in private practice. This number is likely to remain fairly stationary, though, should the Government accept the Association's policy of securing for private patients the right to obtain medicines in the service, the number of patients privately treated and of practitioners to attend them would doubtless increase.

The memorandum includes a brief reference to the requirements in wartime (in cold, warm, and hot war), but the surplus of doctors who would be required in nuclear warfare is beyond estimate.

Conclusion

Summarizing its conclusions, the memorandum repeats that any calculation of the actual number of doctors required during the next ten or twenty years is subject to many unpredictable and imponderable factors. Not the least of these is the rapid change in the scope of medicine. Any figure can be only a rough estimate, and, in any event, mere numbers are not the criterion of the standing of the profession or the value of its work. It is much more important that the new entrants should be of high calibre and should feel a vocation for medicine.

PUBLIC HEALTH MEDICAL OFFICERS IN SCOTLAND

AMENDED SICK-PAY SCHEME

Committee C of the Medical Whitley Council has agreed on certain amendments to the sick-pay scheme applicable to public health medical officers in Scotland, and has recommended local authorities to put this agreement into effect.

The present sick-pay scheme for medical officers in Scotland is the scheme set out in paragraph 14 of the Scheme of Salaries and Conditions of Service for Administrative, Clerical, and Technical Staffs (April, 1949) adopted by the National Joint Industrial Council for Local Authority Services (Administrative, etc., Staffs) with amendments which had been agreed subsequently by the Council up to February 5, 1951. Committee C has agreed that the sick-pay scheme for public health medical officers should be amended to incorporate amendments which have been made to the sick-pay scheme for other local authority officers since February 5, 1951. The revised scheme with the new additions side-lined for reference is set out in M.D.C. circular No. 31, and supersedes the arrangements set out in paragraph II (b) of appendix B to M.D.C. circular No. 2. Medical officers of health should have a copy of M.D.C. circular No. 31.

On July 11 Dr. J. Stanley Thomas, retiring honorary medical secretary of the East Ham Local Medical Committee, was presented with a silver salver by Dr. John Sullivan, chairman of the Committee, on behalf of his medical colleagues, as a tribute "not just for services rendered, but a sincere and grateful acknowledgment of his wise and friendly help at all times and his concern for the well-being of the general medical services in the area." Dr. Thomas has recently been appointed chairman of the East Ham Executive Council. The presentation was made before general medical practitioners of East Ham, their wives and guests, in the out-patient department of the East Ham Memorial Hospital.

WAS IT A DRUG?

Regulations 16 and 17 of the National Health Service (Service Committees and Tribunal) Regulations, 1948, provide that where a practitioner prescribes under the National Health Service preparations which are not drugs or medicines, and therefore outside the scope of the Act, the executive council may recover their cost from him. If he challenges their action, the matter may be referred to the local medical committee, with the possibility of appeal to referees.

The findings of the referees in a recent appeal under the Regulations are reported below. The decision in this, as in all cases, is related to the circumstances of this particular case only and is not binding on the referees who may hear other cases.

"Formulac"

Dr. X prescribed formulac for two patients, both suffering from hiatus hernia and one of them being pregnant at the time. The executive council decided that formulac was not a drug which they were bound to provide in these two cases. Dr. X appealed to the local medical committee, who upheld the decision of the executive council. He then appealed to the referees.

Appeal Hearing

At the hearing before the referees Dr. X said that there was no drug which will cure hiatus hernia, but the symptoms could be relieved by an antacid, demulcent, bulk-occupying substance taken in a recumbent position. Formulac was a combination of milk powder and methyl cellulose, aluminium hydroxide, magnesium trisilicate, and ascorbic acid. He relied on the collective action of these ingredients to attain his purpose. The nutritive value of the milk powder was insignificant, being equivalent to 25 calories in one dose, against 200 calories in a glass of milk; the dose was one tablespoonful once a day. The powder, as he used it, was the vehicle only for administering the drugs with which it was combined.

The local medical committee gave the referees the reasons for its decision. It considered that, though other substances were added to the milk powder, formulac was basically a food and used as a substitute for other foods. If it were allowed to be prescribed for its vitamin content a loaf of vitaminized bread should also be allowed. The local medical committee conceded that the addition of magnesium trisilicate and aluminium hydroxide might counteract any uncomfortable symptoms caused by the food content of the powder, but the same effect could be obtained with a partially digested food.

Referees' Findings

The referees were of the opinion that it was no part of Dr. X's purpose to provide his patients with nourishment, or even extra nourishment. Milk powder was not a concentrated food, and one tablespoonful a day could have no appreciable effect on the patient's diet. The local medical committee seemed to have thought that the magnesium trisilicate and aluminium hydroxide were intended to counteract any uncomfortable symptoms caused by the food contained in the powder. The referees, however, were satisfied that the intention was to counteract the symptoms caused by the disease and the presence of food taken by the patient in the ordinary way to sustain life. The methyl cellulose, the magnesium trisilicate, and the aluminium hydroxide could have been prescribed as a separate mixture directed to be taken with a glass of milk or a tablespoonful of milk powder, but the referees thought that the importance of the milk powder in relation to the admittedly pharmaceutical elements in the preparation was so small that the nutritional value of the powder could be ignored, and the purpose of the prescription as a whole could fairly be regarded as medicinal. If it were held that the preparation was a compound of food and medicine the proviso to Regulation 17 (2) of the National Health Service (Service Committees and Tribunal) Regulations would require that

the value of the food and the value of the drugs should be separately ascertained. The referees doubted whether this would produce any significant result. They decided that in all the circumstances formulac, as used in this case, was a drug which the executive council was bound to provide.

Questions Answered

National Insurance for Part-time Employees

Q.—What is my National Insurance liability as an employer of part-time domestic help for which I pay 16s. a week?

A.—A person employed on domestic work for less than eight hours a week by any one employer is not insurable as an "employed" person, though that person is insurable under the Industrial Injuries Act. In this case the employer would not be liable to pay any contributions towards the National Insurance scheme—neither the employee's share nor the employer's share. The employer should, however, stamp a card weekly with 7d. stamps to cover contributions to the Industrial Injuries scheme. Threepence of this should be deducted from the 16s. paid. If, however, the domestic work occupies more than eight hours a week the worker is insurable as an employed person and stamps to the full value (employer's and employee's share) should be placed on her card weekly. The employee's share can be deducted from the 16s. paid, but if this is not done it is the employer's responsibility to make up the full amount. The Regulations make it quite clear that once the weekly wage has been paid it is legally impossible for an employer to obtain from the employee any contribution which should have been deducted but was not.

Fees for Hospital Patients' Certificates

Q.—As a full-time senior house officer am I entitled to charge a fee for "works notes" certifying that persons are in- or out-patients of the hospital and thereby unable to attend work?

A.—A report to a patient who is under observation or treatment at the hospital comes within the scope of a doctor's duties under the terms and conditions of service of hospital medical staff in the N.H.S. when the information required can be given without a special examination of the patient by reference to hospital records or from knowledge acquired in the course of attendance on the patient. In these circumstances a fee cannot be charged for the report. This arrangement also covers the furnishing of a report on the patient, with his consent, to an interested third party, for instance an employer. When the patient is no longer under observation or treatment at the hospital when the report is asked for, or if a special examination is required, the work is outside the practitioner's contract and a fee may be charged.

During 1955 about 86,000 pensioners of the 1939-45 war were examined by medical boards and about 68% had their current assessments continued unaltered. The total number of examinations by medical boards was over 108,000. These figures are given in the Report on War Pensioners for 1955 (House of Commons Paper No. 331 of session 1955-6, H.M.S.O., price 4s. 6d.) issued jointly by the Ministry of Pensions and National Insurance, the Ministry of Health, and the Secretary of State for Scotland. In England, Wales, and the Irish Republic nearly 11,000 in-patients were discharged after treatment in hospital in 1955, and out-patient attendances totalled about 8,000. At the end of 1955 1,516 war pensioners were being treated as hospital in-patients and 6,422 as out-patients. In Scotland 1,248 were treated in hospital in 1955. In Northern Ireland the number was about 920.

HOSPITALITY

A French doctor's niece, a widow, would like to stay in a doctor's house in London on an *au pair* basis for a year in order to improve her knowledge of English.

Two French girls would like to visit families living in the London area. They are willing to care for children.

A German doctor's daughter and a girl friend would like to arrange exchange with a British doctor's daughters for six months or a year and would be willing to help in the house. They wish to study English and prefer somewhere near a language school.

A Yugoslav doctor's daughter, aged 17, would like to arrange a holiday exchange in 1957. The Yugoslav family live in a comfortable house with a garden, in a small town. The British girl would have a room of her own during her stay. She would be taken to the sea by the parents, who also speak English. Photographs are available.

A doctor from Hamburg would like a holiday exchange for his daughter, aged 11, for her summer holiday in 1957.

Would anyone interested please get into touch with Brigadier H. A. Sandford, International Medical Visitors Bureau, B.M.A. House, Tavistock Square, London, W.C.1.

Correspondence

Because of heavy pressure on our space, correspondents are asked to keep their letters short.

Keeping Up With the Times

SIR.—Every member of our profession who sits back for a moment to contemplate where the present N.H.S. is taking us will heartily applaud your leading article entitled "Keeping Up With the Times" (*Journal*, August 18, p. 406).

Your correspondence columns show how deeply the profession has been stirred by the refusal of the Minister even to consider a claim for increased remuneration. We have every right to insist that the Government of to-day keeps the pledges of its predecessors. Against its better judgment (as expressed by the plebiscites of 1948) the profession agreed to accept service in the N.H.S., with remuneration on the basis of the two Spens reports: We have kept our part of the bargain and it is up to the Government to do the same.

We shall, however, be making a great mistake if we allow the daily press to give the impression that we are simply out for more pay: every time such headlines appear our professional status declines a stage further in the eyes of the public. Let us make it known as widely as possible that the anxieties so widespread in the profession are not due simply to problems of remuneration. They are basically due to our realization that, under the N.H.S. as at present constituted, we are progressively losing our freedom and our status as a learned profession, while being forced to accept the dictates of the politicians. Would the Minister have dared to speak to the profession in 1948 as he has done in 1956? The Guillebaud Committee, set up by the Minister, makes it clear what is in store for us when it states: "Longer experience of the working of the Service and the gradual emergence of a new generation may make comparatively simple many things which now appear difficult or impracticable."

We have had over eight years' experience of working in the N.H.S. We have seen how we are made a political pawn as (in your words) "rival political parties feverishly search for methods of bribing the voter, and do not hesitate to use Medicine in this unholy game." We must look afresh at those methods which gave us independence of action in the past: you mentioned the surrender of the right to buy and sell goodwill—for a sum which has proved quite unrealistic. Unfortunately we allowed the N.H.S. to include

100% instead of 90% of the population—an alternative which would have allowed sufficient independent practice for us to be able to withstand this domination of our profession—and, if a sacrifice is needed to secure the future, we must be prepared to face this.

The leaders of our profession must get busy and tell us how to escape from the net which is closing ever more closely around us. Your leading article is a clarion call for us all to wake up and to act quickly now—to-morrow will be too late.—I am, etc.,

London, N.W.1.

E. C. WARNER.

REFERENCE

¹ Report of the Committee of Inquiry into the Cost of the National Health Service, 1956, p. 62. H.M.S.O., London.

Keeping Records in General Practice

SIR,—Not very long ago in your columns you printed certain communications on records in general practice. I wonder whether you would be interested in a method which, while not only ensuring good record-keeping of patients who are visited, also saves the G.P. and his secretary a great deal of time. Two of us have worked this system for eight months and have found it very satisfactory.

Most G.P.s keep a visiting book which entails re-writing visiting lists at intervals and arranging the order of visiting by various annotations in the visiting book. If record cards are entered up, this entails additional work in getting the cards out of the files before visiting and returning them to the files afterwards. What we have done is to use the patients' record cards as a visiting list, thus dispensing with a visiting book.

In the surgery we keep a filing box of the Post Office sorting pigeon-hole type, with a compartment for each day of the week. If a patient is seen on a Monday and requires another visit on the Wednesday his record card is put into the Wednesday compartment after the Monday visit.

The next problem to be met is if the patient needs a visit next week or in two or four weeks' time. To overcome this we number the weeks. If this week is week 1, then next week is week 2, the following week is week 3, and the next week is week 4. One month from week 1 is again week 1; one month from week 2 is again week 2; and so on. A calendar is kept in the surgery with all the weeks in the year so numbered. Thus, if a patient is seen in week 1 on a Monday and requires a visit on a Wednesday in a fortnight's time—i.e., week 3—then a figure 3 is entered on the top right-hand corner of the patient's record card and the card is filed in the Wednesday compartment in the surgery filing box. A chronic patient who is visited every fortnight throughout the year will have (for example) the figures 1, 3 or 2, 4 entered on his record card. In the doctor's car is kept another box with compartments for each day of the week, working on the same principle. This box, of course, is quite small—about the size of a small basket.

The surgery box is capable of various refinements. Each doctor working in a partnership can have one column in the box so that each doctor's visits are kept separate. Alternatively, if zoning by geographical areas is employed, then the box can be constructed with as many columns as there are zones. Before starting the day's visits, all that is required is to arrange the record cards in order of sequence of visiting. The secretary does not have to get all the cards out of the main files, as the majority will already be in the surgery box. All that she has to do is to get the cards of new visits for that day.

With this system (which we have christened "the Kirone system") whenever a patient is visited all his records of past illnesses and present illness are *always* at hand. Visiting books (with all their attendant writing up) need not be kept at all. If a patient is seen by one doctor one day and another doctor the following day, it is an easy matter to transfer the record card from the one doctor to the other. The system itself costs nothing to run and is very simple to use. It has frequently withstood the strain of 25-30 visits per day per doctor, the area of visiting covering about

100 square miles. We also employ a similar system for surgery attendances which we have found very satisfactory.—We are, etc.,

Cheshire, Staffs.

J. M. KIRKWOOD.

RICHARD D. JONES.

Remuneration Claim

SIR,—Would it not be useful, in discussing the remuneration issue, to publish a few earnings in other occupations? One may quote these: cleaner in a motor factory, £16 a week; labourer on hydro-electric scheme in Scotland, £18 a week; girl of 22 making costumes, £12 to £14 a week.

Not only is it useful to give such figures for purposes of comparison but also to illustrate how our own expenses, from the high payments quoted, have risen. And another illustration might be interesting. If we consider a working family of six persons, the parents and two children employed, their combined visible income may easily lie in the range of £1,000 to £1,500 yearly. Though they do not usually, in presenting wage demands, quote or remember the fact, such a family is often receiving a large "hidden" income in the form of subsidies on education, housing, and so on. This corresponds to a much larger gross income, which may lie in the range of £250 to £500.

It is thus evident that without the years of training, of large expenditure, and intellectual work of a professional man, the family reward is often as good as his. And with this there is no need for such professional and social expenses.—I am, etc.,

Hitchin, Herts.

G. C. PETHER.

SIR,—May an interested outsider have the courtesy of your columns to make an observation on the current wage dispute? I am at a loss to understand why so many writers to the *B.M.J.* insist on making excuses as to why they want more money. Surely the medical profession should be the highest-paid group in any country. Is there a more important group? Does anyone have a more exacting job, or more responsibility than a doctor? Does a politician? a civil servant (so often uncivil)? an innkeeper? a coalminer?

To be effective a doctor has to be respected. People do not respect nor do they seek the advice of a man who is financially embarrassed. This may be an unpleasant thought, but it is nevertheless true, regardless of socialist ideology.

This is indeed the age of the trade union, and the British medical profession certainly seems to need one. The B.M.A., which led a blind and bewildered profession into the National Health Service, is obviously doing very little. A new organization is needed. One which will demand and not go "cap in hand" to ask on the basis of this report or that report. If the demands are not met, and promptly, then mass resignation from the Service is indicated. Why there has not already been mass quitting of the Health Service I find it difficult to understand. I feel, however, that the first step to improve the lot of the British doctor should be the formation of an organization or union with power to ensure collective action. The time for circumlocution, quibbling about ethics, and "holier-than-thou" attitudes is past. A "get tough" policy is needed.

This fight is one which doctors everywhere may one day have to face. I hope the leadership which the world has come to expect from British medicine will be shown in this struggle.—I am, etc.,

Alberta, Canada.

A. P. N. LEE.

Charging Each Other

SIR,—Although I should imagine that no one could have received more generous kindness from colleagues than my family and I have done, I doubt if "despicable" is quite the word to be used if an account is rendered.

Circumstances differ so widely. I have had at least one present which must have cost much more than if I had sent in a bill. The late Dr. Whitfield told me that his house

R.A.M.C. Golfing Society

SIR,—At the annual general meeting of the Royal Army Medical Corps Golfing Society in June alterations were made in the rules so that all commissioned officers of the Corps, serving or retired, including those who held emergency commissions, would be eligible for full or associate membership of the Golfing Society.

Meetings are held in spring, summer, and autumn, and matches are played throughout the year. The accent is on the opportunity to renew old friendships more than on the quality of the individual golfer. The autumn meeting will be held on Thursday, October 4, at Woking Golf Club. All officers of the Royal Army Medical Corps, serving or retired, interested in joining the Golfing Society should write to the honorary secretary, Major-General E. Marsh, M.C., 14, Orchard Rise, Kingston Hill, Surrey, or to the captain, Brigadier R. Phillipson, O.B.E., the War Office, A.M.D.7, Lansdowne House, Berkeley Square, London, W.1.—I am, etc.,

London, W.1.

R. PHILLIPSON.

H.M. Forces Appointments

ROYAL NAVY

ROYAL NAVAL VOLUNTEER RESERVE

Surgeon Commander V. S. Hughes-Davies, V.R.D., has retired. Surgeon Lieutenant K. S. Stewart to be Surgeon Lieutenant-Commander.

Acting Surgeon Lieutenant J. C. Campbell to be Surgeon Lieutenant-Commander.

ARMY

Colonel C. H. K. Smith, O.B.E., M.C., late R.A.M.C., has retired on retired pay, and has been granted the honorary rank of Brigadier.

ROYAL ARMY MEDICAL CORPS

Captain B. A. Gavourin to be Major.

ARMY EMERGENCY RESERVE OF OFFICERS

ROYAL ARMY MEDICAL CORPS

Captain B. R. Frisby, from R.A.R.O., Class III, to be Captain, and has been granted the acting rank of Major.

TERRITORIAL ARMY

ROYAL ARMY MEDICAL CORPS

Major E. M. Wright, T.D., has retired, retaining the rank of Major.

Captains Sir James D. Fraser, Bt., and J. R. Murdock have been granted the acting rank of Major.

TERRITORIAL ARMY RESERVE OF OFFICERS: ROYAL ARMY MEDICAL CORPS

Brigadier A. L. Crockford, C.B.E., D.S.O. M.C., T.D., Q.H.S., from Active List, to be Brigadier.

Colonels W. E. Tucker, C.V.O., M.B.E., T.D., C. W. Arnot, O.B.E., M.C., T.D., G. B. Mitchell-Heggs, O.B.E., T.D., F. R. Langmaid, O.B.E., T.D., Q.H.P., and R. Mowbray, from Active List, to be Colonels.

Lieutenant-Colonels G. E. David, M.C., T.D., T. P. Sewell, T.D., and F. J. G. Slater, M.C., T.D., from Active List, to be Lieutenant-Colonels.

Majors (Honorary Lieutenant-Colonels) C. E. W. Bower, T.D., J. A. W. Segerdal, T.D., and F. H. Hollingshead, O.B.E., T.D., having attained the age limit of liability to recall, have ceased to belong to the T.A.R.O., retaining the honorary rank of Lieutenant-Colonel.

Major J. R. Hamerton, T.D., having attained the age limit of liability to recall, has ceased to belong to the T.A.R.O., retaining the rank of Major.

Majors G. R. Fryers, F. W. Newby-Good, T.D., and J. A. Paterson, from Active List, to be Majors.

Captain (Honorary Major) A. M. W. Thomson has ceased to belong to the T.A.R.O., retaining the honorary rank of Major.

Captains (Honorary Majors) N. J. Crawford, W. N. Chisholm, M.B.E., T.D., and A. G. McCallum, having attained the age

was full of fountain-pens. His neighbour said to me: "If you must give me a present do let it be a cheque." One may hesitate to go to the best man in a specialty simply from reluctance to accept his charity. Some of us have joined a provident society chiefly in order that the specialist may receive some recognition in addition to our gratitude; must we be disappointed and our intention frustrated?

As between general practitioners, I think that the position is usually different. Here most of us, all of us I expect, feel that the greatest compliment one can receive is to be called in by one's neighbour, and the question of finance therefore can arise only in very exceptional cases.—I am, etc.,

W. MAXWELL PENNY.

Beckenham, Kent.

New Partnership Surgery Premises

SIR,—I was interested in Dr. E. Anthony's description of the above (*Supplement*, September 8, p. 121), and I will be grateful if you can spare space enough to air a sense of injustice with the Ministry of Health over the financial aspect of such desirable premises.

My partner and I opened a very similar "surgery" in July, 1955, though somewhat smaller and costing us, with out furniture and equipment, something over £3,000. The Ministry refused our appeal for financial aid by reason of our not being a large enough "group" practice (we were a "group" of three). Being in a rural district we are most unlikely ever to become a large group. It appears that the latter are, or may be, advanced a large proportion of the cost of such premises free of interest by the Ministry. Surely such discrimination is grossly unfair, additionally so in that the cost to the individual diminishes proportionately with the numbers of his partnership.—I am, etc.,

Sunninghill, Berks.

C. MATTHEWS DUNCAN.

Board and Lodging Charges

SIR,—Recently the Government urged the freezing of prices to halt the upward trend of the cost of living. Following upon this, on July 9, the Minister of Health refused to discuss an adjustment in pay for medical staff whose remuneration has fallen below the standard promised at the inception of the National Health Service. A fortnight later insult was added to injury when we received a memorandum with details of increased charges for residential emoluments. The statutory one month's notice was not given nor any guarantee of minimum standards of accommodation.

The new charges involved a loss of £40 per annum to the registrars in this hospital at a time when all prices are rising. It is in the interests of the patients and hospital that registrars are resident. Other occupations requiring people to reside away from their homes subsidize them for so doing. Don't let us be penalized for being instantly available by day and by night.—We are, etc.,

B. G. HAGGART.

A. LL. OWENS.

T. H. MARMION.

S. E. PREBBLE.

J. B. MONTGOMERY.

Prescot, Lancs.

Waiting-room Rhyme

SIR,—From time to time there comes to my mind the rhyme quoted below, but my memory fails me concerning its source. Albeit of equivocal literary merit, it seems to me the most apposite and quaint of waiting-room furnishings, and I am curious to know the name of the author, as I feel that a measure of credit is due to him. Perhaps one of your readers is able to enlighten me. The verse, as I recall it, is as follows:

"While in this room you wait,
Read, knit, do crosswords or just meditate.
Read, knit, do crosswords or just meditate;
Good work takes time, to shirk is sin;
Have patience, sitter, and exchange a grin."

—I am, etc.,

DENNIS J. STAYTE.

Bristol, 2.

limit of liability to recall, have ceased to belong to the T.A.R.O., retaining the honorary rank of Major.

Captain (Acting Major) R. Cutts, from Active List, to be Captain, and has been granted the honorary rank of Major.

ROYAL AIR FORCE

Group Captain G. A. M. Knight, C.B.E., to be Air Commodore.

Wing Commander G. Gilchrist to be Group Captain.

Wing Commander J. H. Neal has retired.

Squadron Leaders E. C. B. Bramwell, C. R. Griffin, and S. E. Cupples to be Wing Commanders.

Flight Lieutenants R. S. Wambeck, D.F.C., I. R. Lindsay, E. L. Gilbert, D. W. Atkinson, Agnes R. D. Bartels (Woman Medical Officer), F. J. Davies, M. A. de Chenu, G. K. K. McKay, A. D. Moore, and A. J. Merrifield to be Squadron Leaders.

Flight Lieutenants D. D. Forbes, A. D. Mason, R. A. Davidson, M. H. Gough, E. J. McCabe, and A. J. Rowland have been transferred to the Reserve, retaining the rank of Squadron Leader.

P. D. L. Roper to be Squadron Leader.

ROYAL AIR FORCE RESERVE OF OFFICERS

Squadron Leaders J. D. Milne and C. N. Young have relinquished their commissions, retaining the rank of Wing Commander.

Squadron Leader J. L. Brown has relinquished his commission, retaining his rank.

ROYAL AUXILIARY AIR FORCE

Flight Lieutenant M. Y. Paget to be Squadron Leader.

ROYAL AIR FORCE VOLUNTEER RESERVE

Squadron Leaders K. G. Bergin and J. Jamieson have relinquished their commissions, retaining the rank of Wing Commander.

Squadron Leader B. H. Pickard has relinquished his commission, retaining his rank, on appointment to the R.A.F.V.R.

Squadron Leaders A. J. Beddie, T. S. B. Kelly, D. A. Davies, G. D. Elphick, R. G. D. Forward, K. V. Jackson, L. S. Calvert, J. Evans, P. T. D. Lynch, J. C. McGregor, H. G. Magill, and A. J. McKendrick have relinquished their commissions, retaining their rank.

Flight Lieutenant W. E. Gibb has relinquished his commission, retaining the rank of Wing Commander.

Flight Lieutenants G. H. B. Roberts, A. L. Alban, N. J. Burnand, J. E. Cawthorne, W. J. Lynd, J. McA. McArthur, J. L. Morgan, A. M. Howard, J. P. Kelly, and C. W. R. Rayne-Davis have relinquished their commissions, retaining the rank of Squadron Leader.

HER MAJESTY'S OVERSEA CIVIL SERVICE

The following appointments have been announced: G. C. Butler, M.B., B.Ch., D.P.H., Senior Medical Officer (Administrative), Northern Region, Nigeria; A. J. Evans, M.B., B.S., D.A., Specialist (Dermatologist and Venereal Diseases), Western Region, Nigeria; C. R. Jones, M.B.E., M.B., B.Ch., Assistant Health Adviser, Eastern Aden Protectorate; J. D. Llewellyn-Jones, M.B., B.Ch., M.R.C.O.G., Specialist Obstetrician, Federation of Malaya; W. Puleston-Jones, M.R.C.S., L.R.C.P., D.P.H., D.T.M.&H., Administrative Medical Officer, Grade A Supernumerary, Federation of Malaya; A. K. Kouppas, M.D., D.M.R.D., Specialist (Radiologist), Cyprus; J. J. MacPherson, F.R.C.S.Ed., Specialist Surgeon, Grade B, Federation of Malaya; R. J. K. Tallack, M.B., Ch.B., D.P.H., Senior Medical Officer, Kenya; T. Wilson, M.D., D.P.H., D.T.M.&H., Director, Institute for Medical Research, Federation of Malaya; C. M. Bahemia, L.R.C.P.&S.Ed., Medical Officer, Health Department, Mauritius; F. P. Brown, M.B., B.S., D.R.C.O.G., Medical Officer, Kenya; R. H. Currie, M.B., Ch.B., D.P.H., Medical Officer, Special Grade, Tanganyika; W. P. Hadlow, M.B., B.S., Medical Officer, Somaliland Protectorate; J. A. Kay, B.M., B.Ch., Medical Officer, S.P.H.S., Fiji; Ann H. Low, M.B., B.S., D.C.H., Lady Medical Officer, Uganda; H. J. Marrable, M.B., Ch.B., Medical Officer, S.P.H.S., Fiji; N. O'Beirn, M.B., B.Ch., Medical Officer (Tuberculosis), Western Region, Nigeria; R. O. Parnis, M.D., F.R.C.S., Specialist Surgeon, Western Region, Nigeria; K. D. Ray, M.B., F.R.C.S., Medical Officer, Special Grade, Northern Region, Nigeria.

Dangerous Drugs Act: Restoration of Authority

The Home Office announces that the authorities granted by the Dangerous Drugs Regulations under the Dangerous Drugs Act, 1951, have been restored to Dr. Richard Morton Geldart (Dorset).

Association Notices

GENERAL MEDICAL SERVICES COMMITTEE

Assistants and Young Practitioners Subcommittee

The following have been returned as representatives of unestablished principals and assistants on the Assistants and Young Practitioners Subcommittee for 1956-7:

Region	Unestablished Principal	Assistant
1	No nomination	No nomination
2	R. M. S. Matthews (Romford)	No nomination
3	I. M. Quest (St. Helens, Lancs)	R. D. Jones (Staffs)
4	R. A. A. R. Lawrence (Leabrooks)	No nomination
5	F. G. Tomlins (Chingford, E.4)	No nomination

Diary of Central Meetings

SEPTEMBER

24 Mon.	Armed Forces Committee, 2 p.m.
25 Tues.	Organization Committee, 12 noon.
26 Wed.	Staffing Committee, 11 a.m. (Time changed from 2 p.m.)
26 Wed.	Tuberculosis and Diseases of the Chest Group Committee, 2 p.m.
27 Thurs.	Constitution Committee, 10.30 a.m.

OCTOBER

3 Wed.	Public Relations Committee, 2 p.m.
3 Wed.	Distribution Subcommittee, Medical War Relief Fund, 2.30 p.m.
4 Thurs.	Central Consultants and Specialists Executive, 10 a.m.
5 Fri.	Public Health Committee, 10.30 a.m.
10 Wed.	Alternative Edition Subcommittee, Joint Formulary Committee, 11 a.m.
11 Thurs.	Editorial Subcommittee, Joint Formulary Committee, 11 a.m.
17 Wed.	Defence Trust Subcommittee, G.M.S. Defence Trust, 2.30 p.m.
18 Thurs.	G.M.S. Committee, 10.30 a.m.

Branch and Division Meetings to be Held

BOURNEMOUTH DIVISION.—At Board Room, Royal Victoria Hospital, Boscombe, Friday, September 28, 8.15 p.m., meeting. Address by Dr. T. J. B. Geffen: "Aetiology of Hypertension."

ESSEX BRANCH.—At Palace Hotel, Southend-on-Sea, Saturday, September 29, 12.30 for 1 p.m., official luncheon; members' wives and friends invited; 2.30 p.m., annual general meeting. Address, followed by questions and answers, by Dr. Donald Hunter: "Diagnosis."

LONDONDERRY DIVISION.—At Londonderry City and County Hospital, Friday, September 28, 8.15 p.m., annual general meeting.

MID-HERTS DIVISION.—At Wellington Court Clinic, Brickett Road, St. Albans, Friday, September 28, 8.45 p.m., meeting.

READING DIVISION.—At Royal Berkshire Hospital, Wednesday, September 26, 8.30 p.m., meeting. Lecture by Dr. S. F. Logan Dahne: "B.M.A. Conference at Toronto, 1955, and Visit to Eastern States of U.S.A."

SOUTH ESSEX DIVISION.—At Oldchurch Hospital, Romford, Friday, September 28, 9 p.m., Medical Brains Trust. Panel: Drs. R. C. S. Benson, W. J. S. Ewan, A. S. Mason, and F. McL. McGown.

SOUTH WARWICKSHIRE AND RUGBY DIVISIONS.—At Clarendon Hotel, The Parade, Leamington Spa, Tuesday, September 25, 8 for 8.15 p.m., informal supper; 9 p.m., joint meeting.

TOWER HAMLETS DIVISION.—At Mile End Hospital, Bancroft Road, E., Friday, September 28, 3 p.m., clinical meeting.

Meetings of Branches and Divisions

HAMPSTEAD DIVISION

The following officers were elected at the annual general meeting held on May 23, 1956:

Chairman.—Dr. Lionel J. Stoll.

Vice-chairman.—Dr. Arthur Dalby.

Honorary Secretary and Treasurer.—Dr. E. Donald Page.

Assistant Honorary Secretary.—Dr. John Etheridge.

SUPPLEMENT TO THE BRITISH MEDICAL JOURNAL

LONDON SATURDAY SEPTEMBER 29 1956

CONTENTS

Retirement Pensions for the Self-employed	139	"Bigger Than Life"	141
Occupational Health Committee	140	Correspondence	142
Occupational Health and Industry	141	Association Notices	145

RETIREMENT PENSIONS FOR THE SELF-EMPLOYED

PROVISIONS OF FINANCE ACT

[FROM A SPECIAL CORRESPONDENT]

Two sections of the 1956 Finance Act may prove of great assistance to members of the medical profession in providing for retirement. The first applies only to those who derive the whole or part of their earned income from non-pensionable employment, while the second benefits everyone intending to purchase an annuity by a capital payment.

Section I—Providing a Pension out of Income

Proposals made in the Act are designed to enable those persons with earned income derived from non-pensionable employment to provide pensions for themselves on the same favourable terms as regards taxation as are already enjoyed by contributors to approved pension schemes. Hitherto the person not entitled to the benefits of such a scheme has not had this advantage in respect of his private arrangements for setting money aside for retirement. The maximum relief that he has been able to claim is relief of income tax on two-fifths of his contribution if his savings take the form of life assurance policies.

Two questions arise: (1) Who are eligible? and (2) What are the benefits for those who are eligible?

Those Eligible

(1) *Full-time Practice Under the N.H.S.*—Doctors who practise wholly under the National Health Service and are also members of the N.H.S. Superannuation Scheme will not be affected by the proposals.

(2) *Local Government and Other Pensionable Employment.*—Doctors working whole-time for local authorities or for private firms and participating in approved superannuation schemes are not affected by the proposals.

(3) *Private Practice.*—Doctors, the whole of whose earned income is derived from private practice, will be eligible.

(4) *Part-time Health Service (or other Pensionable Employment) and Part-time Private Practice.*—Doctors so engaged will be eligible to benefit in relation to their earned income from private practice within certain limits as defined below.

(5) *Practice (Whole- or Part-time) under the N.H.S. where a Doctor has Opted out of the Health Service Superannuation Scheme from Inception.*—The position of doctors who

opted out of the N.H.S. Superannuation Scheme is not yet clear and is under discussion with the Ministry. It may be that some rearrangements will be possible as a result of which they may be able to benefit from the new proposals.

Benefits for Those Eligible

The advantage to those who are eligible is that they will be able to make provision for their retirement in such a way that the money they set aside out of their earned income from year to year will not be taxed. However, the manner in which they do this will be very closely controlled.

The type of policy to be approved is one under which premiums are payable up to the age chosen for retirement, and in consideration for which a pension in the form of an annuity then becomes payable to the policyholder for the remainder of life. The benefits must be taken as a pension which will be taxed as earned income, and the chosen retirement age must not be earlier than 60 nor later than 70. The policy must not provide for payment of any lump sum in addition to or in lieu of pension. The only occasion on which a lump sum may be payable is by way of a return of premium in the event of the death of a policyholder before reaching pension age. The policy may provide for the payment of a pension to a widow, but in that case the pension may not exceed that payable to the policyholder.

Contributions per annum are permitted within the following limits and will rank for full relief of income tax and surtax:

(1) In the case of purely private practice, premiums up to a maximum of 10% of eligible private earnings or £750, whichever is the lesser.

(2) For part-time Health Service (or other pensioned employment) and part-time private practice, premiums up to a maximum of 10% of total eligible earnings or £750, whichever is the lesser, less one-tenth of pensionable emoluments for the year of assessment.

(3) Older entrants are permitted to increase their maximum contributions in both categories (1) and (2) in accordance with the following scale:

Year of Birth	Max. Sum	Percentage
1914 or 1915	£825	11
1912 or 1913	£900	12
1910 or 1911	£975	13
1908 or 1909	£1,050	14
1907 or any earlier year	£1,125	15

It is important to note that if any pensions are being received or pension rights retained from previous employment

Correspondence

Because of heavy pressure on our space, correspondents are asked to keep their letters short.

Remuneration Claim

SIR.—Dr. I. Goldblatt's letter (*Supplement*, September 15, p. 130) advocating a plebiscite or questionnaire on the desirability of introducing a per-item-of-service payment for general practitioners is most timely. For it is only at this time, when the insecure position of our profession has been so vividly illustrated by the Minister of Health's rebuff, that there is any hope of overcoming the usual apathy and inertia in our own minds, so often so unfairly attributed to the B.M.A. The very least that such a plebiscite could do would be to alert the Government to the expediency of implementing the remuneration claim before any major change in the Health Service was contemplated by the profession.

The only arguments against "per item" payment which I have ever heard advanced are that it would lead to abuse, and that it would entail more record-keeping and clerical work. Neither of these objections is of any moment, for the system works well for dentists, and it would entail no more clerical work than the sending of bills in private practice. Per-item payment is the natural procedure in any profession. It is so universal that it hardly needs advocacy, while the weird Chinese system of capitation payment is totally unpredictable and has been applied in Great Britain for the sole purpose of obtaining the services of practitioners as cheaply as possible. It succeeds in this alone. Per-item-of-service payment would do away with this foolish attempt to define the average patient and the average doctor. This attempt has resulted for eight years in gross underpayment for proper medical care and the encouragement of clerical medicine—i.e., the substitution of prescription writing and letters to hospitals for the practice of medicine as taught in the medical schools.

A demand for per-item-of-service payment would represent the first serious attempt by the profession to grapple with the problem of "unemployment and underemployment" in its own ranks. Payment for work done would inevitably enable large-list doctors to reduce their lists even on a basis of pre-war payment, for surgery attendances and domiciliary visits. In our own partnership payment at the rate of 5s. and 7s. 6d. respectively would have more than trebled the income last year. The status of the profession would be partially restored by per-item payment. At the present time an annoying minority of patients waste surgery time and disturb leisure hours with the most trivial and unreasonable demands. A small token charge would obviate this, but, since the Government is motivated by political expediency rather than common sense, this will never be done—unless a per-item-of-service payment necessitates it.

Finally, it is important that we should realize that our power in negotiations decreases every year. Not only is the die for the present pattern set harder, but the older men are leaving our ranks. These in most cases represent the financially secure elements, who are more independent of the Government and N.H.S. and more likely to press claims. Moreover, the day that compulsory National Service ends there will certainly be unemployment in our profession unless we act now. Too many doctors will mean loss of status, loss of negotiating power, and a salaried service within two years.

It is high time this matter was fully aired and the opinion of the profession measured by a plebiscite. Expenses could be met by a small optional postal order accompanying each vote.—I am, etc.,

Bingley, Yorks.

S. ADRIAN PRICE.

SIR.—We are informed that the average net income of the general practitioner is £2,222, but like Dr. H. T. Chilton

(*Supplement*, September 8, p. 124) I am extremely sceptical of this figure, and your footnote to his letter only deepens the mystery. What on earth is this formidable "£573 in respect of income from other sources"? I have never met another doctor who gets such an enormous sum. Who and where are they?

Let us analyse the sources as given in the *Supplement* for March 3 (p. 70): Private practice is now almost dead, effectively killed by the politicians' refusal to let private patients have free drugs like anyone else. There may be a few fortunate practices with a large private list, but the average must be very small. As regards maternity services, I suppose the average G.P. is lucky if he gets 12–15 domiciliary confinements a year. This certainly could not account for more than £100. It is absurd to include payments to dispensing doctors, as out of this they have to pay their steadily mounting drug bills, which leaves little, if any, profit. Very few G.P.s are lucky enough to have hospital appointments now, and the number is gradually getting less. Payments for training grants, for sight testing, and from Government departments affect only a small minority of us. This leaves only payments from local authorities for notifications, inoculations, and vaccinations consisting of the odd few pounds.

"Most of us would be very interested to know how this huge figure of £573 has been arrived at. Or is it a figment of the statisticians' imagination? One thing I think is certain. If we really got an average of £573 from "other sources" in 1953–4 then we are definitely not getting it now, and in a few years it will have shrunk to a fraction of what it was. But can we convince the politicians and public of this fact? If we can it will be a great help in gaining support for our claims.—I am, etc.,

Merioneth.

C. C. M. WATSON.

SIR.—I do hope that the leaders of the British Medical Association have taken note of Dr. I. Goldblatt's letter (*Supplement*, September 15, p. 130), because it contains the most important suggestions which have been made in recent letters.

It is of fundamental importance that representatives of any body should be in possession of the opinions of those they represent. At the present moment it is impossible that this state of affairs exists, and therefore I consider that without delay a questionnaire should be sent to every doctor in the country in an endeavour to establish what every man or woman is thinking at the present time. The primary question is: "What do you think of the National Health Service in its present form?" If the reply to this question is that it is bad and not in the best interests of the country or the profession, then steps should be taken at once for either extensive reform or withdrawal from the Service in the event of unreasonable obstruction from the Government.—I am, etc.,

London, S.W.16.

D. G. ALLEN.

SIR.—Dr. C. R. Barker (*Supplement*, September 15, p. 130) has given us the Government's answer. But you will note this extract from Miss Hornsby-Smith's letter: "... we would not be justified in giving consideration to any claim for a general increase in medical remuneration." Perhaps optimistically, I feel that consideration might be given to those practitioners whose income is below the oft-quoted figure of £2,222 net. It would indeed be interesting to know how many have incomes of less than £2,222 gross.

One cannot expect the Government to feel indulgent towards the practice with the maximum list of 3,500 patients. Such a practice attracts its quota of midwifery cases and temporary residents. Let us face facts. The crux of the matter is the totally unrealistic maximum figure of 3,500. The Ministry knows full well that a desperate struggle for existence is going on in general practice. I have not yet been asked for the suit off my back, but my doorbell attracts its share of beggars. Recently I lost a family of six because I lent the mother a shilling to purchase medicine. Rather

than pay me back she changed her doctor. Was I right or wrong?

The Ministry knows only too well the financial state of general practice, and of the many whose only break from the tedium of work is the occasional refresher course—when a locum can be found. The Negotiating Committee must think again, or engage a lay expert to advise how general practice can be saved.—I am, etc.,

Barrow-in-Furness.

J. H. C. CORR.

Women Doctors Exist

SIR.—I have had, in most respects, a very clear and business-like communication from an honorary official of the B.M.A. There are, however, one or two curious points about it. I am on the envelope addressed by my Christian name (correctly) as "Agnes." Inside I am addressed as "Dear Sir." I am then asked to bring my "wife" to a luncheon. Later I am told "we shall join the ladies." Where I and other doctors of the female sex have been in the meantime is not stated.

Is it not time that even the honorary officials of the B.M.A. (to whom we all owe so much) should know there are such beings as women doctors? I have already suggested to a local honorary official that "your spouse" should be substituted for "your wife," and "join our friends" for "join the ladies," but apparently without effect.—I am, etc.,

Colchester.

AGNES ESTCOURT-OSWALD.

Board-and-Lodging Charges

SIR.—The statement in Mr. Roger Brearley's letter (*Supplement*, September 8, p. 126) that the new scale of charges for registrars is subsidized is open to some doubt when considered in relation to certain comparative costs which I shall mention. But I leave that to the judgment of residents of his own group. There is, however, no doubt that the charges for senior staff are grossly excessive.

As Mr. Brearley points out, under paragraph 17 of the Terms and Conditions of Service, hospital management committees were required to fix their own charges "equal to the value of the service provided," and the prescribed principle was to charge in full. In 1949 management committees were determined charges according to this paragraph, but now we are faced with new charges which represent over 100% increase on charges covering the full cost in 1949. When this increase is compared with the increase over the same period of the cost-of-living indices of about 38%, cost of hospital meals of 23%, and rise in salary of S.H.M.O.s of 16%, the full extortionate nature of the new charges will be appreciated. The average purchase cost of food in hospital per person per annum is currently about £65. Furthermore, if a hospital resident were, for full value, to eat four hospital meals per day for 365 days a year, the total cost of his individual meals as cooked and served, based on the recently introduced rate of charges for officer grades, would be £146 per annum. It is thus apparent that charges of £350 and £400 leave a totally exorbitant margin for the rent of the rooms provided, especially in view of the nature of the accommodation generally available and the poor situation of such a high proportion of our hospitals from the point of view of residential amenity, factors which are not likely to be remedied in the foreseeable future. It is in the general interest of the service as well as in the particular interest of those concerned that these charges be reviewed.—I am, etc.,

Croydon, Surrey.

J. J. LINEHAN.

Doctors' Earnings

SIR.—Recent correspondence about doctors' net earnings has at least revealed the prevalent confusion about some of the real issues involved.

The doctor is not free to use his so-called net earnings for the private purposes of himself and his family. A substantial slice of his net earnings is still exacted by his N.H.S. practice. Unlike the schoolteacher, for instance, who is under no necessity to provide his own school premises, a doctor must acquire premises to be used either wholly

or in part for N.H.S. practice. Such premises must be paid for—normally under a mortgage agreement—involving a charge upon the doctor's net earnings over many years. Is such a charge to be recognized as a legitimate expense for his N.H.S. practice net earnings, or is it to be regarded as a levy upon his private charity for the benefit of the public? Or the doctor's car, in these days a must, not a luxury: running expenses are taken into account, but what of capital depreciation over and above the proportion allowed by the Inland Revenue? But how many doctors recognize this as an expense on their net earnings?

The net earnings of many, perhaps most, doctors suffer further diminution because they do not claim, and indeed are not even aware of, the full legitimate expense charges upon their income. They do not, for instance, take account of items of outlay which are in fact incurred in the daily routine of their N.H.S. practice—e.g., damage to a suit from bloodstains in cases of immediate urgency, or from canine enthusiasm, or loss of their pens, gloves, hats at their N.H.S. patients' homes, or damage to spectacles or watches. Such and many other items may amount over a period to a considerable sum. But in how many cases do they enter into the reckoning? The services of the doctor's wife, who is exploited to the uttermost day and night—services which in the business world command a salary of at least £500 per annum. In how many cases is an adequate claim made under this head?

If the doctors had only made themselves conversant with the full reductions and allowances permitted by income-tax law, there could never have been published so generous an official estimate of their average net earnings as has in fact appeared.—I am, etc.,

Birmingham, 32.

R. M. HOWSON.

Was It a Drug?

SIR.—I recently had occasion (*Supplement*, January 14, p. 11) to draw your attention to the unsatisfactory manner in which decisions on whether a substance is or is not a drug are made. In your issue of September 15 (p. 129) you report yet a further example of this form of petty tyranny. In this case a doctor had ordered "casilan" (1) for a patient dying of carcinoma of the bronchus, where, one would have thought, the only possible effect it could have would be a nutritional one—yet the referees decided it was a drug; (2) for a patient with cirrhosis of the liver, where nutrition was already specially provided by a suitable diet, where this substance was ordered in the hope of producing a therapeutic effect over and above that, and where, therefore, it might with some reason have been recognized as a drug—yet the referees (albeit with one dissentient) decided it was not.

I have no wish to question these decisions, dubious as they are, on the basis of the brief summary of the facts that appears in the *Journal*, but I feel that I am speaking for more than one prescribing practitioner if I say that it makes me tired when I am told that local medical committees and referees decide each case on its merits—as though there were some special virtue which made this a worthy and ideal method. Not only is this by no means the case, but it has been freely recognized that some principles should be laid down which should serve as guidance in these matters. In fact, a special committee was set up which made a report on the principles by which drugs may be distinguished from foods and toilet preparations. A comprehensive extract of this report appears in the *Handbook for General Medical Practitioners*, presumably for their guidance.

However, neither local medical committees nor the referees take any notice of these principles, nor do they publish others (if any) that they are prepared to recognize. They prefer to hide behind the unchallengeable curtain of "considering each case on its merits." Now, to cap it all, the referees have plainly stated that the Definition of Drugs Joint Subcommittee does not mean what it says, or if it does this is inconsistent with the Act. Anyway, they have

openly discarded it. The practitioner is thus completely in the dark. There is no one who dares advise him on what he may or may not prescribe. Ordinary common sense does not appear to apply, and even if he decides to chance it (at the risk of his pocket) in any given case this does not preclude an opposite decision in the next apparently identical case.

This attitude of "We are not going to tell you what the law is, but heaven help you if you break it" is a piece of unwarranted arrogance. Local medical committees have a duty to their electorate, even if the referees and executive councils have not. I challenge any of them to pretend they are representing the doctors in their area (the sole reason of their existence) if they continue as they do at present.—I am, etc.,

London, W.9.

A. LEWIS.

Cost of the N.H.S.

SIR,—There is a genuine need for an incentive for the G.P. to prescribe with economy and to resist the demands of certain types of patients. This would be provided if the funds allocated for the provision of drugs were divided amongst practitioners in proportion to the size of their lists and the doctor provided his own prescription forms and paid the chemist direct. The staff employed to sort and price prescriptions would become redundant, the doctor and chemist would regain some of their independence, and the right to prescribe as we think fit would be safeguarded.—I am, etc.,

Sheffield.

IAN A. WOOD.

What is Excessive Prescribing?

SIR,—The suggestion in my article (*Supplement*, September 1, p. 115) that there might, in comparable hospitals, be a real association between the cost per head per week of drugs and dressings and the average length of stay per case seems to have aroused some interest, and two or three friends have asked if I am sure of my data. So it may be well to set the figures out in more detail. In the following I use "high cost" and "low cost" solely in relation to the weekly cost of drugs and dressings. All figures relate to "acute" hospitals with 300–900 beds.

I quoted the figures for hospitals in the Manchester Group. Certain other groups show a similar, though less perfect, gradation.

	Average Stay per Case (Days)	Average Weekly Cost per Head of Drugs and Dressings
South Western Group:		£ s. d.
Royal Devon and Exeter	13	1 4 5
Royal United and Manor	15	1 2 3
Taunton and Somerset	15	1 1 11
Southmead	16	1 1 4
Frenchay	23	19 2
Oxford Group:		
Northampton General	10	1 9 0
Royal Berkshire	10	18 5
Stoke Mandeville	27	12 1
Birmingham Group:		
Coverley and Warwickshire	11	1 17 10
North Staffs	15	1 6 6
Dudley Road	14	1 1 8
Gulson	12	1 0 6
Wordley	18	18 7
Hallam	17	16 11
Little Bromwich	22	9 9
The large London teaching hospitals:		
St. Mary's	14	2 5 3
King's College	15	2 3 9
West London	14	2 3 6
St. George's	15	1 18 7
Middlesex	19	1 18 2
St. Thomas's	16	1 17 6
London	18	1 16 8
Westminster	18	1 14 11
Barts	19	1 12 3
Hampstead General	17	1 11 4
Guy's	17	1 11 3
Hammersmith	18	1 10 10

Only the Middlesex is notably out of place.

In the S.E. Metropolitan group the two lowest-cost hospitals have long stay and the two highest cost have short stay.

	Average Stay per Case (Days)	Average Weekly Cost per Head of Drugs and Dressings
St. Alfege's	16	£ s. d. 1 4 3
St. Giles'	18	1 5 2
Pembury	19	17 0
Southern	23	16 8

In the S.W. Metropolitan group the range is from Royal Hants County, 12 days, £1 6s. 5d., to Lambeth, 22 days, 16s. 2d. In between the gradation is irregular. In the N.E. Metropolitan group the range is from Oldchurch, 16 days, £1 7s. 7d., to Mile End, 22 days, 14s. 9d.

The figures for the Leeds Group are:

	Average Stay per Case (Days)	Average Weekly Cost per Head of Drugs and Dressings
Huddersfield R.I.	14	£ s. d. 1 5 0
Bradford R.I.	17	1 10 8
Pinderfields	31	16 7

The three hospitals in the Liverpool group are much on a par as regards cost and length of stay.

In the remaining four groups, East Anglian, Newcastle, Sheffield, and Welsh, there is little regularity in cost and length of stay, though a tendency for high-cost hospitals to have shorter length of stay is still visible.

Reviewing the whole field, the data, I suggest, give sufficient support to the suggestion that there is real correlation between drug costs and length of stay to warrant further investigation. Speaking broadly, it costs as many pounds to treat and maintain a patient in hospital per week as it costs shillings to supply him with drugs. It might seem, therefore, a case of spending shillings to save pounds. Hospitals who pride themselves on low drug expenditure may be doing a disservice to both patient and taxpayer, as also may Ministerial pressure to work to a tight budget on drugs.

The Department is introducing next year a new system of cost accounting in the larger hospitals. Opportunity might be taken to go more fully into the matter.—I am, etc.,

Horsham, Sussex.

F. F. MARCHBANK.

Health Centres

SIR,—As chairman of the professional committee of the Harold Hill Health Centre, Romford, I consider it necessary to point out that in the report on health centres (*Supplement*, August 4, p. 89) it is stated that there are three suites occupied by general medical practitioners, whereas the accommodation consists of three suites each providing consulting-room, examination- and waiting-rooms, and a further consulting-room with which is shared one of the three waiting- and examination-rooms. In effect, therefore, there are four suites fully occupied, and any costs should be based on the provision of four suites and not on three as quoted in your tables of capital and running costs.

Further, although in the table of running costs the cost to each doctor is given as £111, the actual cost is £125 per doctor by reason of the fact that, although nine doctors actually hold sessions in the centre, two of these practitioners are in partnership, and, as they share the sessions applicable to that partnership, they are for costing purposes regarded as one unit. I would also point out that the total amount payable in respect of the rent and facilities applicable to general medical services is £1,000, or £250 per suite,

which is the amount that would have been payable by each doctor had four doctors each exclusively occupied one suite.

I trust you will publish this correction, as the computation of costs on three suites instead of four creates a much higher cost per suite than is actually the case.—I am, etc.,

J. GORDON FIFE.

Romford, Essex.

Association Notices

SIR CHARLES HASTINGS AND CHARLES OLIVER HAWTHORNE CLINICAL PRIZES, 1957

The Sir Charles Hastings Clinical Prize Competition is established by the Association for the promotion of systematic observation, research, and record in general practice. The competition has been extended by the addition of a second prize known as the Charles Oliver Hawthorne Clinical Prize. The following are the regulations governing the awards:

1. The Sir Charles Hastings Clinical Prize, consisting of a certificate and £75, will be awarded for the best entry.
2. The Charles Oliver Hawthorne Clinical Prize, consisting of a certificate and £50, will be awarded for the second best entry.
3. Any member of the Association who is engaged in general practice is eligible to compete for these prizes.
4. The work submitted must include personal observations and experiences collected by the candidate in general practice, and a high order of excellence will be required. If no work entered is of sufficient merit no award will be made. Candidates in their entries should confine their attention to their own observations in practice rather than to comments on previously published work on the subject, though reference to current literature should not be omitted when it bears directly on their results, their interpretations and their conclusions.
5. Essays, or whatever form the candidate desires his work to take, must be sent to the Secretary, British Medical Association, B.M.A. House, Tavistock Square, London, W.C.1, not later than December 31, 1956.
6. A prizewinner in any year is eligible for an award of either of the prizes in any subsequent year. A study or essay that has been published in the medical press or elsewhere will not be considered eligible for a prize, and a contribution offered in one year cannot be accepted in any subsequent year unless it includes evidence of further work.
7. If any question arises in reference to the eligibility of the candidate or the admissibility of his or her entry the decision of the Council on any such point shall be final.
8. Preliminary notice of entry for this competition is required, on a form of application to be obtained from the Secretary.
9. Each entry, which should be unsigned, must be typewritten or printed on one side of the paper only and accompanied by a note of the candidate's name and address.
10. No definite limits are laid down as to the length of the work submitted, but the Council anticipates that for this competition 3,000 to 10,000 words would be suitable.
11. Inquiries relative to the prizes should be addressed to the Secretary.

KATHERINE BISHOP HARMAN PRIZE

The Council of the British Medical Association is prepared to consider an award of the Katherine Bishop Harman Prize in the year 1957. The value of the prize is £75. The purpose of the prize, founded in 1926, is the encouragement of study and research directed to the diminution and avoidance of the risks to health and life that are apt to arise in pregnancy and child-bearing. It will be awarded for the best contribution submitted in open competition, competitors being left free to select the work they wish to present, provided this falls within the scope of the prize. Any registered medical practitioner in (a) the British Commonwealth and Empire or the Republic of Ireland and (b) any member of the British Medical Association wherever resident is eligible to compete.

Should the Council of the Association decide that no contribution submitted is of sufficient merit, the prize will not be awarded in 1957, but will be offered again in the year next following this decision, and in this event the money value of the prize on the occasion in question shall be such proportion of the accumulated income as the Council shall determine. The decision of the Council will be final.

Each contribution must be typewritten or printed in the English language, and must be accompanied by a detachable slip bearing the candidate's name and address. The Council anticipates that contributions should be between 3,000 and 10,000 words, although no definite limits are laid down. Preliminary notice of entry is required and a form for this purpose can be obtained from the Secretary. Entries must be forwarded so as to reach the Secretary, British Medical Association House, Tavistock Square, London, W.C.1, not later than December 31, 1956. Inquiries relative to the prize should be addressed to the Secretary.

PRIZE ESSAY COMPETITION FOR PROVISIONALLY REGISTERED PRACTITIONERS, 1957

The Council of the British Medical Association is prepared to consider the award, in 1957, of prizes to provisionally registered practitioners for essays submitted in open competition. The subject of the essay is: "Medicine is an Art as well as a Science."

In awarding the prizes due regard will be given to evidence of personal observation and experience. No study or essay that has previously appeared in the medical press or elsewhere will be considered eligible for a prize.

Any provisionally registered practitioner in the pre-registration year at the time of submission of the essay is eligible to compete for a prize. If any question arises in reference to the eligibility of a candidate or the admissibility of his or her essay, the decision of the Council of the British Medical Association shall be final. Should the Council decide that no essay entered is of sufficient merit, no award will be made. At least one prize of £50 is offered. In determining the number of prizes to be awarded, the Council will take into consideration the number and standard of essays received.

Essays must not exceed 5,000 words, and must be typewritten or legibly written in the English language on foolscap paper, on one side only, must be unsigned, and must be accompanied by a note of the name and address of the entrant. Notice of entry for this competition is necessary and a form of application can be obtained from the undersigned.

Essays must be forwarded so as to reach the Secretary of the British Medical Association not later than January 31, 1957. Inquiries relative to the competition should be addressed to the Secretary, British Medical Association, B.M.A. House, Tavistock Square, London, W.C.1.

SCHOLARSHIPS IN AID OF SCIENTIFIC RESEARCH

The Council of the British Medical Association is prepared to receive applications for research scholarships as follows: an Ernest Hart memorial scholarship, of the value of £300; a Walter Dixon scholarship, of the value of £300; four ordinary research scholarships, each of the value of £200.

The scholarships are given to candidates recommended by the Science Committee of the Association as qualified to undertake research in any subject (including State medicine) relating to the causation, prevention, or treatment of disease.

In addition, applications are invited for the award of the following research scholarship: the Insole scholarship, of the value of £250, for research into the causes and cure of venereal disease.

Each scholarship is tenable for one year, commencing on October 1, 1957. A current scholar may apply to be re-appointed for a further year, though no scholarship will be renewed more than twice. A scholar is not necessarily required to devote the whole of his or her time to the work of research, but may be a member of H.M. Forces or may hold a junior appointment at a university, medical school, or hospital, provided the duties of such appointment will

not, in the opinion of the Science Committee, interfere with his or her work as a scholar.

Applications for scholarships, including renewals, must be made not later than March 1, 1957, on the prescribed form, a copy of which will be supplied on application to the Secretary, British Medical Association House, Tavistock Square, London, W.C.1. Applicants are required to furnish the names of three referees who are competent to speak as to their capacity for the research contemplated.

OCCUPATIONAL HEALTH PRIZE

The Occupational Health Prize was established by the Association for the purpose of encouraging interest and research in the field of occupational health. The Council of the British Medical Association is prepared to consider the award of this prize, which consists of a certificate and £50, in the year 1957. Any member of the Association who is engaged in the practice of occupational health, either whole-time or part-time, is eligible to compete for the prize. Candidates may select their own subject.

Entries should be submitted in a form suitable for publication and must include personal observations and experiences collected by the candidates in the course of their work. If no entry is of sufficient merit no award will be made. Candidates should confine their attention to their own observations rather than to comments on previously published work on the subject, though reference to current literature should not be omitted when it bears directly on their results, their interpretations, and their conclusions.

Essays, or whatever form the candidate desires his work to take, must be sent to the Secretary, British Medical Association, B.M.A. House, Tavistock Square, London, W.C.1, not later than January 31, 1957. No study or essay that has been published in the medical press or elsewhere will be considered eligible for the prize, and a contribution offered in one year cannot be accepted in any subsequent year unless it includes evidence of further work. A previous prizewinner is not precluded from entering. If any question arises in reference to the eligibility of the candidate or the admissibility of his or her essay, the decision of the Council on any such point shall be final.

Preliminary notice of entry for this competition is required on a form of application to be obtained from the Secretary. Each entry must be typewritten or printed on one side of the paper only, and accompanied by a note of the candidate's name and address. No definite limits are laid down as to the length of essays, but the Council anticipates that, for this competition, essays should consist of between 3,000 and 10,000 words. Inquiries relative to the prize should be addressed to the Secretary.

PRIZE ESSAY COMPETITION FOR MEDICAL STUDENTS, 1957

The Council of the British Medical Association is prepared to consider the award, in 1957, of prizes to medical students for essays submitted in open competition. The subject of the essay is: "The Medical Student and Research—Past Achievements and Present Opportunities."

Any medical student who is a registered member of a medical school in the United Kingdom, Commonwealth and Empire, or the Republic of Ireland at the time of submission of the essay is eligible to compete for a prize. Previous prizewinners are eligible for a second award. If any question arises in reference to the eligibility of a candidate or the admissibility of his or her essay, the decision of the Council of the British Medical Association shall be final. Should the Council decide that no essay entered is of sufficient merit, no award will be made. The prizes offered will normally be of the value of £25, but, in determining the number and exact amount of prizes to be awarded, the number and standard of essays received will be taken into consideration by the Council, which reserves the right to vary the number and amount of the prizes.

Essays must not exceed 5,000 words, and must be typewritten or legibly written in the English language on foolscap paper, on one side only, must be unsigned, and must be accompanied by a note of the name and the medical school of the entrant.

Notice of entry for this competition is necessary and a form of application can be obtained from the undersigned.

Essays must be forwarded so as to reach the Secretary of the British Medical Association not later than January 31, 1957. Inquiries relative to the competition should be addressed to the Secretary, British Medical Association, B.M.A. House, Tavistock Square, London, W.C.1.

A. MACRAE,
Secretary.

Diary of Central Meetings

OCTOBER

- | | | |
|----|--------|---|
| 2 | Tues. | Amending Acts Committee, 2 p.m. |
| 3 | Wed. | Public Relations Committee, 2 p.m. |
| 3 | Wed. | Distribution Subcommittee, Medical War Relief Fund, 2.30 p.m. |
| 4 | Thurs. | Central Consultants and Specialists Executive, 10 a.m. |
| 5 | Fri. | Public Health Committee, 10.30 a.m. |
| 8 | Mon. | S.H.M.O.s Group Council, 2 p.m. |
| 9 | Tues. | Central Ethical Committee, 2 p.m. |
| 9 | Tues. | Subcommittee on Schedule of Prescribed Industrial Diseases, Occupational Health Committee, 2 p.m. |
| 10 | Wed. | Alternative Edition Subcommittee, Joint Formulary Committee, 11 a.m. |
| 11 | Thurs. | Central Consultants and Specialists Committee, 10.30 a.m. |
| 11 | Thurs. | Editorial Subcommittee, Joint Formulary Committee, 11 a.m. |
| 11 | Thurs. | Journal Committee, 2 p.m. |
| 12 | Fri. | Ophthalmic Qualifications Committee, 1.30 p.m. |
| 12 | Fri. | Ophthalmic Group Committee, 2 p.m. |
| 12 | Fri. | Science Committee, 2 p.m. |
| 17 | Wed. | Private Practice Committee, 2 p.m. |
| 17 | Wed. | Defence Trust Subcommittee, G.M.S. Defence Trust, 2.30 p.m. |
| 18 | Thurs. | G.M.S. Committee, 10.30 a.m. |
| 22 | Mon. | Scientific Exhibition Subcommittee (Newcastle, 1957), Arrangements Committee, 2.45 p.m. |
| 25 | Thurs. | Compensation and Superannuation Committee, 2 p.m. |
| 25 | Thurs. | Charities Committee, 2.30 p.m. |

Branch and Division Meetings to be Held

DARLINGTON DIVISION.—At Darlington Memorial Hospital, Tuesday, October 2, 8.30 p.m., meeting. Lecture by Dr. C. E. Kellett: "Aspects of Complement."

DARTFORD DIVISION.—At Out-patient Department, West Hill Hospital, Dartford, Tuesday, October 2, 8.30 p.m., clinical meeting.

DERBYSHIRE BRANCH.—At Temple Hotel, Matlock Bath, Sunday, October 7, 3 p.m., annual meeting. Address by Dr. Robert Forbes: "Recent Developments in Medical Litigation."

EAST HERTS DIVISION.—At Hertford County Hospital, Thursday, October 4, 8.30 p.m., meeting. Annual B.M.A. Lecture by Mr. R. J. McNeill Love: "Some Common Abdominal Conditions" (illustrated by lantern slides).

GLASGOW DIVISION.—At Glasgow Regional Office, 234, St. Vincent Street, Glasgow, Thursday, October 4, 8.30 p.m., meeting, followed by film show.

GRIMSBY DIVISION.—At Grimsby General Hospital, Thursday, October 4, 7 p.m., clinical evening, followed by annual general meeting.

GUILDFORD DIVISION.—At Milford Chest Hospital, Godalming, Thursday, October 4, 8.30 p.m., clinical meeting.

HARROW DIVISION.—At Rayners Hotel, Rayners Lane, Tuesday, October 2, 8.30 p.m., annual general meeting.

HASTINGS DIVISION.—At Royal East Sussex Hospital, Hastings, Tuesday, October 2, 8.15 p.m., meeting. Address by Dr. David Rice: "Some Legal Aspects of Psychiatry."

LEWISHAM DIVISION.—At Lewisham General Hospital, Tuesday, October 2, 8.30 p.m., meeting. B.M.A. Lecture by Sir Russell Brock: "Basic Principles in the Diagnosis of Diseases of the Lungs."

LINCOLN DIVISION.—At Saracen's Head Hotel, Lincoln, Thursday, October 4, 7.30 for 8 p.m., dinner; address by Dr. Hugh Clegg (Editor, *British Medical Journal*): "Some Problems of Editing and Publishing." Following his talk, Dr. Clegg will answer any questions on current topics. All medical practitioners, whether B.M.A. members or otherwise, are invited.

NORTH-EAST ESSEX DIVISION.—At Essex County Hospital, Colchester, Tuesday, October 2, 8 p.m., clinical meeting.

PRESTON DIVISION.—At the Winckley Club, Preston, Thursday, October 4, 7 for 7.30 p.m., Annual Dinner. Ladies invited.

STIRLING BRANCH.—At Stirling Royal Infirmary, Thursday, October 4, 8.30 p.m., scientific meeting. Lecture by Dr. Magnus Pyke, D.Sc., Ph.D.: "Chemicals in Food."

SWANSEA DIVISION.—At Langland Bay Hotel, Thursday, October 4, 7.30 for 8 p.m., dinner. Chairman's address by Dr. I. P. G. Howells: "The Changing Scene of General Practice."

WEST MIDDLESEX DIVISION.—At Paul's Restaurant, New Broadway, Ealing, W., Thursday, October 4, 8.30 p.m., meeting. B.M.A. Lecture by Mr. John Howkins: "Criminal Abortion." Members' wives, members of adjacent Divisions, and members of the local section, B.D.A., are invited.

SUPPLEMENT TO THE BRITISH MEDICAL JOURNAL

LONDON SATURDAY OCTOBER 6 1956

CONTENTS

General Medical Services Committee	- - -	147	Hospitality	- - -	148
Support for Remuneration Claim	- - -	148	Correspondence	- - -	149
Enthusiasm at Darbishire House	- - -	148	Association Notices	- - -	150

GENERAL MEDICAL SERVICES COMMITTEE

THE REMUNERATION CLAIM

An all-day meeting of the General Medical Services Committee was held at B.M.A. House on September 20, with Dr. A. TALBOT ROGERS in the chair. Dr. F. M. Gould, Birmingham, a new member, was cordially welcomed to the Committee.

The meeting was saddened by the announcement of the death of Dr. D. F. Whitaker, who had been a very valuable member of the Committee and certain subcommittees and liaison committees for some years. Tributes to his modesty and effective work were paid by the CHAIRMAN and by Dr. C. M. SCOTT, and members stood in silence as a token of respect.

A letter was read from Dame Enid Russell-Smith, thanking the Committee for its congratulations and good wishes on her forthcoming promotion to Deputy Secretary of the Ministry of Health, and adding that of the latter she would certainly stand greatly in need.

Five members were reappointed as part of a joint committee to prepare a memorandum of evidence for submission to the Ministry of Health Working Party on the field of work, recruitment, and training of social workers at all levels in the local health and welfare services: they were the Chairman, Dr. J. C. Arthur, Dr. A. Brown, Dr. H. C. Faulkner, and Dr. Kate Harrower. A similar number are appointed by the Central Consultants and Specialists Committee and by the Public Health Committee.

The CHAIRMAN made a brief statement on the progress of the remuneration claim and on a meeting which had taken place between representatives of the Negotiating Committee and the Ministry of Health on August 1. He referred to the statement which had appeared in the *Supplement* to the statement which had appeared in the *Supplement* on September 15 (p. 129), and added that they had now heard that the Minister had lost no time in asking his legal advisers to study the document which had been presented.

The Middlesex Local Medical Committee had forwarded a resolution in which it deprecated the widely published statements about the average net remuneration of medical practitioners, and the inevitable reaction in the public mind as a result of such statements. Middlesex called for a vigorous publicity campaign to explain the true significance of the figures. Dr. S. WAND suggested, however, that the statement complained of was made some time ago and the public had now probably forgotten all about it. The figure was factual and was the basis of the Danckwerts award. After some discussion it was agreed that no further action should be taken along the lines suggested by Middlesex.

The Central Pool

The CHAIRMAN reported on negotiations with the Ministry on the size of the central pool for 1954-5. He was glad to

be able to report that finality had now been reached, and that the final settlement for that year would be paid on January 1, 1957.

Emergency Call Service

The CHAIRMAN invited the Committee to consider another matter arising out of reports in the press about the emergency call services which have been operating in certain parts of London during the year. It would be remembered that a committee was reappointed at a previous meeting to examine the whole problem of deputizing arrangements, with particular reference to those run on a commercial basis.

After a very full debate it was decided to publish the following statement setting out the Committee's view:

The General Medical Services Committee of the Association has been considering the reports which have appeared in the daily and weekly press about the Emergency Call Services which have been operating in certain parts of London during the year.

While it believes that schemes of this kind are open to abuse, the Committee is satisfied that they do not of necessity run counter to the National Health Service Act and its regulations.

The Committee again wishes to emphasize that a general practitioner in the National Health Service is personally responsible for treatment under Section 8 (1) of the First Schedule of the N.H.S. (General Medical and Pharmaceutical Services) Regulations, 1954, and it is therefore the responsibility of every individual doctor to satisfy himself—and his executive council—that he has made adequate deputizing arrangements when he is necessarily absent from his practice.

The Committee believes that the interests of general practice and the public are best served by providing for proper off-duty and leisure time by means of group practice, partnership, and rota schemes. It recognizes, however, that in certain areas it may not always be possible for the individual doctor to participate in such arrangements and, in consequence, an emergency call service may constitute a suitable supplement to the more usual methods of practice. When such a supplementary scheme operates, it should conform with the customary arrangements in the other forms of practice and should not be used as an opportunity to escape a contractual obligation to provide a personal and continuing service or to enable a doctor to avoid all emergency week-end and night calls.

It hopes that the sponsors of the London schemes will now respond to the invitation to meet the Committee for an exchange of views, for until the full details are known it is impossible for the Committee to give an assurance to its constituent local medical committees that the schemes provide all possible safeguards against abuse.

Treatment of Merchant Seamen

A deputation from the Maritime Subcommittee of the Private Practice Committee was received to discuss the N.H.S. fees for attendance on seafarers, in which there were said to be many anomalies at the present time. The deputation consisted of Dr. E. L. Caldwell-Smith, chief medical officer of the Shipping Federation, Dr. D. J. Avery, of London, and Dr. W. Laing, of Birkenhead. It was contended, for example, that while at certain ports the full

temporary resident fee was paid for each seafarer treated, in another the full fee was paid only for the first three men examined in one day, and thereafter was reduced to 5s. for each man. In some areas the full fee was paid only for the first man, and in others the reduced fee of 5s. was paid for each seafarer, no matter how many were examined in one day. It was also mentioned that very often a visit to a seafarer within port limits entailed a long and difficult journey to an isolated quay, a boat trip to a ship moored in the roads, and a hazardous and uncomfortable journey over the side, followed by an examination in cramped quarters. The whole journey and examination took at least an hour.

The DEPUTY SECRETARY, however, pointed out that the regulations were now being amended, that it had been agreed that the 5s. fee was too small and was to be increased to 8s. 6d., and that, moreover, the new regulations provided the right of appeal to the Minister. It was at the discretion of the executive council, with the advice of the local medical committee, to decide what the fee should be.

After considerable discussion it was agreed that the members of the deputation should put in writing to what extent, in their view, the alteration of regulations modified the grounds of their complaint, and whether they wished to submit some alternative proposals.

Inquiry into Cost of Prescribing

A letter was read from the Ministry proposing an independent committee consisting of a lay chairman, five general practitioners representing different areas and types of practice, the dean of a medical school, two general physicians, a pharmacologist, a pharmacist, and a statistician to inquire into the cost of prescribing in the N.H.S. The committee would be expected to tackle the investigation on broad lines, including medical education and training, the influence of hospital practice, the effect of advertising techniques of manufacturers, and pressure by patients.

It was decided to consult with the Chairman of Council and the Chairman of the Central Consultants and Specialists Committee before agreeing to the proposed constitution.

Other Business

Dr. J. A. PRIDHAM, chairman of the Organization Committee, moved that the Committee should be responsible out of its own funds for the payment of subsistence allowances to its members when attending centrally arranged meetings, and to members of subcommittees and of annual or other conferences arranged by the Committee, except where subsistence allowance was paid from any source other than B.M.A. funds. Decision on this matter was deferred until a subsequent meeting.

Dr. F. GRAY, on behalf of the London Local Medical Committee, raised the question of general-practitioner representation on boards of governors of teaching hospitals. He said that there were fourteen such hospitals in London, and a year ago there was a representative of general practitioners on eight and none on the other six. The position had now worsened. There was a representative of general practitioners on only five of the fourteen boards.

It was agreed to make representations to the Minister of Health stressing the need for a representative of general practitioners to be appointed on the board of governors of each of the fourteen teaching hospitals in London.

Dr. PRIDHAM gave a report on the question of general-practitioner maternity beds at Portway Maternity Hospital, Weymouth, which had been brought forward at previous meetings. The question seemed now to have reached an impasse, owing to the necessity for providing improved toilet facilities, accommodation for a premature babies' unit, and rooming-in. The hospital management committee had stated that it would be willing to give the subject of general-practitioner maternity beds the fullest further consideration when circumstances permitted. Dr. Pridham said that the position was most unsatisfactory, and he hoped that matters would be pursued further.

SUPPORT FOR REMUNERATION CLAIM

At a meeting of the South Bedfordshire Division on September 21 at Luton to discuss remuneration, 55 members attended out of a total of 96 and unanimously passed the following resolution:

"That this Division expresses its strongest possible support for the Negotiating Committee in its dealings with the Minister on the subject of remuneration, and pledges its determination to take whatever steps the Negotiating Committee finds it necessary to advise even if that involves resignation in part or whole from the Health Service."

ENTHUSIASM AT DARBISHIRE HOUSE

SECOND YEAR'S WORK

Doctors working at the Darbshire House Health Centre, Manchester, are still enthusiastic about health centres as a base for general practice, according to the annual report for 1955-6, which describes the work done in the centre's second year.

Four general practitioners and one assistant work there with an ancillary staff consisting of one social worker, two full-time and three part-time nurses, one secretary with three full-time and two part-time assistants, one part-time radiographer, one part-time clinical pathology technician, one part-time physiotherapist, and a caretaker and cleaning staff. The doctors report that they "are much impressed by the undoubted benefits of group practice, and would be exceedingly unwilling to return to practice where the advantages of having nursing assistance, x-ray, and laboratory facilities on the premises were absent. Simple physiotherapy has been found of great use. The benefits of having a social worker attached to the centre have been great, both for patients and doctors, and initial scepticism has proved unfounded."

The centre is also used for teaching final-year students from Manchester University "in the art of general practice." The students apparently appreciate the experience, and the doctors too have found it "stimulating, and not without benefit." The patients have raised no objections. An adviser in teaching, appointed by the university (Dr. R. Logan), is available for consultation and is helping the doctors of the centre to carry out clinical investigations, including one into iron-deficiency anaemia.

Each doctor retains his financial independence and sees his own patients, though freely consulting his colleagues. "No attempt has been made at specialization." With each doctor running his practice in his own way "unanimity in general policy is achieved," while "each doctor's individuality in the management of his practice is preserved."

The total number of patients on the doctors' lists was 12,356. Though an appointments system is available, relatively few of them take advantage of it.

HOSPITALITY

A German doctor's daughter, aged 17, would like to stay with a British medical family on an *au pair* basis for about a year. In exchange for board and residence she would be willing to help with light housework or care for children.

An Austrian doctor's family will receive an English girl on an *au pair* basis.

An Italian doctor's son, a medical student aged 17, would like to stay with an English family between November and Christmas this year on an exchange basis.

A Swiss doctor's son, aged 17, would like a holiday exchange with an English boy of the same age. Alternatively, he is prepared to give French lessons on an *au pair* basis.

Would anyone interested please get in touch with Brigadier H. A. Sandiford, International Medical Visitors Bureau, B.M.A. House, Tavistock Square, London, W.C.1.

Correspondence

Because of heavy pressure on our space, correspondents are asked to keep their letters short.

Start Afresh

SIR,—I am extremely pleased that the Government has failed to keep its side of the bad bargain we made in 1948. My only fear is it will have second thoughts and pay us the 24% which is our just due, and leave us with our other serious grievances unredressed.

Sad it is to say, but true nevertheless, the only issue likely to bring unity and strength to our profession is real financial hardship. It is with many of us now, and it will increase and remain for ever as long as we have to rely entirely on the Government to pay us. Since 1911 it has never been convenient for any Government to grant us extra money unprovoked. Every award has required a serious threat of withdrawal of service before it has been granted. It has been a continuous undignified fight. It would be nice to think that reasoned argument would prevail, but the Government always outsmarts us. The Government only gives way when it sees we mean business and are prepared to resign. Negotiations and arguments get us nowhere without this threat. This time, let us hope we have the courage and good sense to carry it out and only re-enter the Service on our own terms. Our grievances go much deeper than the financial ones.

To me, and to many of us, our grievances are not just money. This latest financial swindle is the one chance of uniting the profession to resign. It is quite obvious that the mood of the nation is in favour of a health service of some sort, but let us as a profession only re-enter one on our own terms. For example: (1) We should insist on a service similar to the Australian one. This is not perfect, but it is at least better than ours. (2) We must get rid of the capitation system of payment. (3) We should insist on the optional return of goodwill or immediate payment of compensation based on present-day money value. (4) If drugs are to be free to anyone then they must be free to all. These are only a few of the points to add. Now is the time. It will soon be too late.—I am, etc.,

ANTHONY PARTRIDGE.

Shoreham-by-Sea.

SIR,—The National Health Service is composed of three parties—the insured patient, the Government, and the doctor. So far as the first two parties are concerned it is a service (whether health or not). The patient receives service in return for contributions; the Government receives service for its contributors. It is only for the bulk of the doctors (the general practitioners) that it is not a service but a piece-work job. Yet these are the purveyors of the service, and their quality is the quality of the service provided.

A service means increments according to the length of service, opportunities for promotion to the administrative and other grades, a reserve cadre of 1/7 for relief in sickness and to cover leave of any sort, opportunities for study and research, a pension scheme or contributory provident fund (superannuation). At it stands the medical component of the N.H.S. is a collection of confusions, chiefly because in 1948 it was recruited from the existing (and even then out-of-date) cadres of the profession—the G.P., the hospital doctor, the health officer, the consultant, the research worker, the super-consultant. Each was taken in on different terms, without thought for the overall picture of the future; without, one fears, appreciation of what such compartmentation would do to the quality of the service that would result, the effect upon the individual, the effect upon the whole status of the profession.

We have had a bitter lesson; but have we learned from it? The Service will soon be ten years old, and it is not a remuneration claim that is called for but complete re-planning. It is administrative failure that has brought us

to this pass. We brought too much of the old into the new without paring it to fit the new context. The armour we have built up to protect ourselves—the group practice—is not the true solution.

The doctor is a medical man, the product of a lengthy and costly education, and whether he be working single-handed or in a big group he is entitled to the same standard of living. His income in a national health service should not be dependent upon popularity with patients, and Government should pay either a salaried cadre or, if the capitation fee must be retained, pay 30s. for the first 2,000 patients and 5s. for the rest, per head. This might reduce big lists, which smother initiative and exhaust reason, and set us on our feet again as possible contributors to the problems of medicine in Britain and abroad.

At the same time the G.P. should be encouraged to specialize by (say) a year's study leave every seven years. He should be sure of a month's holiday a year—both these being met from the reserve cadre of doctors in the Service. In the case of those with existing practices at the time the Service was instituted and whose cases might be prejudiced by the suggested changes, could not Government pay 35s. per head for the first 2,000 patients, the additional 5s. representing an annual payment towards the goodwill value of the practice? This would be offset to some extent by the progressive reduction in interest payments and clear the stage for a revision of ideas.

Only when we are prepared to scrap the existing agreements and start afresh in the light of experience can the doctor, as well as the patient and the Government, get a fair deal in the National Health Service. In this context one may say that the doctor has done little to have his point of view made known, and his claim for increased remuneration has suffered thereby. Only the other day in a Scottish newspaper the following statement appeared: "The Joint Under-Secretary of State for Scotland is to make a two weeks' 'see for himself' tour of the Scottish hospitals. He hopes to see on the spot some of the difficulties facing hospital staffs and also to look at the conditions from the patients' point of view." Hospitals and patients! Why not the general practitioner? Could he not be the focus of a "see for yourself" tour? Perhaps his difficulties and problems might take on a more solid aspect with authority if such a thing happened. At present it is only the rare few who fall from grace who appear by name in the news; otherwise a policy partly blurred by ethical standards and partly by exclusiveness has taken us out of the public scene and far away from the national sympathy. Only rarely is a G.P. found taking a prominent part in the social life of the environment, whether town or village. Perhaps if he were less busy, less preoccupied by financial problems, he would regain that esteem and affection which characterized our members in pre-National Health Service days.—I am, etc.,

Crocketford, Dumfries.

L. SUTHERLAND.

Medical Staffing of Mental Hospitals

SIR,—I fully endorse all that Dr. S. Krauss has written (*Supplement*, September 15, p. 130). If the overall ratio of consultants to S.H.M.O.s is as officially stated, then I cannot help thinking that there must be a glut of consultants in other areas to balance the inverse ratio that exists in this one.

At our mental hospital, out of a staff of seven, there are three juniors, three S.H.M.O.s, and only one consultant, and much the same sort of thing goes, as notable if less glaring, for most other hospitals in the area. The area is the South-western Region.

These "degrading" committees (what an appropriate term Dr. Krauss uses) have certainly done a capital job here. They have mowed the grass finely—and kept it mowed—in spite of the most persistent evocations from suitably experienced specialists, graded S.H.M.O. and kept so graded, who have for a great deal of the time been doing consultants' work and doing it apparently with satisfactory efficiency.

doing this work along with their own because there are not enough consultants to go round.

I say—advisedly—with *satisfactory* efficiency, because the labourer is worthy of his hire, and only the really exceptional person, who certainly could not thrive, much less exist, within the levelling-up or levelling-down mediocrity of the National Health Service, could give of his best while suffering so great a sense of frustration, so embittered and resenting. I wonder what the railway worker—or rather his union—would have to say if guards were used to drive the train and still got their old wage? Yet this is what is happening to thousands of disillusioned S.M.O.s, who have in many cases unfairly been stricken down by the regional reaper's hand, all hope and ambition gone.

In this area will be found institutional doctors getting a lower salary than the head male attendant or the matron, to say nothing of the clerk to the hospital, and, more relevant to this issue, there are specialists in this region who are not only doing the so-called consultants' work when consultants are unavailable, including domiciliary visits (a few of the boldest have refused), but who are also regarded as sufficiently knowledgeable to lecture at the nurses' training schools in their specialties, yet not similarly remunerable, for such lectures are valued at precisely three-quarters of the consultants' lecture fee—i.e., they are paid 1½ guineas, instead of the consultants' 2 guineas per lecture.

Such men and others no less deserving have so far failed to persuade their regional boards to up-grade them, in spite of repeated exhortations and the ever-present difficulty of medical staffing in mental hospitals, and the insufficiency of psychiatric consultants.¹

The last review by the regional board was quite a while ago, and another is long overdue. But another will be of little avail so long as our regional benches are constituted as at present. An adequate representation of those who have local knowledge, of local reputations, conditions, and difficulties, is essential. The present juridical benches, born of the cap and gown out of remote control, clearly prefer the callow youth direct from the school of the large teaching hospital (they knew the bright boy in class) with little more experience than that afforded by the nimbus of the midnight lamp, oozing with degrees, and the ability to impress a committee, to those who may well be regarded locally as qualified by performance and a long experience to be consultants.

So long as this is the case, the mental health service with regard to staffing difficulties, from bottom to top, is likely to be "bogged" up. . . . And, of course, in the long run, our mental nurses, in dangerously short supply, already over-worked and understaffed, will have to take the strain, more strain, for a psychiatric consultant's role is primarily a preventive and advisory one—to keep patients out of mental hospitals.—I am, etc.,

Exminster, Devon.

JOHN W. FISHER.

REFERENCE

¹ Central Health Services Council. Report for the Year Ended December 31, 1955. 1956. H.M.S.O., London.

Health Centres

SIR.—The facts about the accommodation for general practitioners at the Harold Hill Health Centre, Romford, were fully stated in the report of the London Local Medical Committee on Health Centres—i.e., that there are three suites consisting of consulting-room, examination- and waiting-rooms, and one additional consulting-room. It is true that in the report the Committee reckoned this accommodation as three suites, whereas it would have been more correct to have reckoned it as three and a third, not four as Dr. J. G. Fife writes (*Supplement*, September 29, p. 144). The Committee felt, however, that its comparisons of costs could be only approximate and would not be appreciably affected by the omission of a small fraction.

It may surprise your readers to learn, both with regard to this criticism by Dr. Fife and his further statement that the rent per doctor was given incorrectly, that the report was sent to him in draft before being approved by the

London Local Medical Committee, and his reply was: "The details about Harold Hill are substantially correct."—I am, etc.,

London, W.C.1.

F. GRAY,
Secretary,
London Local Medical Committee.

Association Notices

Diary of Central Meetings

OCTOBER

- | | |
|-----------|---|
| 8 Mon. | S.H.M.O.s Group Council, 2 p.m. |
| 9 Tues. | Central Ethical Committee, 2 p.m. |
| 9 Tues. | Committee on Capital Punishment, 2 p.m. |
| 9 Tues. | Subcommittee on Schedule of Prescribed Industrial Diseases, Occupational Health Committee, 2 p.m. |
| 10 Wed. | Alternative Edition Subcommittee, Joint Formulary Committee, 11 a.m. |
| 10 Wed. | Catalogue Subcommittee, Film Committee, 2 p.m. |
| 11 Thurs. | Central Consultants and Specialists Committee, 10.30 a.m. |
| 11 Thurs. | Editorial Subcommittee, Joint Formulary Committee, 11 a.m. |
| 11 Thurs. | Journal Committee, 2 p.m. |
| 12 Fri. | Science Committee, 11 a.m. (Time changed from 2 p.m.) |
| 12 Fri. | Ophthalmic Qualifications Committee, 1.30 p.m. |
| 12 Fri. | Ophthalmic Group Committee, 2 p.m. |
| 12 Fri. | Overseas Committee, 2 p.m. |
| 17 Wed. | Private Practice Committee, 2 p.m. |
| 17 Wed. | Defence Trust Subcommittee, G.M.S. Defence Trust, 2.30 p.m. |
| 18 Thurs. | G.M.S. Committee, 10.30 a.m. |
| 18 Thurs. | Radiologists Group Committee, 11 a.m. |
| 22 Mon. | Scientific Exhibition Subcommittee (Newcastle, 1957), Arrangements Committee, 2.45 p.m. |

Branch and Division Meetings to be Held

- ALDERSHOT AND FARNHAM DIVISION.—At Northfield Hospital, Aldershot, Wednesday, October 10, 8.30 p.m., annual general meeting. Discussion on remuneration, to be opened by Dr. R. G. Gibson. Film: "The Twins of Kano."
- BARNSELY DIVISION.—At Queen's Hotel, Barnsley, Wednesday, October 10, 7.15 for 7.30 p.m., dinner and dance.
- BLACKPOOL AND FYLDE DIVISION.—At Savoy Hotel, Blackpool, Wednesday, October 10, 7.15 p.m., dinner; 8.30 p.m., lecture by Mr. R. Thurst: "Some Jewish Laws of Hygiene."
- BROMLEY DIVISION.—At Cray Valley Hospital, St. Paul's Cray, Tuesday, October 9, 8.15 p.m., clinical meeting. Dr. D. F. O'Neill: "Migraine."
- CROYDON DIVISION.—At Mayday Hospital, Thornton Heath, Tuesday, October 9, 8.30 p.m., clinical meeting.
- HENDON DIVISION.—At Heudon Hall Hotel, N.W., Tuesday, October 9, 8.45 p.m., meeting. Dr. Maurice Campbell: "Sherlock Holmes and Medicine." Wives and friends of members are invited.
- KINGSTON-ON-THAMES DIVISION.—At Kingston Hospital, Wolverton Avenue, Kingston-on-Thames, Tuesday, October 9, 7.30 p.m., clinical meeting.
- MONMOUTHSHIRE DIVISION.—At Angel Hotel, Abergavenny, Thursday, October 11, 8 for 8.30 p.m., dinner; clinical meeting. Subject: "Tubercle in Children." Speakers: Dr. S. Rosehill, Mr. T. H. L. Rosser, Dr. T. A. Brand, and Dr. M. I. Jackson.
- NORTH STAFFS DIVISION.—At North Stafford Hotel, Station Road, Stoke-on-Trent, Tuesday, October 9, 8.15 p.m., joint meeting with North Staffs Branch of Pharmaceutical Society. Lecture-film demonstrations by Dr. J. J. Merry.
- PRESTON DIVISION.—At The Playhouse, Market Street, Tuesday, October 9, 8.30 p.m., meeting. B.M.A. Lecture by Mr. Charles Evans: "Kangchenjunga." Ladies invited.
- SCUNTHORPE DIVISION.—At Blue Bell Hotel, Scunthorpe, Thursday, October 11, 7.45 for 8.15 p.m., meeting. Discussion to be opened by Dr. E. Grey-Turner (Assistant Secretary, B.M.A.): "Remuneration."
- SOUTH MIDDLESEX DIVISION.—At Red Lion Hotel, Hounslow, Wednesday, October 10, 7.30 for 8 p.m., Medical Practitioners' and Pharmacists' Joint Annual Supper; lecture by Dr. W. A. F. Macdonald: "Adam to the Atom." (Illustrated by lantern slides.)
- SOUTHPORT DIVISION.—At Nurses' Home, Southport General Infirmary, Friday, October 12, 8 for 8.30 p.m., meeting. Lecture followed by film demonstration on cortisone by Dr. J. J. F. Merry.
- SOUTH-WEST ESSEX DIVISION.—At Sir James Hawkey Hall, Woodford Green, Thursday, October 11, 8 for 8.30 p.m., annual dinner and dance.
- SOUTH-WEST WALES DIVISION.—At Boar's Head Hotel, Carmarthen, Saturday, October 13, 7.30 for 7.45 p.m., annual B.M.A. dinner and lecture. Mr. C. Naunton Morgan: "Advances in the Surgery of the Anal Canal and Rectum."
- STOCKTON DIVISION.—At Stockton and Thornaby Hospital, Tuesday, October 9, 8.30 p.m., meeting. Lecture by Dr. John Burton: "My Recent Visit to Russia."

SUPPLEMENT TO THE
BRITISH MEDICAL JOURNAL

LONDON SATURDAY OCTOBER 13 1956

CONTENTS

Medical Manpower	151	B.M.A. Film Library	154
Recruitment to the Dental Profession	153	Scottish News	154
Individual Membership of W.M.A.	153	Questions Answered	154
Empire Medical Advisory Bureau	153	Correspondence	155
Sickness Certification in N. Ireland	154	Association Notices	158

MEDICAL MANPOWER

SCOTTISH COMMITTEE'S MEMORANDUM

The Scottish Committee of the British Medical Association has submitted a memorandum of evidence to the departmental committee (the Willink Committee) appointed by the Minister of Health and the Secretary of State for Scotland to estimate on a long-term basis the number of medical practitioners likely to be engaged in all branches of the profession in the future and the consequent intake of medical students required.

Broadly speaking, the Committee feels that almost every aspect of the subject is "fraught with prognostic difficulty." It was possible to discern certain trends, but their continuance depended upon factors so unpredictable that "nothing short of efficient crystal gazing could give the answer." However, the Committee has set out those considerations which have enabled it to reach some conclusions.

Historical

The growth in the number of doctors in proportion to the population since the end of the last century is attributed to the developments in medical knowledge and the great expansion of specialism which came with the modern emphasis on the scientific aspects of medicine. The extended opportunities thus created were inevitably reflected in the number of those seeking to make medicine their career. The medical schools long established in the four university centres in Scotland were well placed to meet this situation. As a consequence a high proportion of British doctors were trained in the Scottish medical schools. A substantial proportion of those trained in Scottish schools were not of Scottish origin; nevertheless, even allowing for this, the proportion of young men and women in Scotland seeking to make a career in medicine has for long been significantly higher than in the rest of Great Britain. The Committee believes that this reflects the high esteem in which professional occupations have long been held in Scotland.

Not only has the content of medical practice been greatly altered by the elimination or much diminished incidence of illnesses common a hundred years ago (and to a lesser extent by the appearance or increase of others which were not), but the changes in age distribution of the population, social and economic status, etc., have in turn had an indirect effect on medical practice which is difficult to assess in relation to future trends and requirements.

Present Situation

An assumption that the expected phase of expansion of the profession following the start of the Health Service might

be followed by one of contraction when the declared objects of the Service are attained is not as logical as it appears, the Committee says, because there are many imponderable factors which can influence future developments and make unpredictable demands on medical manpower. It is by no means certain that much contraction can be looked for as a result of an efficient health service or even that such contraction will occur at all.

Some indication of the trends can be seen in the statistics of medical employment in the National Health Service since 1948. In 1948-9 there were 2,419 general practitioners in contract with executive councils in Scotland. By 1954-5 this number had increased to 2,568, an increase of approximately 6%. In 1951 the number of doctors in the Scottish local health authority service was 250. The figure at the end of 1955 had increased by approximately 16% to 291. The numbers in the different grades of hospital medical staff in Scotland at December 31 are shown in the following table.

	1949	1950	1951	1952	1953	1954	1955
Consultant	653	708	731	751	810	835	876
S.H.M.O.	274	301	321	328	316	337	353
Senior registrar	161	191	197	217	213	223	236
Registrar	266	269	208	202	206	246	281
J.H.M.O.	..	..	..	131	163	161	..
S.H.O.	..	..	..	155	174	189	..
H.O.	..	..	..	576	547	579	..

By far the greatest increase in an all-round increase in the number of doctors participating in the Health Service has been in those working in the hospital service. There are approximately 30% more doctors working in the hospitals now than there were only seven years ago. The increase in the amount of service rendered by the hospitals is about 35 to 40%. From this the Committee points out that the staff increase was in no sense a luxury one but came about in response to a genuine demand.

The Committee thinks that the spreading of hospital and specialist service throughout Scotland is well advanced and that any further increase in hospital medical establishments will mainly reflect developments in medical knowledge and practice.

Superficial consideration might suggest that the increase in hospital attendance would lead to a reduction in general-practitioner attendance, but this is not so. The Committee thinks it more likely that the reverse is true, and that it is because people are going more readily to see their family doctors that more of them are being referred to hospital. Whatever may be the actual balance of effect of the Service, there can be little doubt that the percentage increase in the total of general medical services has been substantially

greater than the percentage increase in the total numbers of practitioners.

Both the number and proportion of those with small lists are appreciably less in 1955 than in 1951. This indicates that the capacity of general practice as a whole to undertake more service is to this extent reduced. It is widely, although by no means universally, considered that the permitted maximum for lists is still too high. If this view became more generally accepted the broad tendency, observable since the inauguration of the Service, towards "spreading the load" of general practice is likely to continue. It is highly probable that in such circumstances it would prove necessary to have more doctors engaged in general practice.

Intake of Medical Students

The Committee calculates, very much in round figures, that British medical schools will require to produce enough replacements for a total present medical force of about 66,000 and to allow for an increase during the next 10 to 25 years of about 10%.

Admissions to Scottish medical schools have fallen by about 20%, while applications are not far short of 50% less than they were seven or eight years ago. It is recognized by the Committee that the high level of applications in the early post-war years reflects the backlog of demand created by the war, but it doubts if this factor alone fully explains the large drop in applications in 1951 and 1952. It believes these figures support the fairly general impression that there has been a significant decline in the number not only of those seriously contemplating entry into the medical profession but also of those measuring up to selection committee standards.

Twenty or more years ago the majority of applicants came from professional families, many from medical families. Nowadays, the Committee is informed, such applicants constitute quite a small proportion of the total. Formerly doctors for the most part were pleased when their children elected to follow in the parental footsteps and encouraged them to do so, but now they are much less enthusiastic and sometimes actively discouraging.

Economic factors operate in the same direction. Many professional-class parents, often unable to obtain grants from public funds, find the cost of putting their sons and daughters through medicine under present conditions more than they can undertake.

Apart from their intrinsic importance these aspects are relevant to the practical considerations which have led to the present inquiry. If, for example, there were to be a really serious dearth of suitable applicants, estimates of required intake at which the Committee might arrive could prove to be largely of academic interest. The Committee feels, however, that it is reasonable to hope that any falling off in numbers of suitable recruits to the medical profession is only temporary and that in the long run the high place of medicine as a career of choice will be recovered.

The Future

The factors likely to influence medical requirements seem to the Committee to fall into two interdependent main groups—namely, those immediately and directly affecting the practice of medicine, and those affecting the general level of health in the community and thus indirectly the practice of medicine. Most obvious in the first group are advances in the knowledge and understanding of disease processes and in the means of treating or preventing them. There is no reason at all to suppose that this process of advance will halt, and illnesses which now make heavy demands on medical services may in quite a few years' time have largely disappeared.

A less obvious factor in this group is the system of organizing and financing a medical service which depends for its finance on an annual parliamentary vote. It seems to the Committee that this must have a bearing on the "number of medical practitioners likely to be engaged in all branches of the profession in the future." Under such a system the amount of money to be devoted to the medical

service must be determined, at least to some extent, by considerations unconnected with actual medical need. Secondly, the amount to be spent has to be determined in advance, and of course the decision as to what the nation is to pay for its doctoring has to be a collective, not an individual, one as it is under less highly organized systems. Whatever may be its other merits or demerits, such a system does not make for flexibility of response to changing need, and changes in establishment are consequently rendered less likely than they would be under less centralized arrangements.

This relative inflexibility is likely to affect mostly the situation in the hospital and specialist services. At the same time the Committee finds it easy to imagine that changes in the organization, administration, and financing of the public health and general medical services also could materially affect the numbers of doctors required to undertake them. While it is not at all unlikely that such changes will come about, it seems to the Committee quite impossible at the present juncture to forecast either when they are likely to occur or what form they might take.

The Committee is not entirely convinced that the increasing age of the population more or less automatically results in an increasing need for medical services. Much illness suffered by the elderly is preventable. Much of the thought and effort of the developing specialty of geriatrics is directed to prevention of this kind of illness. To the extent that this objective is attained an ultimate reduction in the demand for medical services for the elderly can be anticipated.

Studies of schoolchildren and young adults over the years reveal evidence of continuing improvement in the general level of physical health among the younger age-groups in the community. This has resulted in the main from the application of medical knowledge to the problems of disease prevention, principally but not exclusively through those practising in the public health service. There remains much scope for fresh developments in the field of preventive medicine, as well as for more effective prosecution of measures already initiated. No one can say with certainty, but it is undoubtedly possible that application of the principles and practice of preventive medicine to the problems of psychogenic disorder might result in improvement in the general level of mental health comparable with that already achieved in relation to physical health. No matter how vigorously this desirable end were pursued, however, it could be achieved neither quickly nor without initially increasing rather than diminishing the need for doctors.

It is the Committee's belief that quantitative limitation of entry, based on population, might well have an adverse qualitative effect on the total recruitment in this country. Should a policy of limitation appear to be indicated as a result of the Willink Committee's inquiry and estimates, this object could be better achieved by raising the standards of entry and qualification in all the schools. Any policy which had the effect of partially dismantling, as it were, the carefully built up apparatus of medical teaching would be most unwise.

Conclusion

In conclusion, it must, the Committee thinks, be anticipated that the number of doctors engaged in all branches of the profession will during the next 10 to 25 years be not less than it is at present and is likely to be more. If, after making allowance for "wastage" (by death, retirement, marriage of women doctors, etc.), an average practising life of 30 years is assumed, the annual number required for replacement would be 2,200. The figure for 1955, by which time presumably adjustment to the new registration requirements had been made, was 2,309. An intake into the profession of this order does not allow a large margin for meeting the increased demand for doctors which the Committee believes is likely to arise in the proximate future. To produce this number of graduates would require an annual intake of students of nearly 3,000 (allowing for a student wastage of approximately one-eighth), a number which is in

excess of the present total intake of the British and Irish schools. From this it seems possible to the Committee to draw at least the negative conclusion that there is no prima-facie argument in favour of quantitative limitation of student intake to British medical schools. At the same time it does not think that positive steps need to be taken now to increase intake, because adjustment will occur without this.

The Committee thinks that some of the factors which could influence future requirements might conceivably be less difficult to assess in a few years' time, and that the Departmental Committee should consider postponing, perhaps for five years, a forecast of long-term requirements. Finally, the Committee thinks that it would be valuable to keep up-to-date the statistical information collected for the present inquiry and to keep the situation under periodic review.

RECRUITMENT TO THE DENTAL PROFESSION

COMMITTEE SUGGESTS REMEDIES FOR SHORTAGE

There is little prospect of any increased entry into the dental profession during the next few years to balance the retirement of the many dentists of advanced age at present on the register. The numbers entering the dental schools during the last five years dropped to their lowest, and even if recruitment is stimulated at once there can be no hope of an increase of substance for at least eight years. This situation is disclosed in the report¹ of the Departmental Committee on recruitment to the dental profession which was set up in 1955, under the chairmanship of Lord McNair, by the Minister of Health and the Secretary of State for Scotland.

In the committee's opinion the profession is failing to attract recruits for three main reasons. The public does not understand the true import of dental health and too little is known of the possibilities of dentistry as a career; many dentists are unwilling to advocate it; parents cannot afford the outlay for training for a profession which is not as attractive as it could be.

Remedies

If appropriate steps are taken to remedy these things, the committee feels that young people will offer themselves in sufficient numbers as recruits. To achieve the aim of increasing the register to 20,000 names an annual intake of about 900 will be needed, compared with about 550 at present. A difficulty would be to increase the accommodation in dental schools in sufficient time, and it is recommended that universities should at once consider how they can provide additional places in the preclinical year. The possibility of developing the facilities of dental departments in general hospitals for clinical training should also be considered. A new dental school or schools for an intake of 200 students a year should be established, and the foundation of a dental school in the University of Wales for an intake of 50 students annually should be expedited.

The establishment of an independent and representative standing committee to secure public awareness of dental matters is recommended. In particular the committee recommends that authorities responsible for publicity should encourage the enlistment of women into the profession.

Professional Discontent

Recognizing that dentists should be the best advocates of their profession, the committee recommends that, so far as possible, the causes of their present discontent should be removed. A thorough review of the whole system of remuneration should be undertaken and consideration given to the correction of the present pattern of earnings whereby

¹ Report of the Committee on Recruitment to the Dental Profession, 1956. H.M.S.O., London. Price 3s. net.

professional income tends to diminish in middle age, regardless of increasing experience. The general sense of financial insecurity should also be corrected, particularly in the way of lessening the financial problems facing dentists on retirement.

The committee also recommends that methods should be examined whereby help can be made available to suitable candidates for dental schools whose parents cannot find the contribution necessary under the present rules for State or local authority grants.

To prevent or mitigate causes of professional irritation the committee suggests that the list of treatments set out in the National Health Service (General Dental Services) Regulations as requiring prior approval should be reviewed now and at two-yearly intervals, so that any treatment which could be an occasion or a source of abuse by either patient or dentist could be removed.

The number of consultant posts should be increased, the committee says, as should also facilities for research and original work.

INDIVIDUAL MEMBERSHIP OF W.M.A.

SECRETARY-GENERAL'S VIEWS

The Secretary-General of the World Medical Association, writing in the *World Medical Journal* for September, states his opinion that the objectives and proper influence of the W.M.A. can be obtained only by support of the doctors in all countries. Mere membership of their national association in the W.M.A. is not sufficient. Support can be given by individual members of the medical profession through membership in a supporting committee or through the latest proposal to establish associate individual membership in the W.M.A. The two methods are not necessarily in conflict. Associate membership can be conferred on supporting committee members.

The Secretary-General goes on to say: "It is essential to arouse the individual doctor if our principles are to prevail. If the standards of medicine are to progress the medical profession must remain free. It can remain free only if it faces the threats of government or outside agency controls with unanimous support of the individual members of the profession." Formerly, doctors could confine their thoughts to scientific medicine. Now the social structure of the world has changed so they must pay attention to medical economics and social changes. If doctors are alert they can guide and control these changes instead of being controlled by them.

The question of associate or individual membership will be discussed eventually by the General Assembly of the W.M.A. after member associations have considered the matter.

EMPIRE MEDICAL ADVISORY BUREAU

FIRST WINTER "AT HOME"

Mr. and Mrs. A. M. A. MOORE received the guests at the first of the "at homes" to be held this winter by the Association's Empire Medical Advisory Bureau. Some 160 doctors, many accompanied by their wives, from 12 Commonwealth countries accepted invitations and were able to meet a number of distinguished medical men in this country who were present. Further receptions will be held at intervals during the winter months. The medical director of the Empire Medical Advisory Bureau is Brigadier H. A. Sandiford.

The Minister of Health has decided to add fluorohydrocortisone preparations to the list of specially expensive drugs, reagents, and appliances for the supply of which doctors receive payment over and above their capitation fees (E.C.L. 53/56). The amendment was effective from September 1, 1956.

SICKNESS CERTIFICATION IN N. IRELAND

SELECT COMMITTEE'S COMMENTS

The number of persons medically certified for sickness benefit in Northern Ireland in 1954-5 was about one and a half times the figure for Great Britain in proportion to the insured population. In its report¹ for that year the Northern Ireland Select Committee of Public Accounts stresses "the gravity of the present position as regards medical certification and the urgent need for improvement."

It is stated in the report that if the rate of certification were reduced to that obtaining in Great Britain payments in sickness benefit would be reduced by more than £1 million a year. So far any improvement from a policy of securing the co-operation of doctors had not been readily discernible, and in the Committee's view, from both the financial and the moral aspects, "the time has arrived when disciplinary action should be taken in the case of doctors who continue to give unjustifiable certificates of incapacity."

B.M.A. FILM LIBRARY

The following films have recently been added to the library:

Circular Vascular Suture.—Black and white, sound, 12 min., made by Professor Vladimir Kovanov, presented by the Russian delegation of doctors, November, 1955. The film demonstrates end-to-end anastomosis of arteries by a method of suture which ensures that the cuff does not interfere with the blood flow and the sutures themselves are not in direct contact with the blood, not even the intima sutures.

Gait.—Colour, sound, 30 min., 1956, made in collaboration with the Orthopaedic Institute, University of London, presented by Imperial Chemical Industries, Ltd. The film is complementary to *Gait*—ICI/M.34. Here an analysis of gait is made on the basis of (1) weakness of muscles controlling joints, (2) disorders of the joints, (3) abnormalities of the bones.

Artificial Respiration.—Black and white, sound, 11 min., 1956, presented by Imperial Chemical Industries, Ltd. The Schaefer and Holger Nielsen methods are described, first on wall charts and then demonstrated by a team of first-aiders on a patient suffering from drowning. The combined method with two operators and the use of "novox" apparatus is also shown.

Examination of the Unconscious Patient.—Black and white, sound, 6 min., 1956, presented by Imperial Chemical Industries, Ltd. Demonstration of a systematic method of examination of an unconscious patient by a first-aiders.

Removal of Clothing and Treatment of Fractured Collar-bone.—Black and white, sound, 6 min., 1956, presented by Imperial Chemical Industries, Ltd. Demonstrates a method of removing clothing followed step by step with the treatment of the fracture.

First Aid for Patient with a Fractured Spine.—Black and white, sound, 8 min., 1956, presented by Imperial Chemical Industries, Ltd. A team of first-aiders demonstrates the correct method of handling and treating such an injury from the initial approach to the eventual removal of the patient on a stretcher.

Rehabilitation at Swindon.—Black and white, sound, 22 min., 1951, presented by the British Transport Commission. The film shows the rehabilitation workshop attached to the railway workshops at Swindon. It consists largely of a series of illustrations of specially adapted machines being operated by injured men so that in working them they will exercise and rehabilitate the muscles related to the injury and at the same time carry out useful work.

Kielland's Midwifery Forceps.—Colour, sound, 17 min., 1955, made by Mr. A. Gunn. It describes the forceps and demonstrates how they are applied to the foetal head. The delivery in a case of transverse arrest is demonstrated.

My First Baby.—Black and white, sound, 30 min., 1955, made by Miss J. R. C. Burton-Brown. The film shows from the expectant mother's point of view the training she receives during the antenatal period and culminates with a normal delivery.

An Operation for Cerebrospinal Fluid Fistula.—Colour, silent, 7 min., 1954, made by Mr. Harvey Jackson. The film gives an account of an operation for a patient who has a cerebrospinal

fluid fistula. The patient is shown demonstrating the leak of C.S.F. before the operation, and then steps of the operation are shown.

Orbital Decompression.—Colour, silent, 9 min., 1954, made by Mr. Harvey Jackson. This film shows shots of a patient suffering from haemangioma in the orbit before and after operation for orbital decompression and removal of a tumour. The steps of the operation are clearly shown.

Congenital Dislocation of the Hip.—Black and white, silent, 7 min., made by Mr. G. D. Rowley. The film shows the clinical examination of a child with congenital dislocation of the hip, followed by a brief outline of the method of treatment.

Scottish News

DRUG BILL IN SCOTLAND

The secretary of the Pharmaceutical General Council (Scotland), Dr. D. McCALL, stated at the Scottish Association of Executive Councils conference in Ayr on October 5, in reply to a reference by Mr. J. NIXON BROWNE, Joint Parliamentary Under-Secretary of State for Scotland, to the "rising drug bill," that he did not consider the drug bill was unduly high. According to a report in the *Scotsman*, Dr. McCALL cited an article in the *British Medical Journal* (F. F. Marchbank, *Supplement*, September 1, p. 115) to show that low cost of drugs meant a high total cost to the State because of longer absence from work, hospital treatment, etc. He admitted there were extravagances which an attempt should be made to reduce. Prescribing of mixtures had fallen from 60% in 1925 to 15% in 1951; in the same period prescribing of proprietary medicines rose from 7% to 30%, and now made up about 45% of all medicaments.

A report of the Scottish Association of Executive Councils conference will be published in a subsequent issue of the *Supplement*.

Questions Answered

We publish below a selection of those questions and answers which seem of general interest. It is regretted that it is not possible to supply answers to all questions submitted.

Locum Rates

Q.—Would you give me particulars of the "B.M.A. rates" for locums?

A.—There are no B.M.A. rates in the sense that the Association has approved a scale of fees for locums. The Association is well aware of the rates usually obtaining and is always willing to advise inquirers on whether a particular proposal accords with usual practice. The ordinary rate payable is 16 guineas a week all found. If the locum uses his own car or is required to do so, he is entitled to a car allowance to cover depreciation, tax, insurance, and maintenance, but not running expenses for professional duties, which are, of course, a practice expense of the principal. This is a generalization. There is nothing to prevent the principal and locum agreeing on a figure to include petrol and oil if they wish to do so. Lastly, if the locum is required to live out, then the principal is responsible for board and lodging. If, on the other hand, the locum lives out at his own request, then he is entitled to the accepted value of "all found," which is three guineas per week.

Correction.—In the report of the G.M.S. Committee (*Supplement*, October 6, p. 147) Dr. F. E. Gould's initials were wrongly printed in the first paragraph.

Correspondence

Because of heavy pressure on our space, correspondents are asked to keep their letters short.

Starting Afresh

SIR.—The Chancellor of the Exchequer stated at Bromley that since 1951 wages have increased by 47% and the cost of living by 25%. This confirms the B.M.A. figures, over which there need be no further argument, and spotlights the necessity and justice of our cause, apart from its legality. Furthermore, it shows that the money is there in the country. Definitely something must be done soon to ease our position. However, if the Government refuses to keep the agreements made when setting up the present system of remuneration, which necessitates adequate payment at pre-war standards since the individual doctor is required to take the risks of an insurance company without the right to alter the rates in accordance with claims or to reject bad risks, we must seek and demand alternatives.

Dr. F. R. Goodwin (*Supplement*, September 8, p. 124) has suggested one method whereby overtime (evening and night visits) should be charged extra to the patients concerned. Evening surgeries could be earlier to achieve reasonable working hours. But I think that this would lead to many difficulties and disagreements—for instance, as to the time a message was actually handed in. It would be much better and much fairer to insist on a payment per item of service system, as is being worked in other countries. There should be a basic payment of 5s. per consultation at the surgery, and 10s. for each visit, plus mileage. Nobody could but agree that these payments would be reasonable. Nevertheless, every doctor's income would very materially increase, and everyone would receive an adequate return for his work. Though there would be more book-keeping, it would be possible to employ a nurse-secretary-receptionist again to keep the books, who would also relieve the doctor in countless other little ways, leaving him free to attend to his proper calling, the practice of medicine. Moreover, under this scheme, patients would have complete freedom to attend whatever doctor they wished as they wished, subject only to the recognized medical ethics. Panel record cards would be eliminated, each doctor keeping his own records. If he required the previous record of a new patient, he would write for it himself to the old doctor. Thus, doctor would deal direct with doctor, cutting out all the intermediate delays. Large numbers of Ministry staff would become redundant, and doctors would be freed from bureaucracy, and free to have the assistance in their own offices instead of in the Ministry's numerous offices. This saving would go a long way to covering the extra payments to the doctors, and, apart from other countries, we have precedents in paying for services rendered in the dental and ophthalmic services on which the scheme could be modelled. It would be wise for us to demand, if only as a safeguard against the continued rise in cost of living, the flexibility of the French system, whereby if a doctor thinks he is worth more than the basic payment of the Government, and his patients agree, he may charge more, the difference being paid by the patient. Thus may extra skill on the part of a doctor, or better facilities given to the patient, be suitably rewarded.

As mentioned above, I believe that this scheme could bring adequate remuneration to doctors without costing very much more, reduction in Ministry staffs covering much of it. The rest could be covered by restricting free medicines to those drugs and formulae listed in the *National Formulary*. Those patients who desired more elegant preparations could be allowed to pay the difference. Deficiencies in the *Formulary* could be covered by more frequent supplements, and hospital pharmacies would have their freedom (and controls) as at present, so that new expensive drugs ordered or advised by specialists could be obtained through them.

The only objection that can be made to this scheme by the Government is that some doctors might over-visit to line their own pockets. This would be an insult to the profession, and not really to be upheld when one remembers that doctors are already trusted to control large sums of money by their certification. However, an automatic and free control could be had by making part of the fee for a service or a visit payable by the patient, as is done in other countries, if necessary washing out the dispensing fee in compensation to the public. By this means, also, by so adjusting the portion payable by the patient, could the scheme be worked without costing the Government any more than the present system of underpayment, if really necessary. Finally, I should like to put very forcibly the suggestion that only by introducing some such scheme as I have outlined can the profession retrieve its dignity and freedom.—I am, etc.,

Leominster.

C. W. F. MCKEAN.

SIR.—It is time to couple with any claims for increased remuneration a fixed policy for the future. We must not be shortsighted, for with our present economy this subject will become the recurring decimal. We ought, as a matter of obligation, to plan for those who will follow us, and try for their sake to end the need for periodic claims, with all the waste of nervous energy and time that this entails.

Rather than establish a claim now, I would prefer that a firm and fixed principle is evolved which will survive the changes in policy, party, and personalities. We lose prestige every time the endless bickering starts again. None of us knows what will happen to the cost of living, but for some time at least it is going to rise. Are we to lose this present opportunity of reaching a definite agreement with the Minister of Health, which will remove the need for repeated claims and arrive at some adjustment with the cost of living? Or, having won a claim, go through the whole weary procedure in another few years? By that time we shall be well-trained (and well-chained) civil servants.

My finances are such that I should welcome an increase, but if an arrangement could be reached I should feel happier than I do now, with or without it.—I am, etc.,

ShIPLEY.

D. H. JUDSON.

What is Excessive Prescribing?

SIR.—The arguments against economy in prescribing presented by Mr. F. F. Marchbank (*Supplement*, September 1, p. 115, and September 29, p. 144) are so fallacious and misleading that they call for a reply. The data from Germany put forward to support the argument that often it is uneconomical for a doctor to restrict his prescribing of expensive drugs merely result from the fact that those doctors who treat many of their patients at home will obviously thereby spend more on medicines than those doctors who are able to send many of their patients into hospital. The cost of domiciliary treatment, which avoids the enormous overhead expenses of hospital treatment, is, of course, very much less. This is a cogent argument for advocating treatment in the patient's home whenever possible, but not for advocating expensive prescribing as a virtue.

The second argument put forward by your correspondent, based on data from English hospitals, could be summarized as follows: in hospitals where the average weekly cost per head on drugs and dressings is higher, the average stay per case is less—as a result, so we are to infer. Again the cart is put before the horse. In "acute" hospitals the expenditure on drugs and dressings will be greater during the earlier part of a patient's stay (operation, acute stage of illness, etc.) than during the later convalescence. Therefore, the less time each patient spends in hospital the greater will be the average weekly expenditure on drugs and dressings. These hospitals with convalescent units or better facilities for convalescence at home will maintain a brisk turnover of acute cases and will therefore spend more on drugs and dressings. Only if it can be shown that there is a correlation between the amount spent per patient in, say, the first

¹ Government of Northern Ireland, Report from the Select Committee on Public Accounts, 1954-5, 1956. H.M.S.O., Belfast.

week after operation and the total period of convalescence would your correspondent's argument begin to bear examination, but no evidence of this sort has been adduced. It will need better logic than this to convince our consciences that extravagant prescribing is not one of the seven deadly sins.—I am, etc.,

Portobello, Midlothian.

P. R. MYERSCOUGH.

SIR,—On reading Mr. F. F. Marchbank's letter (*Supplement*, September 29, p. 144) I felt it would have been more helpful if he had quoted the *total* cost of drugs received by the patient during his stay in hospital rather than the weekly cost. I calculated these totals from the figures he quotes, and find that the total cost of drugs a patient may be expected to receive is approximately constant, regardless of how long he stays in hospital, and also that a high rate of expenditure does not, in fact, result in a high total expenditure.

This suggests that it would be most economical to encourage hospitals to spend as much as they like on drugs, thus curing their patients sooner and saving the cost of prolonged accommodation, as well as freeing their bed for someone else.—I am, etc.,

Butterknowle, Co. Durham.

N. J. B. ALEXANDER.

Was it a Drug?

SIR,—Having just read the most recent report (*Supplement*, September 22, p. 134) with regard to Regulations 16 and 17 of the National Health Service (Service Committees and Tribunal) Regulations, 1948, I can come to only one conclusion. That is, that we as a profession are stark, staring mad. I am sure our psychiatric colleagues would have a more polite and inspiring phrase, but I am certain it would not be more understandable.

Poor Dr. X, whoever he was in this case, or whoever he might be in future cases, has my profound sympathy and admiration. He must have felt like Alice in Wonderland as he worked his way through committees to appeals and on to tribunals. May I also congratulate him, or his advocate, on the masterly defence put forward for his fiendish crime? In the end it won the day, won his freedom, and cleared his name from the black stain that would have dogged his footsteps for evermore. Oh, you wicked man, Dr. X, this will surely teach you a lesson you will never forget. Do not ever again prescribe a food that might be a drug or a drug that might be a food, or a drug containing a food that might be a food and not a drug, or even a food that contains a drug that might be a drug or a food. To borrow a phrase, "Open the cage, here I come."—I am, etc.,

Hayes, Middlesex.

S. EDELMAN.

Cost of Prescribing

SIR,—We hear a great deal nowadays about excessive prescribing and expensive drugs, and it may be of interest to recall the comparatively generous terms which were offered to practitioners 145 years ago.

Lieutenant-Colonel Gillow, of the R.A.O.C. museum, recently unearthed a circular issued by the Office of Ordnance dated May 8, 1811. This deplures the "exorbitant charges made by several practitioners at several stations for medicines administered to artificers and labourers in the employ of the Ordnance" and goes on to lay down a scale of payments. A curious point about the statement is that a flat rate is laid down for the various medicaments, etc., quite irrespective of their ingredients, with the exception of "powder bark," the scale for which varied from 1s. to 1s. 6d. an ounce according to the fluctuation of the market. "The exhibition [at a shilling a time] of any medicine in the form of draughts, except in cases of absolute necessity" was "totally inadmissible." Mixtures, juleps, decoctions, infusions, etc., ran from 1s. 6d. for four ounces up to 4s. for a pint, while an emetic or aperient went for 6d.

The practitioner was paid 4d. for every dose of medicine taken at short periods—e.g., every three or four hours—whether as pills, powders, or boluses. He received 1s. for supplying a box of pills containing a dozen, while an "ordinary sized blister" brought him 1s. 6d. with dressings. Visits averaged 1s. per mile; night visits were paid at 5s. under two miles and double the day charge for over two miles. For surgical dressings, when the patient was able to attend the surgeon, the latter could receive up to one guinea a month.

When one remembers the relative values of those days it seems that the civil medical practitioner must have done very well if he received 4d. every time a patient on "medicine and duty" swallowed his three-hourly dose, especially if he were able to augment his income with an occasional "ordinary sized blister."—I am, etc.,

Crookham, Hants.

R. E. BARNESLEY.

Remuneration Claim

SIR,—Correspondence in the *Supplement* on the subject of remuneration suggests that the profession is in favour of vigorous action should this prove to be necessary. Before possible battle is joined it would seem prudent to inspect our defences, and, if necessary, take action to remedy any weaknesses. So far as the hospital side is concerned, defence appears to consist almost entirely in the Hospital Medical Staffs Defence Trust, and it seems to me that we should be making every effort to bring the fund up to a worth-while figure. The following observations are intended as a contribution to this objective.

Publicity.—Most of the hospital doctors I have spoken to had never heard of the Defence Trust, and of the few who had heard of it not one had any clear idea what the Trust was supposed to be for. When I asked one whole-time specialist if he would consider subscribing, his reply was: "I think the part-time people do well enough. I do not see why I should be asked to subsidize their income-tax battles. Give me some indication that the same zeal will be shown in righting our problems, then I will subscribe." It seems clear that a short pamphlet clarifying the purpose for which the Defence Trust has been formed should be prepared. If it were then circulated to every consultant and specialist in England and Wales, I feel certain that the return would make the initial outlay very much worth while.

Subscription.—It has been suggested that the minimum subscription should be £3 for a consultant and £1 10s. for an S.H.M.O. Now it has been suggested that this sum would be allowable for income-tax purposes for part-time specialists, but not of course for those employed full-time. If this is so, then it would be fairer to alter the suggested subscriptions so that the actual cost would be fairly equal for each grade. For example, £5 for a part-time consultant, £3 for a full-time consultant and part-time S.H.M.O., and £1 10s. for a full-time S.H.M.O. If the second scheme were adopted, then the Defence Trust would be many thousands of pounds richer, largely at the expense of the Chancellor of the Exchequer, and no doubt we would all agree that that would be a very pleasant state of affairs.—I am, etc.,

Wakfield.

J. A. DICK.

SIR,—Your Canadian correspondent, Dr. A. P. N. Lee, makes a very fair point in his letter (*Supplement*, September 22, p. 136). One of the very weak points in the present claim, as compared with the wage claims which are so freely granted in all other directions, is the constant attempt at justification. We appear to have gone to the Minister in a somewhat apologetic manner, "cap in hand" indeed, presented a long preamble, and then asked if that preamble is sufficient excuse for a request for consideration of a possible increase in pay. Although this method of approach may have appeared to some of our leaders to be right and proper, surely politicians and civil servants must at once have realized that such an approach merited only one answer, for they are more accustomed to dealing with the

unions, with demands bellicosely made and supported with gross detail, rather than with whispered requests and a plethora of figures.

Dr. G. C. Pether, in his letter immediately above the one already quoted, makes mention of "hidden" income which is never quoted in the so-frequent wage claims regularly granted. We, it would seem, have gone to the greatest length to lay every card on the ministerial table, with an inevitable result. Can we stop all this detail and get down to the basic fact that each pound we earn is worth a great deal less than it was, and we must have more pounds in order to keep our place in the community? That is precisely what we want, it is precisely what so many other sections of the community have said in gaining their own wage increases, and it cannot be gainsaid. Had we only started our negotiations on this broad basis our patients would not be under the delusion that each of us has £2,222 per annum as pocket money.—I am, etc.,

Spillsby, Lincs.

C. E. FRISKNEY.

SIR,—For many weeks now we have read a plethora of letters regarding remuneration and what we should do about it. Might it not now be more helpful if we had another series of letters as to how we are to do it; in other words let us come down to brass tacks.—I am, etc.,

Exeter.

F. E. GRAHAM-BONNALIE.

SIR,—When shall we have some action on our side in this interminable pay dispute? Here we are pouring our hearts out each Saturday while for seven days a week we toil and sweat for a salary at the 1952 value of the pound. That pound, as everyone knows, is now worth 13s. 4d.

I am sick and tired of the endless prattle about why we should have an increase in remuneration. That issue is far beyond all doubt. Do we have to enter the public arena and go on strike to get a fair recompense for our toils? I say no, but if by some mischance that becomes imperative we must be united 100%.—I am, etc.,

Leigh, Lancs.

M. J. MCKENNA.

Technicians' Remuneration

SIR,—I feel that the recent flux of correspondence in the *Supplement* concerning the rejection of the profession's salary claim is in many ways both misplaced and misguided at the moment. Whether or not the N.H.S. is providing a good health service is irrelevant, but as long as we are working in it it is surely incumbent on us to concentrate on making that Service as effective as possible and to accept the lost glories of past social position.

In this connexion I feel obliged to write on behalf of those whose position to-day can only be described as deplorable. I refer to the technicians in the ancillary departments. As a radiologist I can only speak from first-hand knowledge of the radiographers. The maximum salary for a superintendent, often of many years' experience, is £680; salaries for radiographers, dark-room technicians, etc., are of course correspondingly more meagre. Consider the fact that the superintendent of a large or busy department, especially if there is no full-time radiologist, is required to have not only technical and organizing ability of a high degree but also an appreciable amount of medical knowledge; his advice is often called for by the junior medical staff in the interpretation of wet films, and he is not infrequently forced to take decisions regarding patients which involve the acceptance of medical responsibility which is in theory beyond the scope of his position. In short, I consider that a post requiring such a degree of ability and responsibility should carry a salary of at least £1,000 to £1,200, with comparable rates for other ranks.

Already x-ray departments are being strained to the utmost due to understaffing, and replacements for resigning radiographers are becoming impossible to find. I consider it an appalling criticism of the N.H.S. that radiographers are becoming commercial travellers and other non-skilled and non-medical workers because they cannot afford to con-

tinue in their own profession. Furthermore, at the present rate it seems inevitable that hospitals will have to reduce the work of, or even close, their x-ray departments in the foreseeable future unless the post of radiographer is made very much more financially attractive, and immediately.

In view of the dependence of modern medicine on its ancillary services to-day, I feel very strongly that the medical profession should campaign for increased salaries for its technicians, without whom we should find it impossible to work and for whom so little has been done. Also I think such a campaign should take precedence over the medical remuneration claim, since even to-day the profession is paid a living wage, and it does not seem that the provision of a health service for patients will fail, at least in the near future, for lack of doctors.—I am, etc.,

London, S.E.10.

DUNCAN IRVING.

Naming the Doctor

SIR,—At any time after Parliament reassembles a Private Member's Bill is to be introduced which would give the Press access to various public bodies. It is not as yet clear whether medical service committees, where cases against doctors for alleged breach of the terms of service are dealt with, would be included in the Bill.

My letter in the *Supplement* of August 11 (p. 102) urged counter-measures against the Press which continually advocated naming the doctors penalized for breaches of the terms of service, and I gave briefly my reasons for my view. I now urge the British Medical Association to ascertain whether access of the Press to meetings of the medical service committee is proposed in the Private Member's Bill, and, if this be so, to organize opposition to this inclusion in the Bill without any delay. Waiting until after the Bill is passed would prove futile. The Member of Parliament who will be introducing the Bill should be approached and all the other Members lobbied or written to, and the Press should be invited to state our side of the case.

I do not wish to repeat what I had written in my letter of August 11 except to emphasize that cases appearing before the medical service committee, in contrast to those appearing before the General Medical Council, are such that directly and intimately cause concern to the patients of the doctor, who, after having been penalized, is in great danger of having his practice ruined if his name is publicized by the Press. I did not mention in my letter that, as employees, any question of failure to carry out our duties, as is the case with employees universally, should be a matter strictly and wholly between employers and employees.

Of course, if the Private Member's Bill does not envisage access of the Press to medical service committees, then the matter I am raising will not arise.—I am, etc.,

London, N.W.1

M. D. RIPKA.

Fining the Doctor

SIR,—When I left Australia in January last and came here, I did have the intention, after a rest, to engage in any kind of professional work which I might have been able to secure only to save me from idleness. What follows explains my strong reluctance to execute that intention.

Correspondence about the N.H.S. in the *Journal* and elsewhere which has been going on for some time gets warmer and more animated, and the humiliation of doctors being subjected to fines strikes me, one who has never engaged in practice of any kind in this country, as the proverbial "last straw." In a recent issue of the *Journal* it was stated that a doctor was fined £250 for not having his records in order, and on September 28 I read in the *Daily Telegraph* of two doctors having been fined £50 and £25 each for high-cost prescribing. As a newcomer I would like to know who does this fining and do they consider this respectable when applied to members of a profession which claims to be learned? Have they ever tried fining a secretary, receptionist, carpenter, decorator, telephone operator, etc., and with what result?

It is difficult for an outsider and a mere spectator to reconcile the great discontent of the profession in the N.H.S. with their submission to such incredible (but true) and obnoxious treatment. There must be some very compensating factor of tremendous value which they are loath to lose and which keeps them in such a service, and if all that one reads is true and correct why does not the B.M.A. do something? Is resignation from the N.H.S. permitted, and if so how many for reasons of discontent have resigned since the inception of the N.H.S.?—I am, etc.,

London, S.W.19.

B. J. BOUCHÉ.

Occupational Health Committee

SIR.—The report of the first meeting of the Occupational Health Committee for 1956-7 (*Supplement*, September 29, p. 140) states that the question of co-opting a woman doctor to the Committee had been discussed but it had been rejected on the grounds that there were few special problems relating to women in industry as opposed to men.

As an industrial medical officer working in a factory with a large female population I cannot agree with this implied principle. Women are fundamentally different from men, both in their physical and in their emotional make-up, and many medical problems arise in their employment. There are to-day in Great Britain approximately 7 million women working outside the home; some 2 million of these are married. There appears to be no immediate prospect of industry being able to dispense with their services, and it is probable that the number of women employed will increase rather than decrease.

The question of whether it is desirable to have a woman doctor on the Occupational Health Committee is for that Committee to decide, but that there are special problems relating to the employment of women in industry must be obvious to all who have given serious study to the question.—I am, etc.,

York.

MARGARET E. THWAYTES.

Association Notices

Diary of Central Meetings

OCTOBER

- 17 Wed. Private Practice Committee, 2 p.m.
- 17 Wed. Defence Trust Subcommittee, G.M.S. Defence Trust, 2.30 p.m.
- 18 Thurs. G.M.S. Committee, 10.30 a.m.
- 18 Thurs. Radiologists Group Committee, 11 a.m.
- 19 Fri. Estates Committee, 2 p.m.
- 22 Mon. Staff Side, General Whitley Council (at 14, Russell Square, London, W.C.), 10.30 a.m.
- 22 Mon. Full General Whitley Council (at 14, Russell Square, London, W.C.), 2.30 p.m.
- 22 Mon. Scientific Exhibition Subcommittee (Newcastle, 1957), Arrangements Committee, 2.45 p.m.
- 23 Tues. Finance Committee, 2 p.m.
- 23 Tues. Office Committee, following Finance Committee.
- 25 Thurs. Compensation and Superannuation Committee, 2 p.m.
- 25 Thurs. Industrial Nursing Subcommittee, Occupational Health Committee, 2 p.m.
- 25 Thurs. Charities Committee, 2.30 p.m.
- 25 Thurs. Medical War Relief Fund Committee, 3.45 p.m.
- 26 Fri. Assistants and Young Practitioners Subcommittee, G.M.S. Committee, 2 p.m.
- 30 Tues. Remuneration Subcommittee, Occupational Health Committee, 2 p.m.

NOVEMBER

- 6 Tues. Edinburgh Meeting (1959) Steering Committee, 2 p.m.
- 14 Wed. Welsh Committee (at Crown Hotel, Shrewsbury), 2.15 p.m.
- 15 Thurs. G.M.S. Committee, 10.30 a.m.

Branch and Division Meetings to be Held

BLACKBURN DIVISION.—At the Bull and Royal Hotel, Preston, Thursday, October 18, 8 p.m., Annual B.M.A. Dinner and Dance.

CHESTERFIELD DIVISION.—At Station Hotel, Chesterfield, Wednesday, October 17, 8 p.m., dinner dance.

CITY DIVISION.—At Committee Room C, B.M.A. House, Tavistock Square, London, W.C., Tuesday, October 16, 8.30 p.m., meeting. B.M.A. Lecture by Dr. C. Keith Simpson: "It Looks Like Crime" (illustrated by slides). Members of the St. Pancras Division and members' wives are invited.

COVENTRY DIVISION.—(1) At Wine Lodge Hotel, 17, The Burges, Coventry, Tuesday, October 16, 7.30 for 8 p.m., annual dinner. Inaugural address by the Chairman: "Impressions of Witnesses in the Box." Supported by the Chief Constable, Mr. E. W. Pendleton, and Deputy Coroner, Mr. J. Blyth. (2) At Drapers' Club, Bayley Lane, Coventry, Thursday, October 18, 6.30 to 8.30 p.m., reception to members and their ladies. (3) At Styvechale Church, Leamington Road, Coventry, Sunday, October 21, 6.30 p.m., annual church service.

DEWSBURY DIVISION.—At Batley General Hospital, Friday, October 19, 8.15 p.m., clinical meeting.

GRIMSBY DIVISION.—At Winter Gardens, Cleethorpes, Thursday, October 18, 7.30 for 8 p.m., annual dinner.

HALIFAX DIVISION.—At Old Cock Hotel, Wednesday, October 17, 8 for 8.30 p.m., annual supper.

LEICESTERSHIRE AND RUTLAND BRANCH.—At St. Margaret's Church, Sunday, October 21, 11 a.m., annual service for the Medical and Nursing Professions of Leicester.

OLDHAM DIVISION.—At Albion Club, Queen Street, Oldham, Monday, October 15, 9 p.m., meeting. Dr. Don Hilson: "Modern Trends in Everyday Paediatrics."

SALISBURY DIVISION.—At Royal Military Hospital, Tidworth (C Block), Tuesday, October 16, 8 p.m., clinical meeting and discussion.

SCARBOROUGH DIVISION.—At Scarborough Hospital, Thursday, October 18, 8.30 p.m., meeting. Dr. J. H. Cyriax: "Manipulative Medicine."

SHEFFIELD DIVISION.—At University Medical Library, Friday, October 19, 8.15 p.m., general meeting to discuss the recent remuneration claim.

SHROPSHIRE AND MID-WALES BRANCH.—At Royal Salop Infirmary, Shrewsbury, Thursday, October 18, 8.30 p.m., A.G.M.

SOUTH BEDFORDSHIRE DIVISION.—At Luton and Dunstable Hospital, Friday, October 19, 9 p.m., meeting. Miss Rose Heilbron, Q.C.: "Legal Responsibilities of Doctors."

SOUTH STAFFS DIVISION.—At Molineux Hotel, Wolverhampton, Tuesday, October 16, 8 for 8.15 p.m., supper meeting; 9.15 p.m., lecture by Mr. W. Gissane: "An Accident Has Occurred." Members' wives are invited.

SOUTHAMPTON DIVISION.—At Conference Room, Civic Centre, Wednesday, October 17, 8 p.m., ladies' night. Address by Mr. A. Norman Schofield, LL.M.: "A Difficult Problem." A social meeting will follow.

STOCKPORT DIVISION.—At Alma Lodge Hotel, Tuesday, October 16, 8.30 p.m., annual general meeting. Dr. E. E. Claxton (Assistant Secretary, B.M.A.) will be present to answer questions on remuneration.

SUFFOLK BRANCH.—At the Cathedral Church of St. James, Bury St. Edmunds, Sunday, October 14, 3 p.m., a special St. Luke's Day Service. All Suffolk doctors and their families are invited.

SWANSEA DIVISION.—At Swansea Hospital, Thursday, October 18, 7.30 p.m., clinical meeting. Discussion: "The Problems of Anaemia."

TEES-SIDE BRANCH.—At Hemlington Hospital, Tuesday, October 16, 7 p.m., clinical meeting.

TUNBRIDGE WELLS DIVISION.—At Kent and Sussex Hospital, Tunbridge Wells, Saturday and Sunday, October 20 and 21, clinical weekend. Saturday, October 20, 2.30 p.m., Dr. W. Ritchie Russell: "A Clinical Demonstration on Patients Suffering from Nervous Diseases"; 4.30 p.m., Dr. J. H. Cyriax: "A Clinical Demonstration on Patients Suffering from Backache, Fibrositis, and Allied Conditions"; 7.30 for 8 p.m., dinner at Elizabethan Barn; 9 p.m., Brains Trust at Elizabethan Barn.

WANDSWORTH DIVISION.—At St. James' Hospital, Sarsfield Road, S.W., Wednesday, October 17, 8.30 to 10.30 p.m., cocktail party for members, their wives (or husbands), and friends.

WEST HERTS DIVISION.—At Board Room, Peace Memorial Hospital, Rickmansworth Road, Watford, Friday, October 19, 9 p.m., general meeting. Address by Dr. T. W. Preston: "Medical Aspects of Life Assurance." A discussion and questions will follow.

WESTMINSTER AND HOLBORN DIVISION.—At Committee Room C, B.M.A. House, Tavistock Square, London, W.C., Wednesday, October 17, 8 p.m., meeting.

WEST SUFFOLK DIVISION.—At West Suffolk General Hospital, Bury St. Edmunds, Tuesday, October 16, 8.30 p.m., meeting. Dr. D. H. Clarke: "The Management of Minor Neurotic Illness in General Practice." Members of the Nursing Staff are invited.

WIGAN DIVISION.—At Lewis' Restaurant, Wallgate, Wigan, Thursday, October 18, general meeting.

SUPPLEMENT TO THE BRITISH MEDICAL JOURNAL

LONDON SATURDAY OCTOBER 20 1956

CONTENTS

Training of Consultants Under the N.H.S.	159	Scottish News	162
Public Health Committee	160	Rural Patients' Costly Journeys	162
Medical Service in Malta	161	Questions Answered	163
Was It a Drug?	161	Correspondence	163
County Borough of Middlesbrough	161	Association Notices	166

TRAINING OF CONSULTANTS UNDER THE N.H.S.

A SURVEY MADE IN THE S.E. METROPOLITAN REGION

BY

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Since the introduction of the Health Service there has been much discussion and speculation about the training of consultants, the hardships of the training period, and the fate of senior registrars. Figures and facts, however, have been scanty. The purpose of this paper is to show what has been the destination of those senior registrars completing their training in the South-east Metropolitan Region in those eight years; secondly, to show the effect of the regional training scheme on the education of trainees.

The period can be divided into two parts of four years each. From 1948 to 1952 the staffing of hospitals was still largely unregulated and was dependent upon local needs as seen by individual hospitals. Registrar status was undefined, and the previous experience of those that ultimately achieved consultant status was in no way standardized.

In 1952 the Ministry of Health announced a national establishment for senior registrars, linked to the calculated requirements of the future consultant establishments, and the conception of the senior registrar as a trainee consultant was evolved.

"Interchange Posts"

In the S.E. Metropolitan Region the official allocation of senior registrars—namely, 76—was parcelled out between the two teaching hospitals, Guy's and King's, and the regional board's hospitals by mutual consent; roughly half going to the teaching hospitals and half to the regional board's hospitals. Those senior registrars allocated to the board's hospitals were placed in selected hospital groups, the training centres. Wherever possible these training posts —20 out of a possible 35—were permanently linked to similar posts in the teaching hospitals, the holders of each changing over at a fixed time during the four-year tenure of office. Appointment to these interchange posts is made by a joint committee of the regional board and the teaching hospital, on the understanding that part of the four-year period will be held at the teaching hospital and part at the linked regional hospital.

The object of this was to ensure that as many trainees as possible received experience in both teaching and regional hospitals. Those regional posts that remained unlinked were of the highly specialized variety such as plastic surgery or thoracic surgery, which were to all intents and purposes training units in themselves, closely associated with teaching hospitals.

The scheme was introduced in 1952, the interchange posts being created during subsequent years as they became vacant. The task of reducing the regional establishment from the previous level, 71, to the new level, 36, has been gradually achieved by allowing some senior registrarships to lapse where they were not required for training purposes. The products of the earliest interchange posts are, at the end of the first four-year period of the training scheme, just beginning to ascend into the consultant level; at the same time about a third, from both four-year periods, have been lost to the hospital service, presumably by the reduction in establishments. The details are as Table I.

TABLE I.—Destination of Registrars Completing Training
(S.E. Metropolitan Region—Excluding Teaching Hospitals)

	1948-52	1952-6
Completed registrar training	72	67
Became consultant	28	22
Became S.H.M.O.	16	17
Acquired another S.R. appointment	5	9
Lost to hospital service (i.e., wastage):		
To Dominion or another country	5	3
Entered general practice	4	3
Industry or industrial research	1	3
Resigned or appointment terminated	8	8
Returned to country of origin	5	2

It seems that those who have completed their training during this period fall into three categories of approximately equal size: they become consultants; they become S.H.M.O.s; or they are lost to the hospital service. It may not be realized that as many become S.H.M.O. as become consultant.

There is a widespread belief that registrar training, owing to the difficulty experienced in finding suitable employment at the end of it, has since 1948 been a waste of time for many of those that have been through it. Undoubtedly, the proportion of one-third lost to hospital service is too high. But it has been a period of drastic reduction in establishment. The reduction has now been made and the official level reached, so that future years are not likely to see this wastage.

Of the 42 who had been lost to the hospital service, eight in each period (namely, "resigned or appointment

2700

terminated" group) may not have justified the long apprenticeship they have endured. Their destination is not known with certainty. Of the others, who shall say that it is a bad thing that small numbers of our highly trained men have gone to the Dominions, to industry, or to research? And can registrar training really be considered a loss to the small numbers who have entered general practice?

Training Received by Consultants

I will now turn to consider the training received in the S.E. Metropolitan Region by those who have achieved consultant status from it in the two four-year periods (see Table II).

TABLE II.—Training of Consultants

	1948-52	1952-6
<i>Resident or S.H.O. Experience (Junior Level)</i>		
Total receiving training	28	22
Held house appointment at teaching hospital only	25%	0%
Held house appointment at regional hospital only	57%	0%
Held house appointment at both teaching and regional hospitals	7%	100%
<i>Registrar or Senior Registrar Experience (Senior Level)</i>		
Total receiving training	28	22
Teaching hospital only	7.2%	5%
Regional hospital only	50%	30%
Both teaching and regional hospitals	42.8%	65%

Although there is demonstrated here an increased influence of the teaching hospitals in the training of consultants at both junior and senior level, the trend is not only away from the "purely regional experience" but also away from the "purely teaching hospital experience" toward a "joint regional and teaching hospital experience."

Length of Training Period for Consultant Status

In the 1948-52 group an average time of six years was spent in civil hospital appointments, with an additional period of war service which varied between three and seven years. Thus consultant status was achieved at from nine to thirteen years after qualification.

In the 1952-6 group an average of 9.2 years was spent in civil hospitals, with an additional period of war service or national service varying from three to seven years. Consultant status was achieved from 12 to 16 years after qualification.

The time spent between qualification and consultant status was in both groups and in individual cases lengthened exactly by the number of years of war or national service. In other words, the time taken to achieve consultant rank was proportional to the length of time spent in civil hospitals and not proportional to length of war or national service. In future, if national service remains at two years it looks as though on an average about eleven years will elapse between qualification and consultant rank.

Looking back, it appears that during the last eight years the chances of a senior registrar becoming a consultant were about one in three; the chances of his becoming a consultant or S.H.M.O. were about even: in any event he was more than likely to find specialized or highly technical employment in some place other than general practice. Looking forward, it would seem that these chances are likely to be bettered, provided that the present ratio of senior registrar to consultant establishment does not fall, and in so far as the S.E. Metropolitan Region is representative of the country as a whole.

My thanks are due to the S.A.M.O. and the D.S.A.M.O. of the S.E. Metropolitan Regional Hospital Board for their help in making their records available to me.

According to the *Irish Independent*, the Northern Ireland Hospitals Authority has approved a new scale of board and lodging charges for hospital medical staff as follows: senior house officers, £150 a year; junior medical officers and registrars, £170; principal registrars, £200; senior medical officers, £350; consultants, £400.

PUBLIC HEALTH COMMITTEE FIRST MEETING OF NEW SESSION

A meeting of the Public Health Committee was held at Headquarters on October 5. Dr. J. P. TILLEY was unanimously re-elected to the chair. Dr. E. COLIN-RUSS and Dr. K. S. MAURICE-SMITH were welcomed as new members. Discussion took place on the use of co-option to ensure representation of special categories of the service.

The Committee appointed three of its members (Drs. S. C. GAWNE, J. F. WARIN, and ELSPETH M. WARWICK) to join with representatives of other committees in preparing the Association's evidence to the Cranbrook Committee, which is undertaking a review of the maternity services of England and Wales. The resolutions bearing upon public health passed at the last Annual Representative Meeting were considered, and appropriate action was decided.

The Committee had before it a resolution from the Coventry Division which had been sent to local members of Parliament drawing attention to the number of immigrants with communicable diseases. It also considered a document by the Joint Tuberculosis Council on immigration and tuberculosis which had also been considered and supported by the General Medical Services Committee. The Committee decided to recommend to Council that there should be discussions with the Ministry of Health with particular reference to tuberculosis.

It was reported that on the request of the Council of the Association the Joint Consultants Committee had received representatives of the Public Health and the General Medical Services Committees to discuss the representation of preventive medicine services on regional hospital boards. The suggestion had been made that each regional board and board of governors should include a minimum of five consultants, together with a general practitioner and a medical officer of health.

M.O.H. as Consultant in Epidemiology

The question of the medical officer of health as a consultant in epidemiology again came forward. At the April meeting of the Committee Dr. H. D. CHALKE presented a memorandum on the subject, and on his proposal the principle that medical officers of health should be appointed honorary consultants of hospital groups and should serve on medical advisory committees was agreed upon. A recommendation was made that regional hospital boards should be urged to consider such appointments in the interests of all concerned. This, however, was referred back by the Joint Liaison Committee, some members considering that it would not be advisable to press for the appointment as a right of a medical officer of health as an honorary consultant. It was pointed out that medical officers of health already had statutory powers and that there was usually a very happy liaison between the M.O.H. and the hospital staffs. A further point was that status was not at stake so much as a genuinely close association between the parties concerned.

After a wide discussion Dr. Chalke moved that the Committee reaffirm its previous resolution—"he would not take back one word of it." Some alternative wordings were suggested, but the original resolution, on a show of hands, was reaffirmed as follows:

That the Public Health Committee agrees with the principle of medical officers of health being appointed honorary consultants of hospital groups and serving on medical advisory committees, and recommends that regional hospital boards should be urged to consider such appointments in the interests of all concerned.

Remuneration Appeals

It was reported that, with three exceptions, every local authority in the United Kingdom had now accepted M.D.C. circular No. 24 (Industrial Court award No. 2565). A report was also made on the implementation of M.D.C. circular No. 27, of June, 1956, on the remuneration of public health medical officers. On Whitley appeals taken on behalf of public health medical officers during the past session a

ailed report was received, together with a note by the Assistant Secretary (Dr. A. V. KELYNACK) on Whitley appeals procedure. Particular reference to regional appeals was made to cases of medical officers seeking the advice and report of the Association.

It was reported that negotiation would begin shortly in a special subcommittee of Committee C for the revision of the 1947 and 1951 part-time agreements. The staff side of the subcommittee would have representatives of consultants and general practitioners and the public health interest would be represented by the chairman of the Staff Side of Committee C.

Future of Chest Services

A memorandum on the future of chest services was submitted from the Chest Services Subcommittee of the Central Consultants and Specialists Committee. Dr. PETER EDWARDS, chairman of the subcommittee, said that, although there was declining tuberculosis mortality, there was as yet no convincing evidence that the incidence of the disease would diminish at the same rate. Therefore it would continue to be necessary to maintain an organized tuberculosis service based on area clinics. Many patients would continue to be referred to chest clinics, and the fullest facilities should be available. In his memorandum Dr. Edwards sketched the pattern which should be followed and the appropriate medical establishment. It called for an increase of about 40% in the present consultant establishment of the clinics in order to equate the number of consultants in chest diseases with the number in other specialties, and a corresponding decrease in the S.H.M.O. establishment.

The Committee agreed that the principles laid down in the memorandum be accepted and supported.

Other Business

Among much other business which crowded the day's agenda were consideration of the White Paper containing the Government proposals for regulating the provision of slaughterhouses; the responsibility for clean milk, a subject which had previously been before the Committee, together with excerpts from the report of the Arton Wilson Committee; notifications of infectious diseases; and vaccination and immunization record cards.

MEDICAL SERVICE IN MALTA

MEDICAL M.P.'s VISIT

Nothing has been heard yet of the appointment of the commission to review the medical service in Malta. In the settlement which was reached in April in the dispute between the Government of Malta and the medical profession in the island it was agreed that a commission should be appointed "to undertake a comprehensive review of the medical service and to submit recommendations for the future organization and terms and conditions of employment" (see *Supplement*, May 5, p. 263). The members of the commission, to be approved by both sides, were to be from the United Kingdom.

Meanwhile it is reported that Mr. John Cronin, an orthopaedic surgeon and Socialist M.P. for Loughborough, has been invited by Mr. Dom Mintoff, the Prime Minister of Malta, to advise the Maltese Government on the reorganization of the island's medical service. According to *The Times* (October 10) the Medical Officers' Union has said it will not co-operate with Mr. Cronin. The Union notes that Mr. Cronin's terms of reference are almost identical with those of the expected commission, and therefore it does not see the advisability of his visit at this juncture. The committee of the Union has said that the Union will extend to Mr. Cronin, as a member of the profession, traditional Maltese hospitality, but it will not be in a position to discuss those issues which by the terms of the agreement are to be dealt with by the commission, whose appointment is anxiously awaited.

WAS IT A DRUG?

Regulations 16 and 17 of the National Health Service (Service Committees and Tribunal) Regulations, 1948, provide that where a practitioner prescribes under the National Health Service preparations which are not drugs or medicines, and therefore outside the scope of the Act, the executive council may recover their cost from him. If he challenges their action, the matter may be referred to the local medical committee, with the possibility of appeal to referees.

The findings of the referees in a recent appeal under the Regulations are reported below. The decision in this, as in all cases, is related to the circumstances of this particular case only, and is not binding on the referees who may hear other cases.

"Lacidac"

Drs. X and Y, practising in partnership, gave six prescriptions each for three tins of lacidac full cream for a baby who was seriously ill and unable to retain any food but lacidac. The executive council decided that this was not a drug which it was bound to provide. Drs. X and Y appealed to the local medical committee, who upheld the decision of the executive council. The doctors then appealed to the referees.

Dr. X appeared in person on behalf of himself and Dr. Y. He rested his case mainly on the obligation of a general practitioner to follow exactly the directions of a consultant, contending that if the patient died and it was found that the doctor had not fulfilled the treatment advised he could be very seriously reprimanded. This lacidac had been ordered on the advice of a consultant at the hospital where the child had been treated. Dr. X admitted that he and his partner were well aware that lacidac full cream is classed as a food in the First Report of the Definition of Drugs Subcommittee, but, he said, they also knew that the mother could not afford to buy it. He also claimed that the fact that the child recovered justified the prescription.

In their findings the referees stated that the provision of food for infants was not one of the duties which the Act imposed on executive councils, but by section 22 (1) it was the duty of every local health authority to make arrangements for the care of children who had not attained the age of 5 and were not attending primary schools maintained by a local education authority. Care included the provision of suitable food at prices which the parents could afford. Relief of poverty was not a function of the executive councils, and general practitioners had, by their terms of service, no authority to order food for the children of indigent parents at the expense of the executive council.

When a consultant advised that the patient should be given something which the executive council was not bound to provide the general practitioner what he should take, and, in the circumstances were such that the patient could obtain it free from some other authority, by assisting him to do so. The fact that the child recovered had, in the referees' opinion, no bearing whatever on the question before them.

They decided that this lacidac full cream was not a drug which the executive council was bound to provide.

COUNTY BOROUGH OF MIDDLESBROUGH

The Association has been informed by the town council of the county borough of Middlesbrough that it will agree to the reference to arbitration under the Industrial Courts Act of the dispute regarding the remuneration of the medical officer of health. The town council has stated that it will accept the award of the court. This agreement is subject to the Association withdrawing the county borough of Middlesbrough from the *Important Notice* in the *Journal*. This has been done and the county borough has been informed.

Scottish News

SCOTTISH ASSOCIATION OF EXECUTIVE COUNCILS

NINTH ANNUAL CONFERENCE

The Ninth Annual Conference of the Scottish Association of Executive Councils was held in Ayr on October 4 and 5 under the chairmanship of Mr. EDWARD ADAMS, president of the association.

Presidential Address

Mr. Adams based his presidential address on the report of the Guillebaud Committee and stressed the dangers of complacency following its publication. Was all going well in regard to general medical services? If free choice of doctor was accepted as a necessary basic principle, the President's answer was, "All is going reasonably well." But was the price of freedom an ever-increasing drug bill and an undue proportion of certified sick?

It must now occur to many to ask: "If a doctor depended for his livelihood on a salary and not on a number of patients on his list, would he issue the same number of prescriptions, would he certify the same number of persons unfit for work?" These were not new questions.

Certification

In 1931 Mr. D. Bertram, chairman of the Consultative Council for National Health Insurance, had spoken of the problem of certification. In view of a great increase in sickness claims, he had wondered if there was more sickness. He thought not. In his opinion the standard of incapacity had shifted. Then Mr. Bertram had said:

"Who sets the standard? At first thought, the obvious answer is the doctor; but, I am afraid, on further consideration we will have to seek further for the proper answer. . . . By the time the doctor is consulted the incapacity is an accomplished fact. What can the doctor do but acquiesce? You say, 'But he should not.' Well, that again is a statement which may not stand serious examination. First, under the relationship which we all hope to exist between the doctor and his patients, we cannot expect the doctor to act as if he were a careful, suspicious official. His professional reputation is at stake if he curtly told somebody to go to their work and it turned out that there was something seriously amiss, even though he could find no objective symptoms. His income is at stake if he does not satisfy his customers, just the same as any shopkeeper. His relationship with his patients must be one of confidence, not suspicion, if our service is to produce maximum results. Where does all this lead us? To only one conclusion, that it is hopeless to expect rigorously strict certification from our doctors under the present system."

From such a quotation, said Mr. Adams, it could be gathered that the problems of 1931 were in many ways like the problems of to-day.

Free Choice Essential

Mr. Adams was satisfied that, with a salaried service, the number of prescriptions would fall dramatically and that sickness lists would also fall. There would be a very substantial saving of public money. Nevertheless, he was satisfied that the country could not afford to save that money. From a treatment point of view free choice of doctor was essential, and a fair price had to be paid for safeguarding it. When freedom was preached, it should be freedom for all. The freedom of the established doctor should be available to the new doctor. Too few local medical committees and executive councils agreed with the Medical Practices Committee when an area was said to be under-doctored. Yet was there any real reason why anyone should seek to prevent a doctor practising where he pleased?

Economy in Prescribing

Mr. J. NIXON BROWNE, Parliamentary Joint Under-Secretary of State for Scotland, addressing the Conference,

believed that one of the thorniest problems facing the National Health Service was that of controlling the nation's steadily mounting drug bill without interfering with the doctor's clinical freedom. The rising bill was a serious matter indeed. There was no easy answer to the problem. The family doctor was a busy man with many problems other than prescribing. But it was not unreasonable to expect the family doctor, with his trained mind, to remember the prices of at least some of the different types of drugs that he most frequently prescribed. It was on the doctor that the nation relied to bring the drug bill within reasonable bounds.

Reports received from local medical committees revealed that high costs were mainly due to (1) the excessive use of expensive proprietary drugs where cheaper standard ones would have met the patients' needs equally well; (2) the use of drugs of doubtful therapeutic value; (3) the excessive use of antibiotics; and (4) the prescribing of too much at a time and too often. Good medical practice, said Mr. Nixon Browne, was not incompatible with public economy. Doctors of the highest reputation could keep their drug bill at remarkably low levels.

Dr. DAVID MCCALL, secretary of the Pharmaceutical General Council (Scotland), replied to some of the points made by the Under-Secretary of State, and his contention that, although there were some extravagances which should be eliminated, the drug bill generally was not unduly high was reported in last week's *Supplement* (p. 154). Dr. McCall favoured adoption of the French method of not allowing a new proprietary medicine on the market unless it had been shown to be an improvement on medicines already available. He felt that, at present, the medical student's curriculum did not allow him adequate time for the study of organic chemistry. The student was not given sufficient instruction in pharmacology and was not fully qualified to pass an opinion on the many new potent medications reaching the market.

Conference Resolutions

Among motions approved at the Conference were motions calling for (1) payment of travelling and subsistence expenses in excess of £1 incurred by patients from outlying areas in attending at hospitals and hospital clinics; (2) the extension of the present arrangements for the training of assistants so that trainees might be given experience in the work of public health departments, hospital service, and general practice; (3) the opening of negotiations with foreign countries with a view to bringing about reciprocation of provision of health services on an international basis; and (4) inquiries to be made about the amendment of existing Regulations so that change of doctor might be effected without a fourteen-day interval being necessary.

RURAL PATIENTS' COSTLY JOURNEYS

COMMITTEE'S PROPOSALS TO RELIEVE HARDSHIP

Since the Department of Health issued new instructions in September, 1950, payment of patients' travelling expenses to hospitals and clinics is made only in cases of financial hardship. Patients make a claim to the National Assistance Board, which pays the cost of conveyance by public transport only and does not reimburse charges in connexion with hiring: nor is any allowance made for subsistence. No refund is made if a patient has any capital available.

Doctors in the remoter rural areas of Scotland have been disturbed at the hardship which these rules impose on many of their patients, and also that they often benefit the thrifless. Inquiries by the Highlands and Islands Practitioners Subcommittee of the General Medical Services Subcommittee (Scotland) of local medical committees have produced evidence which shows that many patients may be prevented on occasion from using the National Health Service either

because they are too independent to apply for assistance or, knowing that they may be refused assistance, cannot afford the cost involved. A visit to out-patients in certain cases may involve a stay of three nights away from home.

Help for All

Information of this kind from local medical committees in the Highlands and Islands districts has been incorporated in a memorandum of evidence by the Highlands and Islands Practitioners Subcommittee which has been sent to the Standing Advisory Committee of the Health Services in the Highlands and Islands. The memorandum recommends that patients in the Highlands and Islands area residing at a minimum of 10 miles (or less in very special cases) from a hospital or clinic, which they have to attend as out-patients, should be asked to pay £1 towards their expenses—the balance to be defrayed from National Health Service funds—or the amount of the expenses when less than £1; that the ambulance service should be extended by the use of small cars or shooting-brakes for those patients whose travel by ambulance is not essential on medical grounds, but whose travel by public transport would be an unjustifiable risk; and that consideration should be given to the possibility of extending the use of hostels or similar accommodation for the benefit of patients requiring to spend a night or more away from home.

Questions Answered

Psychiatric Opinions

Q.—From time to time cases are referred by magistrates' courts for a psychiatric opinion, the magistrates adjourning their decision pending such a report. These cases are usually seen in the course of an ordinary out-patient psychiatric clinic. Is a fee payable for such a report, and, if so, by whom?

A.—The terms and conditions of service of hospital medical staff contain a schedule of work which, in the Minister's opinion, comes within the scope of the hospital and specialist services provided under the N.H.S. Act. The work which comes within this schedule must be provided by hospital medical staff without additional payment, and the schedule includes examinations and the furnishing of written reports on the mental or physical condition of offenders referred by courts under Sections 24 and 26 of the Criminal Justice Act, 1948. It is assumed that this ruling now applies to cases referred under Section 26 of the Magistrates Court Act, 1952.

Student's National Insurance Contributions

Q.—During my six years as a medical student I was informed that National Insurance contributions were not necessary. Now I find that if I do not pay these six years' contributions it will result in decreased retirement pension, widow's benefit, etc. The sum can be paid up to four years after qualification, but the income-tax authority tells me that no tax relief can be given. This seems unfair, as the contributions must be paid out of present income, which is small following qualification. May I have your comments?

A.—The semblance of inequity in this point is heightened by the fact that payment may be made in later years in which there is some income, but the tax position is quite clear. Tax is assessable on the net income of any one year and the concession as to later payment does not alter the fact that contributions can only be charged against the years in which they accrued. If there is no taxable income for those years there can be no effective tax allowance, as there is no provision for any carry forward in such circumstances.

Correspondence

Because of heavy pressure on our space, correspondents are asked to keep their letters short.

Senior Registrars and Consultant Appointments

SIR,—As the years pass many senior registrars, excellently trained, are approaching middle age and abandoning hope of obtaining full recognition and employment. Meanwhile, throughout the country, thousands of patients wait many weeks for appointments at hospital; practitioners stop trying to get second opinions in cases where they feel it would be helpful; hundreds of thousands of patients wait many months for admission for operation once they have passed the out-patient barrier. The remedies for this state of affairs are at hand but are not pursued with vigour for a variety of reasons. Some five years ago the Ministry of Health was responsible for setting up authoritative medical working parties which surveyed the consultant services of the regions and made recommendations. Their findings and advice have never been published, but it is known that many extra appointments were advocated.

Some consultants are holding contracts on a part-time basis to a total of 35–52 hours weekly, inclusive of travelling time. The Central Consultants and Specialists Committee is well aware of this situation and has made no serious effort to rectify it. Some of the clinical sessions thus held are only fulfilled in a notional way, while in other cases registrars and clinical assistants carry the whole responsibility, merely referring cases to the consultant on rare occasions. Appointments on a sessional basis are still being sought and obtained by those holding part-time contracts with maximum sessions. An appointing body cannot know an applicant's commitments unless it specifically asks for this information at the appointment committee. Many hospitals refuse to divulge the sessional work of consultants; while some refuse to make any returns of consultants' visits.

These facts do not redound to the credit of the profession and they are associated with a disinclination on the part of some general consultants to advise or welcome appointments in specialties which might encroach slightly on their own provinces. If the Ministry would take the advice of its own appointed advisers, and consultants would adopt a less personal attitude, it is probable that the plight of their senior registrars would be solved, potential patients would gain, and the profession would be more highly regarded by lay administrators, who watch the present situation with a feeling bordering on cynicism.—I am, etc.,

London, N.W.10.

HORACE JOULES.

Political Misuse of Health Services

SIR,—We have just received in the public press a perfect example of the present political misuse of the health services of the country. The Parliamentary Secretary to the Ministry of Health has announced to a Conservative Party conference some figures alleged to result from the trials of polio vaccine earlier this year; these, so far as I know, have not yet been published in the medical press. They were, moreover, presented in a tendentious manner, comparing the total polio cases for a year (2,500-odd) with cases in vaccinated children (10). The statistical relevancy of these two figures would seem to be a little dubious, though no doubt they serve the political purpose for which they were used.

I trust that the M.R.C. is as perturbed as I am at the uses to which its work is put, and that some way can be found to bring home to the Ministry of Health the disgust and contempt with which this sort of action is regarded by the profession.—I am, etc.,

Bushey, Herts.

D. G. WILSON.

Remuneration of S.H.M.O.s

SIR,—There has been considerable correspondence regarding remuneration of the profession, but so far no reference has been made to the earnings of S.H.M.O.s in either the medical or the lay press. This grade, ostensibly restricted, has increased since the introduction of RHB 50/96 at a greater rate in the permitted specialties than the consultant grade, so that now over 3,000 specialists with permanent contracts are S.H.M.O.s. This comprises approximately a third of the specialist service of this country, and a résumé of their earnings cannot therefore be regarded as unimportant or irrelevant. S.H.M.O.s and consultants are intimately related, both clinically and administratively, so that a comparison of their present earnings is justifiable.

A consultant earns £525 more than an S.H.M.O. in his first year, but by the tenth year the cumulative difference is £8,800. If each is appointed at the age of 32 years (the same regulation governs the age of appointment in both grades), the consultant earns £34,675 more than the S.H.M.O. by the time he is 65 years of age. It should be noted that only the basic earnings of the full-time consultant are considered. Fees from domiciliary consultations and merit awards (266 with £2,500 per annum; 665 with £1,500 per annum; 1,330 with £500 per annum) are excluded. A comparison of the salary of S.H.M.O.s and consultants shows a considerable variation since 1948. This is demonstrated in the accompanying table.

	A				B	
	Consultant		S.H.M.O.		Salary Percentage	
	Min.	Max.	Min.	Max.	Min.	Max.
1948-53 (Following award, 1954) 1954-5	£1,700	£2,500	£1,300	£1,750	76	70
(Following award Industrial Court April, 1956) 1956	£2,100	£3,150	£1,500	£1,950	71	61
	£2,100	£3,150	£1,575	£2,025	75	64

Prior to the award of 1954, the maximum salary of an S.H.M.O. was £50 more than the minimum of a consultant. Since then it has remained less, even after the Industrial Court Award of 1956. The ratio between the maximum salary of the S.H.M.O. and the consultant maximum has fallen from 70% prior to 1954 to 64% in 1956. At present entrants into the S.H.M.O. grade receive a salary equal to 75% of that of newly appointed consultants, whereas 10 years later the ratio has fallen to 64%. Two anomalies result: (1) An S.H.M.O. with 10 years' experience or more is still earning less than a newly appointed consultant. (2) An S.H.M.O. suffers with age as far as his life earnings are concerned when compared with the earnings of a consultant, because if the 75% of the minimum end was continued throughout the scale the difference in life earnings would be £17,325—that is, half the present difference.

The value of a fixed salary ratio between the two grades is recognized by the B.M.A., for it would prevent a recurrence of protracted discussions, culminating in arbitration, as ensued following the award of April, 1954. Consequently a resolution "that the salary of the S.H.M.O. grade should be raised to 80% of that of the consultant salary throughout the whole scale" was adopted by the Representative Body in July of this year. The present salary thus envisaged would range from £1,680 to £2,520 with annual increments of £100. Adoption of the above resolution serves no purpose unless it is implemented.

In the opinion of the S.H.M.O. Group, the Joint Negotiating (Remuneration) Committee in its deliberations with the Ministry and other Government bodies should exert maximum pressure to raise the present salary of the S.H.M.O. to 80% of that of consultant—that is, basic salary of the full-time consultant—throughout the whole scale. It is felt that the problem is analogous with that of the general practitioner prior to the Danckwerts Award. This award

not only increased the earnings of practitioners as a whole, but by increasing capitation fees of small practices (500-1,500 on list) beyond those of large practices, went far to correct anomalies within the practitioner service itself. Furthermore, the S.H.M.O. Group Executive Committee was instructed by its Group Council a year ago to aim at a salary of 80% of that of consultant, and the Industrial Court in April, 1956, stated that its award of £75 was without prejudice to further negotiations *re* salary. The Executive believes that should the Joint Negotiating Committee fail to include the previously mentioned resolution in its discussions, then the aim of the S.H.M.O. Group as far as salary is concerned is doomed to failure, as no separate claim on their behalf within the foreseeable future could possibly receive any sympathy from the Ministry, or indeed the profession. S.H.M.O.s should also receive 80% of any sum granted to consultants as a result of the negotiations, so that the final salary is stabilized at 80% of that of consultant at all levels of the scale.

The salary of the senior assistant grade suggested by the Hospital Medical Staffing Subcommittee should not be taken into consideration for the following reasons: (1) The suggested salary scale was relevant to the cost of living in 1954, before a claim on behalf of the profession was contemplated. (2) The senior assistant grade does not exist, and may never be formed. (3) The Minister might accept hospital restaffing but reject the suggested alteration in salary. (4) Although the intention is to abolish the S.H.M.O. grade, this is not synonymous with abolishing S.H.M.O.s. The individuals concerned will remain.

It is felt that the resolution would not seriously complicate discussions, and that it should therefore be adopted as a policy by the Joint Negotiating (Remuneration) Committee. S.H.M.O.s throughout the country hope that the claim of the profession will be successful, and that the relative earnings of S.H.M.O.s and consultants will become realistic.—I am, etc.,

Swansea.

J. H. THOMAS.

Present State of Practice

SIR,—I have never written to the *Journal* before, or voiced my opinions at any meetings, but the time has come, I feel, when more doctors should say or put down on paper what they feel about the present medical service.

There are five main reasons for my anxiety regarding the National Health Service: (1) the degradation of the medical profession to the level of a political pawn or vote-catching institution; (2) the lack of incentive for the general practitioner to use his knowledge or whatever skill he may possess; (3) the paralysing effect on the doctor of the multitude of forms and certificates; (4) the fact that the public is gradually getting into the position of being able to dictate to the doctor; (5) the lowering in status of the individual doctor in relation to the rest of the community.

As regards the governmental reaction to the remuneration claim, it is of course what is to be expected. We have put ourselves in the position of having to approach the Minister cap-in-hand and ask for more money. The threat of strike is unlikely to occur, and therefore the rise in pay is refused, although of course this particular rise has more justification than many others which have been granted.

That is not so important; what I think is very important is that in my opinion the National Health Service in its present form is having a bad effect upon the population and the doctor. I believe it encourages introspection and the cossetting of minor illnesses, and thereby weakening the moral fibre of the people. I believe it has the effect on the doctor of turning his surgery into a sorting office, and thereby discouraging him from doing more useful work and encouraging him to "pass the buck."—I am, etc.,

Uckfield, Sussex.

R. B. TULK-HART.

Admission to Hospital

SIR,—An asthmatic man of 43 years, under treatment for the previous week, went into status asthmaticus which I was unable to relieve. At 10.30 a.m. application for urgent admission to a large local hospital wherein the patient had twice before been treated for this condition was refused, as there were no empty beds in the admitting physician's wards. After some discussion the admitting physician saw the patient with me in domiciliary consultation at 1.30 p.m., and agreed that urgent admission was needed. I hoped, in my simple faith, that some action might now occur, and it did. About 2.30 p.m. the house-physician telephoned and regretted they could not take the patient in, as his chief's wards were full: would I like the case referred to the emergency bed service? I did so like, and about 20 minutes later the E.B.S. telephoned my house and regretted they could not accept the case from a hospital—only from me. I was out, but my wife, after a further telephone call from the hospital, was able to supply the necessary particulars and they agreed to get on with it. It seems that the details supplied by me to the hospital were unacceptable to the E.B.S., but were right enough when re-transmitted by my own telephone. Eventually the patient got into a hospital about seven miles away. I understand from his wife (a nurse) that he was by then in a really ripe condition: he is still, happily, alive.

Next day the consultant's secretary telephoned to inquire what had happened and explained that, as their wards were full, they had to ask leave of the E.B.S. to take a patient into their own hospital, which permission was not granted, presumably before the E.B.S. declined to accept the case for disposal from this hospital. We were all pretty courteous and friendly throughout these transactions and I am not ventilating my criticism against the hospital or individuals concerned, for which and whom I have the highest personal regard. But it is an extraordinary situation when a consultant physician cannot get a case into his own 700-bedded hospital, even though his own beds are full, if the E.B.S. says him nay.

I cannot appreciate this type of improved medical service under the N.H.S., and would much prefer a return to the common-sense independence I remember in the unenlightened past. Sensible administration should aid, not hamper, the practice of medicine, and it is in the hope that a little publicity may prevent further such happenings that I write this letter. I do not want any heads to roll; I only hope that this sort of nonsense may be avoided here, elsewhere, and in the future.—I am, etc.,

London, W.5.

C. J. CORBE.

SIR,—I wish to ventilate that old grievance arising out of the reluctance of hospitals to accept certain types of case.

On October 3 a man in his sixties was visited in the morning and was found to have fractured the neck of a femur some 12 hours earlier. My assistant telephoned to the hospital which receives most of the casualties in this area, and spent some time in an unsuccessful attempt to persuade a house officer to admit this case. As less than 24 hours had elapsed since the accident, it was possible to dial 999 and simply ask "ambulance" to collect the patient. He was taken to the same hospital and was, of course, admitted.

Now, Sir, it is easy to be sarcastic about this sort of thing, but it is indeed a pitiable affair when a courteous attempt to establish contact with another doctor is, in fact, a waste of time. And how misguided is the hospital's attitude! Surely a hospital exists to treat cases which a G.P. cannot deal with a himself, and what case needs expert treatment more than a fractured neck of femur? The sort of person who writes to politicians could obviously stir up a lot of unpleasantness over a case of this sort—and someday someone will. And then authority will direct that all cases presented to a hospital as emergencies shall be admitted without question. Would it not be much better if hospital residents would resolve to it not be much better if hospital residents would resolve to admit every case that comes, if only for one night? After all, if a mistake had been made the patient could go home next day.—I am, etc.,

London, S.W.16.

VINCENT RECKITT.

Unemployment and Under-employment in the Medical Profession

SIR,—In the second survey by Dr. L. S. Potter of unemployment and under-employment in the medical profession (*Supplement*, September 15, p. 127), he includes in his register of doctors regarded as in "dead-end jobs" a number holding appointments outside general practice (for example, registrar) but seeking general-practice openings. Suitable hospital appointments offer the most valuable concentration of experience in subjects of importance to family doctors that it is possible to obtain, and many people consider that the facilities now available in this field should be greatly extended.

I hope Dr. Potter will see fit in future surveys to amend his classification, for it would be a great disservice if the authority of the Medical Director of the Medical Practices Advisory Bureau were to be lent to the thesis that it is a waste of time to take additional hospital appointments in preparation for a career as a family doctor.—I am, etc.,

London, W.8.

DONALD C. BOWIE.

Remuneration Claim

SIR,—I have refrained from entering the fray regarding our remuneration claim, chiefly because most of the letters seem to have been assuming that the Government is a gang of crooks whose one idea is to break an honourable agreement and "down" our profession at all costs. Whether we like it or not, our particular democratic system demands certain procedures, and there is no way of by-passing them. Surely, so far, the Government has not rejected our claims? Am I not right in saying that when the Minister made his statement, which has let loose so much abuse, no claim had been made? I am confident that when all the usual meetings have been held the profession will find, in true British tradition, that we shall receive justice.

I would, in view of my beliefs, like to put forward a serious suggestion regarding the financing of our remuneration. I believe that about 10d. a week is contributed to the National Health Service from the various amounts paid by individuals for National Insurance. I suggest that 3d. a week extra is so contributed and that the present contributions are raised by this amount (1½d. from the individual and 1½d. from the employer). Assuming there are twenty million contributors, this would bring in thirteen million pounds a year. It would, I suggest, have the following advantages: it would be anti-inflationary; it would mean that the individual would be paying more directly for the benefits he obtains; and it would hit nobody, not even the Chancellor of the Exchequer.

May I suggest that, during our own little crisis, "patience and patriotism" should be the watchwords. Do not let us be rushed by hotheads into precipitate action.—I am, etc.,

Newport Pagnell, Bucks.

A. A. CLAY.

SIR,—Much has been written of strike action on the one hand and negotiation on the other, but we appear to be missing the obvious.

A contract can be enforced by law. Action can be taken against the Crown. A contract may be real or implied, and if, by tricks of words, our real contract is not enforceable we most certainly have very adequate proof of an implied contract. As a body the B.M.A. could not take action, but an individual could, and there is nothing to stop a body so vitally interested from providing funds. There must be many of us who would be willing to be the guinea-pig in a test case. I for one am fed up with negotiations with politicians. All the honest ones have hairs growing on the palms of their hands. Last time it took three years—let us invoke the law now. I have no doubt that when the case is won (as I am sure it would be) the Minister would then bring in amending Acts. Then would be the time to have other wrongs put right—if he can alter one bit he can alter the lot.

I would implore our leaders to forsake the kid glove in favour of the mailed fist. It is essential to ascertain if we really have a contract, and the time to do it is now. The place to do it is in a court of law—then there is no doubt in anyone's mind.—I am, etc.,

Walsall.

J. M. LEES.

Closed Shop

SIR,—If the circulation of a plebiscite is being contemplated I submit that B.M.A. owes it to the advocates of the "closed shop" to include a question thus: "Do you believe that membership of the B.M.A. should be made compulsory, so that the Association could control those doctors who act against the common interest?" Headquarters might be surprised at the percentage of answers of "yes," as it is becoming daily more apparent that we must march together or sink to the level of genteel artisans.—I am, etc.,

Dungannon, Co. Tyrone.

CONN MCCLUSKEY.

Association Notices**Diary of Central Meetings****OCTOBER**

- 22 Mon. Staff Side, General Whitley Council (at 14, Russell Square, London, W.C.), 10.30 a.m.
22 Mon. Full General Whitley Council (at 14, Russell Square, London, W.C.), 2.30 p.m.
22 Mon. Scientific Exhibition Subcommittee (Newcastle, 1957), Arrangements Committee, 2.45 p.m.
23 Tues. Catering Committee, 10.30 a.m.
23 Tues. Staff Side, Committee B, Medical Whitley Council, 10.30 a.m.
23 Tues. Financial Advisory Committee, 11.30 a.m.
23 Tues. Finance Committee, 2 p.m.
23 Tues. Office Committee, following Finance Committee.
23 Tues. Full Committee B, Medical Whitley Council, 2.30 p.m.
25 Thurs. Compensation and Superannuation Committee, 2 p.m.
25 Thurs. Industrial Nursing Subcommittee, Occupational Health Committee, 2 p.m.
25 Thurs. Charities Committee, 2.30 p.m.
25 Thurs. Medical War Relief Fund Committee, 3.45 p.m.
26 Fri. Assistants and Young Practitioners Subcommittee, G.M.S. Committee, 2 p.m.
26 Fri. Consulting Pathologists Group Committee, 2 p.m.
26 Fri. Dental Formulary Subcommittee, Joint Formulary Committee, 2 p.m.
29 Mon. S.H.M.O. Group Executive Committee, 2 p.m.
30 Tues. Remuneration Subcommittee, Occupational Health Committee, 2 p.m.

NOVEMBER

- 6 Tues. Edinburgh Meeting (1959) Steering Committee, 2 p.m.
7 Wed. Council, 10 a.m.
14 Wed. Welsh Committee (at Crown Hotel, Shrewsbury), 2.15 p.m.
15 Thurs. G.M.S. Committee, 10.30 a.m.
16 Fri. Joint Committee of the B.M.A. and the Magistrates' Association, 2 p.m.
19 Mon. Study Leave Subcommittee, Central Consultants and Specialists Committee, 11.15 a.m.
20 Tues. Alternative Edition Subcommittee, Joint Formulary Committee, 11 a.m.
21 Wed. Editorial Subcommittee, Joint Formulary Committee, 11 a.m.

Branch and Division Meetings to be Held

BOURNEMOUTH DIVISION.—At Board Room, Royal Victoria Hospital, Boscombe, Friday, October 26, 8.15 p.m., meeting. Address by Dr. W. Fielding: "Points of Departure."

BRIGHTON AND MID-SUSSEX DIVISION.—At Preston Parish Church (St. John's), Sunday, October 21, 6.30 p.m., annual church service.

CLEVELAND DIVISION.—At Hinton's Café, Corporation Road, Middlesbrough, Friday, October 26, 8.30 p.m., meeting. Lecture by Dr. J. H. Cyriax: "Manipulative Medicine."

CUMBERLAND DIVISION.—At Blencathra Sanatorium, Threlkeld, Thursday, October 25, 8 p.m., film: "Conjoined Twins of Kano," followed by annual meeting.

DARTFORD DIVISION.—At Royal Clarendon Hotel, Gravesend, Thursday, October 25, 8.15 for 8.45 p.m., annual dinner. Medical guests are invited.

DUDLEY DIVISION.—At Nurses' Lecture Theatre, The Guest Hospital, Dudley, Tuesday, October 23, 9 p.m., A.G.M.

EASTBOURNE DIVISION.—At Princess Alice Memorial Hospital, Eastbourne, Tuesday, October 23, 8.30 p.m., meeting. B.M.A. Lecture by Mr. A. Lawrence Abel: "Lumps in the Breast," with special reference to cancer, its diagnosis and treatment (illustrated by lantern slides); also a coloured talking cinematograph film: "Breast Self-examination."

EAST HERTS DIVISION.—At Haymeads Hospital, Bishop's Stortford, Thursday, October 25, 8 p.m., clinical meeting.

FINCHLEY DIVISION.—At Finchley Memorial Hospital, Friday, October 26, 8.30 for 9 p.m., meeting. Talk by Dr. A. A. Mason on the use of hypnosis in medicine. To be supported by a short film and demonstration.

GREENWICH AND DEPTFORD DIVISION.—At Miller General Hospital, Greenwich High Road, S.E., Wednesday, October 24, 8.30 p.m., meeting. Dr. C. W. L. Jeanes: "A Chest Physician Visits the New World—a Report on a Four Months' Visit to Canada and the United States of America." Members' wives and other guests are invited, also members of the Woolwich and Lewisham Divisions.

HEREFORD DIVISION.—At County Hospital, Hereford, Wednesday, October 24, 8 p.m., meeting. Address by Professor H. W. Rogers: "Surgery of the Stomach."

HYDE DIVISION.—At Pack Horse Inn, Mottram, Wednesday, October 24, 8.45 p.m., clinical meeting. Talk by Dr. D. Hilson: "A Novel and Useful Congenital Syndrome."

KINGSTON-ON-THAMES DIVISION.—At Tudor Restaurant, Bentalls, Kingston, Wednesday, October 24, 7.30 for 8 p.m., supper dance.

LONDONDERRY DIVISION.—At Londonderry City and County Hospital, Wednesday, October 24, 8.15 p.m., meeting. Lecture by Dr. J. J. E. Merry on the basic principles of therapy with cortisone and related steroids followed by two films: (a) "Therapy with Cortone" (Cortisone Acetate); (b) "Technique of Joint Aspiration and Injection of Hydrocortisone."

MID-ESSEX DIVISION.—At Heybridge Country Club, Ingatestone, Thursday, October 25, 7.30 p.m., annual dinner, followed by annual general meeting.

NORTHERN IRELAND BRANCH.—At Upper Lecture Theatre, Institute of Clinical Science, Grosvenor Road, Belfast, Thursday, October 25, 8.30 p.m., opening meeting of session. Presidential address by Dr. Robert Marshall: "A Visit to Finland." Wives and friends of members are invited.

ST. PANCRAS DIVISION.—At Institute of Ophthalmology, Judd Street, London, W.C., Wednesday, October 24, 8.30 p.m., meeting. Dr. N. H. Ashton: "Oxygen as a Cause of Blindness in Premature Babies." A short film and a practical demonstration will follow. Members of the City Division are invited.

SOUTH-EAST ESSEX DIVISION.—Saturday, October 27, visit to the Houses of Parliament. Coach party to arrive at Westminster at 6 p.m. (approx.). Members, their wives, and friends are invited.

STRATFORD DIVISION.—At King George Hospital, Eastern Avenue, Ilford, Tuesday, October 23, 8.30 p.m., annual general meeting. Address by Dr. D. P. Stevenson (Deputy Secretary, B.M.A.): "Current Events at Headquarters."

TOWER HAMLETS DIVISION.—At St. Andrew's Hospital, Devons Road, Bow, E., Friday, October 26, 3 p.m., clinical meeting.

WEST SOMERSET DIVISION.—At Physiotherapy Department, Musgrove Park Hospital, Taunton, Saturday, October 27, 3 p.m., clinical meeting.

WEST SUSSEX DIVISION.—At Beach Hotel, Littlehampton, Thursday, October 25, 6.30 p.m., general meeting. Mr. Stephen Madden: "Domiciliary Midwifery as Seen from the Hospital."

WINCHESTER DIVISION.—At Royal Hotel, Winchester, Saturday, October 27, 7 p.m., annual meeting; 8 p.m., dinner. Guest of honour, Dr. A. H. Hall, President, B.M.A.

Meetings of Branches and Divisions**LEICESTERSHIRE AND RUTLAND BRANCH**

The annual meeting was held on June 6 at Leicester Royal Infirmary. The chair was taken by Dr. J. Butler, and 36 members were present. The following officers were elected:

President.—Mr. A. L. McCurry.

President-elect.—Dr. J. Cooke.

Vice-president.—Mr. E. R. Frizelle.

Past President.—Dr. J. Butler.

Secretary.—Dr. G. L. Ward.

Dr. G. Waring-Taylor was presented with a silver coffee-pot and milk jug and an inscribed walnut tray and a small cheque as an expression of gratitude for the work he had done as honorary secretary of the Branch for nine years. Dr. O'Donnell showed a colour ciné film of the B.M.A. meeting in Toronto in 1955.

SUPPLEMENT TO THE BRITISH MEDICAL JOURNAL

LONDON SATURDAY OCTOBER 27 1956

CONTENTS

Remuneration Claim - - - - -	167	General Medical Services Committee - - - - -	169
Central Consultants and Specialists Committee - - - - -	167	Scottish News - - - - -	171
S.H.M.O.'s Group Council - - - - -	169	Correspondence - - - - -	171
Birmingham Meeting - - - - -	169	Association Notices - - - - -	172

REMUNERATION CLAIM**MINISTER ON CONTRACTUAL OBLIGATIONS**

Addressing the conference of the Executive Councils Association (England) in London on October 18, Mr. R. TURTON, Minister of Health, said that there appeared to be some widespread misunderstandings about the doctors' pay claim. The claim had not been exhaustively examined in all its details and found wanting. "There has been no such examination of the details," he said, "and we have passed no opinion on them."

He stated that the Government had felt that the claim could not be reconciled with its policy of fighting inflation by exhorting all sections of the nation to observe restraint over increases both of prices and of wages and salaries. The Negotiating Committee had therefore been told that in the present circumstances the Government did not feel justified in giving consideration to any claim for a general increase in medical remuneration. He had not been able to accept the claim that there were contractual obligations to give pay increases, but, "far from brushing it aside, we have readily agreed to a request made by the Negotiating Committee that the matter should be referred for legal advice at the highest level. That advice is now being obtained."

Mr. Turton pointed out that the claim was not concerned with any increases in practitioners' expenses. He had seen letters from doctors urging that mounting practice expenses justified acceptance of the claim, but other agreed arrangements existed to cover these, and extra money was being paid to meet them. He said, "Doctors will, I hope, have a pleasant surprise when they receive their December cheques."

A report of the conference of the Executive Councils Association will appear in a subsequent issue.

B.M.A.'s STATEMENT

The following statement was issued to the Press on October 19 by the Public Relations Department of the B.M.A.

"While the profession is still awaiting his considered reply on their main remuneration claim, the Minister of Health is reported as having said yesterday that doctors will have 'a pleasant surprise' when they receive their December cheques, since they will find that the amount allowed for their practice expenses has increased."

"Anyone reading this might suppose that the Government was 'giving' the doctors something extra and something new. It is, of course, doing nothing of the kind. This is the family doctors' own money which they have already spent

on the Service and which has been owing to them for nearly two years. During this time they have been bearing out of their own pockets the rising costs of everything they need to run their practices, from telephone charges to surgery towels. This December at long last these extra costs will be refunded. It is ridiculous to speak of the repayment of this debt as though it were some kind of Christmas box and a 'pleasant surprise.' One might as well say that it should be a 'pleasant surprise' for an employee when his firm makes up to him the bus fares he spent last year on their business. Doctors would be better pleased if Mr. Turton, having admitted that their practice expenses have gone up, would now admit that the value of what they are left with after paying these expenses has gone down and adjust their remuneration accordingly."

Views of Merseyside Branch

The Merseyside Branch of the B.M.A. at its meeting on October 12 expressed unanimous confidence in the negotiators and indignation of the way in which the Ministry had originally dealt with the claim. Members reaffirmed their adherence to the agreement implied and set out in the Spens Report. Members also felt there should be no delay in pursuing negotiations, and suggested a period of from four to six weeks in which it should be possible to indicate to the profession progress made. Failing this, suitable steps should be taken to put the profession in a state of readiness to bring the necessary pressure to bear for a full settlement of the claim.

CENTRAL CONSULTANTS AND SPECIALISTS COMMITTEE**FIRST MEETING OF THE NEW SESSION**

The first meeting of the new session of the Central Consultants and Specialists Committee was held at B.M.A. House on October 11. Mr. T. HOLMES SELLORS was unanimously re-elected to the chair and Dr. T. ROWLAND HILL to the deputy chair. Two members, Mr. C. E. KINDERSLEY and Mr. A. M. A. MOORE, were added by co-option. Six representatives from the Committee, including its Chairman and Deputy Chairman, were appointed to serve on the Joint Consultants Committee for the new session. Some half-dozen subcommittees were reconstituted, and representatives were appointed to other committees of the Association.

The Chairman reported for the Executive and made certain recommendations, which were agreed to, on action to be taken concerning certain resolutions of the recent Annual Representative Meeting and the Consultants' Conference. One of these concerned the "relative and absolute" underpayment of house-officer grades in hospitals, and called upon the Council to press for substantial increases in the remuneration paid to these grades. In deciding to send this to the Staff Side of Committee B of the Medical Whitley Council the Committee pointed out the strong case for an increase in fully registered house-officer remuneration.

The Committee considered resolutions of the Annual Representative Meeting and the Conference relating to the present distinction awards. They decided to seek further information on the operations of the Distinction Awards Committee and the principles on which the machinery for the allocation of distinction awards works.

Private Beds Distribution

Figures showing the occupancy of hospital private beds were extracted from the official statistics of the hospitals services published by the Ministry. These figures showed that, taking the country as a whole, private beds were not fully used for the treatment of private patients. Figures from the provident societies, however, showed that there had been a considerable increase in the number of people making provision through these societies for private hospital treatment.

The CHAIRMAN said that before raising the matter with the Ministry it was necessary to obtain evidence of the demand for private treatment in those areas where it could not be met with the present facilities. He therefore proposed to the Committee—which was agreed—that a letter be sent to the chairman of each hospital group medical committee asking whether experience had shown that the private beds in the hospital group were adequate and appropriately distributed, or alternatively that where it was felt that more private beds were needed sufficient detailed information should be furnished which would enable a case to be put before the Ministry. This followed upon an instruction at the last meeting of the Central Committee instructing the Executive to review the distribution of hospital private beds and to discover what steps should be taken to secure an improvement in the present position where it appeared to be necessary.

It was also agreed that the Joint Committee be asked to reopen with the Ministry the question of the reintroduction of a moderately priced private bed.

S.H.M.O.s

A long discussion on the question of remuneration of S.H.M.O.s took place on the report of the Executive Committee, together with a memorandum prepared by Dr. J. H. THOMAS, who stressed two anomalies, one that the S.H.M.O. with ten years' experience was still earning less than a newly appointed consultant, and the other that the S.H.M.O. suffers with age so far as life earnings are concerned when compared with consultant earnings. Thus an S.H.M.O. appointed at the age of 32 received £1,575 and a consultant at the same age £2,100, a difference of £525, and after ten years the former received £2,025 and the latter £3,100, a difference of £1,075. At the age of 42 the total difference over the whole period would be £8,540, and at the age of 65 it would be £33,265.

The view of the Executive on the future use of the S.H.M.O. grade was that no action could be taken on this subject until the outcome of the discussion on hospital medical staffing. Pending such discussion it would be premature to establish formal machinery for dealing with the problem. In the meantime the proper way of dealing with any difficulties was to maintain vigilance in scrutinizing advertisements for S.H.M.O. appointments to see that they conformed with the appropriate circular.

It was resolved that attention be drawn in the next issue of the *Bulletin* to the desirability of hospital medical staffs bringing to the immediate notice of the Central Committee

any cases in which hospital boards propose to advertise S.H.M.O. appointments which in the opinion of local consultants are wrongly graded, and to ask the Joint Committee to renew its representations to the Ministry that hospital boards be encouraged to consult with representatives of the profession before submitting advertisements of S.H.M.O. posts to the medical press.

Title of the Committee

Mr. H. H. LANGSTON, chairman of the Constitution Committee of the Association, said that it was hoped to make the final report on the constitution in January. Meanwhile the question of the title of the Central Consultants and Specialists Committee had come forward, and his committee had wondered whether in some way "Hospital Services" could be incorporated, making it clear that the object of the Committee was to watch over all engaged in the hospital services, including the junior members of the staff, and using some such title as "Consultants and Hospital Medical Staffs Committee." Dr. Rowland Hill had pointed out that "specialists" had been removed from the documents used in discussions with the Ministry, and it was perhaps an anachronism to leave the word in the title.

It was decided to leave the matter over until the next meeting.

Guillebaud Report

Professor P. C. P. CLOAKE, as chairman of the subcommittee which prepared evidence for the Guillebaud Committee, gave a lengthy report of the result of that body's deliberations. He said that his subcommittee was pleased to note that from the financial point of view the Guillebaud Committee had made so many recommendations which coincided with those of the Central Consultants and Specialists Committee. It would, for example, be seen that medical membership of boards, elected medical advisory committees, and many other fundamental tenets of the Central Committee were strongly supported by the Guillebaud Committee on financial grounds also. But the subcommittee could not accept the final conclusion of the Committee that they had found no opportunity of making recommendations which would either produce new sources of income or reduce in a substantial degree the annual cost of the Service.

The subcommittee was aware of substantial wasteful expenditure which still occurred, and drew attention to certain items of economic reorganization which would undoubtedly result in economies—namely, (1) provision of out-patient facilities of a standard to allow minor procedures to be carried out without having to admit the patient; (2) extended provision and organization of improved ancillary services so that essential investigations could be carried out before admission or with the minimum delay after admission; and (3) provision of a thoroughly adequate service for the elderly and chronic sick in order that their admission might never be needlessly sought nor their discharge needlessly delayed. Professor Cloake dealt in detail with many of the paragraphs of the report, and ended by saying that the subcommittee welcomed the assurance that the importance of medical planning was recognized, and the profession was ready and willing, as it always had been, to accept this responsibility and play its part.

Maternity and Child Welfare Services

Professor G. I. STRACHAN, in presenting the report of the Obstetrics Subcommittee, dealt with the question of preparing a memorandum for inclusion in the evidence to be submitted to the committee set up by the Minister to review the organization of maternity services. On the question of local health authority and child welfare services, the conclusion was reached that the only logical course, particularly as the Guillebaud Committee had recommended that there should be no transfer of maternity hospitals to local authorities, was to transfer the maternity and child welfare functions of the local health authority to the hospital authority, under which they should be integrated with the departments of obstetrics and gynaecology and paediatrics.

respectively. These departments themselves should be as closely integrated as possible.

As to whether local executive councils should or should not retain responsibility for making arrangements with general practitioners for providing maternity medical services, the conclusion was reached that it was logical and would make for better co-operation if the present opportunity was taken to bring the whole of the midwifery services under unified control exercised by the hospital authority. Admission to the obstetric list was, in the opinion of the subcommittee, purely a formality and its continuance would serve no useful purpose.

Disciplinary Proceedings

Dr. S. COCHRANE SHANKS, chairman of the Medico-Legal Subcommittee, presented a draft memorandum from the Ministry on the procedure for investigating complaints relating to professional behaviour or competence. The subcommittee had agreed upon certain amendments and additions to the memorandum, and the document with these amendments was circulated to the Committee.

**S.H.M.O.'s GROUP COUNCIL
REPRESENTATION OF THE GROUP**

A meeting of the council of the S.H.M.O.'s Group was held at B.M.A. House on October 8, when there was a full attendance from the various regions, including the Scottish. Mr. G. WARING ROBINSON (Sheffield Region) was unanimously voted to the chair. The main business of the meeting was the consideration of the annual report of the executive committee.

The CHAIRMAN said that the Group had a satisfactory record of achievement during the 19 months since the Group council had its first meeting. Good work had been done in ensuring that newly appointed S.H.M.O.s were made acquainted with the Group with a view to becoming members. The most appropriate method of representation had been the subject of much debate. An amendment of the constitution of the Group Committee had been proposed which would make the executive a subcommittee of the Central Consultants and Specialists Committee, the Group itself and the Group council still continuing in being. The idea of the Group executive becoming a subcommittee of the Central Consultants and Specialists Committee was not acceptable, however, but a liaison committee was favoured, with representatives of the central committee, to facilitate matters of common interest. The question was still under discussion.

S.H.M.O. Appointments

Much of the report presented to the meeting concerned matters dealt with when a deputation from the Group executive committee met the executive of the Central Consultants and Specialists Committee. On this occasion concern had been expressed to the central committee at the apparent increase in the number of S.H.M.O. appointments. A proposal was made that no new such posts should be created. The central committee, while agreeing that the wording of the S.H.M.O. document which lays down the scope of the grade (circular R.H.B. (50) 96) was unsatisfactory and inviting suggestions on how it might be modified, could not oppose the proper use of the grade. It was reported that dissatisfaction was also expressed to the Ministry from other quarters about the way in which the circular was applied. The view was expressed that consultation with regional consultants and specialists committees should take place on proposals to create new S.H.M.O. posts before submitting advertisements to the medical press for publication. Two members of the Group executive had produced a memorandum on which a document for the committee might be based.

Mr. G. LOWE referred to the length of time that this whole matter had been simmering. The question was, what was

going to happen as between the Ministry and the Joint Consultants Committee? He wanted to get unity in the profession on S.H.M.O. appointments. The position obviously called for clarification. What was wanted was to be sure that there was no downgrading. He moved that the executive be requested to get on with the job in the best way which appeared open to them and at the earliest possible moment. The CHAIRMAN said they would all agree in principle with that, and the meeting signified its endorsement.

G.P. Specialists

Another matter which arose on the annual report of the executive committee concerned representation on the General Medical Services Committee. It was time, said several members, that something was done to encourage the appointment of general practitioners to serve on the staffs of provincial hospitals. A memorandum on specialization in general practice by Mr. Lowe had received the support of the G.M.S. Committee, and had been discussed by a number of interested bodies. The Central Consultants and Specialists Committee had given its approval to a number of principles, such as that general practitioners should be more closely associated with hospital work than at present.

Comparative Earnings

The meeting had before it a memorandum by Dr. J. H. THOMAS on the remuneration of S.H.M.O.s. From the figures which he brought forward he pointed out two anomalies: the first was that the S.H.M.O. with ten years' experience was still earning less than the newly appointed consultant, and the second that the S.H.M.O. suffered with age so far as earnings were concerned when compared with earnings of a consultant. If both S.H.M.O. and consultant were appointed at age 32, the one receiving £1,575 and the other £2,100, the difference was £525, and the accumulated difference after ten years was £8,540, and by age 65 it would be £33,265.

Apart from a most informative report, the agenda contained resolutions from various regions, mostly on matters which were already under the consideration of the Group council or its executive.

BIRMINGHAM MEETING

The Chairman of the Central Consultants and Specialists Committee, Mr. T. Holmes Sellors, is to address the annual regional meeting of consultants and S.H.M.O.s of the United Birmingham Hospitals and the Birmingham Regional Hospital Board on November 28, at 8 p.m., in the board-room of the Queen Elizabeth Hospital, Birmingham. All consultants and S.H.M.O.s are invited.

GENERAL MEDICAL SERVICES COMMITTEE

The monthly meeting of the General Medical Services Committee was held at B.M.A. House on October 18. To the regret of the members a letter was read from the Chairman, Dr. A. TALBOT ROGERS, intimating that he was compelled to enter hospital for an operation, and that he could not expect to resume full duty before the new year. The meeting sent a message of sympathy and good wishes to Dr. Rogers, who, it was stated, was making good progress. In his absence Dr. A. B. DAVIES (Walsall) was elected temporary chairman of the Committee. A message of sympathy in his illness was also sent to Dr. HOWIE WOOD, a member of the Committee. Dr. J. C. CAMERON (Wallington) and Dr. J. M. B. DONALDSON (Belfast) were welcomed as new members.

It was reported that the Scottish Secretary had informed the Department of Health for Scotland that the G.M.S. Subcommittee (Scotland) had agreed to an inquiry on the cost of prescribing on the lines suggested, but felt that any

investigation into prescribing in Scotland would best be carried out by a committee whose remit related specifically to that country. The subcommittee also thought that the investigation should be broadened to include prescribing throughout the Health Service, not restricted to general practice only.

The question of a joint discussion between the General Medical Services Committee and the Private Practice Committee on drugs for private patients, which had been before the Committee on several occasions, was again brought forward. It was agreed that a joint meeting of the two Committees should take place on November 14.

In reply to a question, Dr. DAVIES (from the Chair) said that there was little to add to the statement on the remuneration claim made by Dr. Talbot Rogers at the last meeting. The expected answer had not so far been received.

After some discussion the Committee agreed to recommend to the Negotiating Committee that the supplementary memorandum prepared by the Negotiating Committee's legal advisers should be sent to the medical press as soon as possible.

Health Centres

The Committee had before it from the London Local Medical Committee a document of the nature of a survey of health centres, also a letter from the London County Council to the London Executive Council on the provision of such centres. The London Local Medical Committee document (see *Supplement*, August 4, p. 89) was based on information relating to four such centres and one group practice. It was shown that the group practice had been more successful than any of the four health centres, the reason being, in the view of the local medical committee, that the patients of the group practice were receiving better service over extended hours of consultation, the use of an appointments system, and infant and antenatal care, all from the same three doctors such as were not available to the same extent at the four health centres.

Certain recommendations were made by the London Local Medical Committee: that the initial cost of health centres could and should be greatly reduced; that health centres of modest proportions should be erected as soon as possible; that doctors working in health centres should be consulted on the appointment of their ancillary staff, etc. The document was further expounded by Dr. F. GRAY. The CHAIRMAN said that this was particularly a London matter and detailed discussion should not be necessary at the moment. The findings and recommendations would be carefully considered.

Dr. M. SORSBY said that the purpose of a health centre was (1) to provide suitable premises for doctors to work in; (2) to furnish adequate ancillary help; (3) to bring together general practice and preventive medicine; and (4) to provide accommodation for several doctors to work in the same building and to co-operate and consult together. There was no reason why a group of doctors in partnership should not provide an equally good service at a health centre, and there was a need for further health centres where this experiment could be tried.

Dr. H. C. FAULKNER and others discussed a very useful and factual report.

Pool of Locumtenents

Another document placed before the Committee was by the Medical Practitioners Union on a suggested pool of locumtenents. Dr. B. CARDEW said that doctors had considerable difficulty in getting suitable locumtenents at the moment when they were required. This seemed to reveal that there was not a large pool of doctors who were unemployed and anxious to take any work offered to them. One of the present difficulties in the N.H.S. was that there was likely to be a hiatus between the time when house jobs were completed and the final decision of the doctor to follow a particular career in medicine. If it was possible to create a reasonably well paid job which a doctor could hold for one or two years and in which he could work in a number of departments of medicine it would be an advantage. There seemed, therefore, a need for a nationally organized locum

service which would supply suitable and appropriately qualified locumtenents on demand to the three branches of the service. They would be paid by the service and not by the individual users, who would be charged the economic amount to cover the approximate cost. The service should preferably be run by some body on which general-practitioner interests were predominant.

Dr. L. S. POTTER, medical director of the Medical Practices Advisory Bureau, said that he was not against the idea if anything could be done along these lines, but there were various difficulties. One of them was seasonal variation. The demand for locumtenents varied with the season, and it was exceedingly difficult to keep employed all who desired employment. He saw many difficulties in anything of this sort, and he thought it would require something stronger on the practical, rather than the theoretical, side before it could begin to work.

The CHAIRMAN said that to him it seemed that the scheme was more likely to fall down on finance than on any other point.

The document was received and referred to the appropriate subcommittee for further consideration.

Resolutions of Conference and A.R.M.

The Committee then addressed itself to the task of considering seriatim the action to be taken on certain of the resolutions of the Conference and of the Annual Representative Meeting.

On a resolution of the Conference referring to the Committee the opinion that regional hospital boards and boards of governors should not be permitted to announce the proposed closure of a hospital, or change of use, unless and until an independent inquiry had been held, Dr. SORSBY said that the time had come when no such change should take place without proper inquiry. This view was strongly supported by other members of the Committee, and by Professor P. C. P. CLOAKE, who recommended that it should be brought before the Liaison Committee.

Some discussion took place on a reference to Council by the Representative Body that general practitioners should be permitted to prescribe on Form E.C.10 for the replacement of appliances at present available only through the hospital service. Dr. SORSBY thought that this might well apply to certain appliances, but not to the majority. It was agreed that the final decision in such cases should rest with the consultants.

A resolution stressing the growing importance of geriatric units was endorsed, and the Committee agreed to urge the Council to keep these matters continually under review, and to take urgent action to ensure their implementation by the Ministry at an early date.

Poliomyelitis Vaccination

It was reported that on the invitation of the Ministry the Chairman and other members of the Committee had attended a meeting to discuss the means by which general practitioners might participate in the arrangements for poliomyelitis vaccination later this year. It was stated that it was hoped that regular supplies of vaccine would become available from the beginning of the new year, and these would be distributed to vaccinate, with two injections, all registered children in the local authority area. General practitioners were to be given an opportunity to take part in the vaccination scheme, and local health authorities were being asked to make arrangements accordingly. The medical officer of health should arrange to discuss the matter at an early date with representatives of the local medical committee. It was stated that it would be for each general practitioner to decide individually whether to take part in these arrangements. The vaccine would be obtainable from the local health authority and practitioners would be advised of the special storage arrangements.

A vote of thanks was accorded to Dr. A. B. DAVIES, the new temporary chairman, for his expeditious conduct of the meeting.

Scottish News

GENERAL MEDICAL SERVICES SUBCOMMITTEE (SCOTLAND)

The first meeting of the General Medical Services Subcommittee (Scotland) for the 1956-7 session was held in Edinburgh on September 25. Dr. C. J. SWANSON, Aberfeldy, and Dr. KATE HARROWER, Glasgow, were reappointed Chairman and Vice-chairman respectively.

Various subcommittees were appointed and representatives were elected to serve on other committees.

Prescribing Costs

A letter from the Department of Health concerning a proposed inquiry, on a United Kingdom basis, into prescribing costs was considered. After a lengthy discussion the Subcommittee expressed the opinion that, while they were in favour of the proposal to set up a committee of inquiry, any investigation into prescribing in Scotland should be carried out by a separate committee. It was accordingly agreed that the Department should be informed that an inquiry specifically concerned with conditions of practice in Scotland offered the best prospect of both eliciting the facts and suggesting effective action in Scotland. The Subcommittee were also of the opinion that the basis of the inquiry should be broadened to include prescribing throughout the Health Service.

Emergency Call Service

Information on an emergency call service which is operating in London was submitted to the Subcommittee, and they also had before them an excerpt from the minutes of the September meeting of the G.M.S. Committee in connexion with this matter. Concern was expressed about the possible development of a scheme of this kind in Scotland, because, in the Subcommittee's opinion, it would not be in the best interests of medical practice.

Mileage

Some members expressed disappointment at the lack of a settlement of the long-standing mileage question. It was agreed that the G.M.S. Committee and the Department of Health should be asked for a progress report.

Examination of Inflation

It was reported to the Subcommittee that the Department had been considering the possibility of executive councils removing from doctors' lists the "pre-adoption" names of those children who are adopted under a new name, as a means of reducing inflation. It was agreed that this might be discussed with the Department at the next routine meeting along with the original proposal regarding notification of change of name and/or address, further consideration of which had to be deferred until after the Annual Conference of Local Medical Committees in June last.

Regional Medical Office Service

Edinburgh Local Medical Committee submitted for the consideration of the Subcommittee a suggestion that space for the recording of the date of birth or age, as well as the diagnosis, should be provided on Form R.M.2A. This proposal was approved, and it was agreed to submit it to the Department.

Group Practice Loans

The Subcommittee agreed to a proposal by the Department to amend paragraph (d) of the first clause of the model agreement by adding a clause indicating that the consulting premises for which a loan had been granted could be used for any such other purposes as were provided for in the proposals approved by the Scottish Group Practice Loans Committee.

Correspondence

Was It a Drug?

SIR,—It really was cheering to read Dr. S. Edelman's letter (*Supplement*, October 13, p. 156) about the recent report which you printed in the *Supplement* on September 22 (p. 134). As the Dr. X concerned I should like to thank him. In particular, the penultimate sentence of his letter has a rhythm which enchants, and might become the fighting slogan of practitioners when we make our mass march into Savile Row. Thank you also, Dr. Edelman, for your sympathy. But I did not feel a bit like Alice in Wonderland, unless it was after the affair was over, when it seemed very like a caucus race. Maybe my colleagues would like to have a summary of how the case creaked its way from beginning to end.

1954. In March I twice prescribed "formulac" on E.C.10 forms. Four months later the local executive council sent me notice that the pricing bureau had queried the prescriptions and had referred them to the local medical committee. My comments were requested and I did not delay in sending them.

1955. In February (that is, six months later) the local medical committee gave their opinion that the preparation was a food, but very properly pointed out my right of appeal. I appealed within the month allowed and had a polite letter from the Ministry explaining that "it might be some time before the meeting can be arranged." They were right. There was silence for a year.

1956. In about March a long-distance telephone call to me brought a feminine voice from the Ministry of Health. I was to attend the hearing in Peterborough on a date in the near future. I replied that this I would do if the Ministry would pay my return fare, my expenses, and compensation for time spent away from the practice. The voice sounded shocked; no, that she could not at all promise. Then, I said, the Ministry had better fix a venue in Cambridge. We hung up in mutual sorrow. Three months later the appeal was held in Cambridge, with two doctors and one barrister-at-law as referees. As could be foreseen, they all were courteous, but with the barrister (who was chairman) I felt this courtesy covered a rather hostile forensic probing. One of the disturbing things was that, in my opinion, they did not seem to have an understanding of the preparation I had prescribed, of some of its ingredients, or of the principles concerned. Indeed, in the report they issued later they alleged that I advised the hiatus hernia patient to take his medicine in a recumbent position. (Can I sue for slander?) The chairman made several medical howlers and it was a privilege to correct him. Not until August (two months later) did I have the report that the appeal had been allowed.

One feels for the Ministry, whose two years of correspondence, move and counter-move, expensive telephoning, and employment of professional experts failed to save the 16s., which was the cost of the two E.C.10's. Of course, they will say that it is the principle which matters. Precisely; that is why I went to a certain amount of trouble to see this through. Please may I offer some advice to all future Dr. X's? (1) Never accept a pricing bureau or Ministry condemnation when you know you are in the right. (2) Insist on an appeal, and insist on its being held near your practice. (3) Always attend in person. Do not seek to be legally represented unless you are of an emotional nature and liable to throw things under strain. It is far wiser that you yourself should be able to explain various medical points as they arise. (4) Prepare your case in great detail and come armed with all the pharmaceutical information you can. But be relevant. Remember that the referees have to judge whether the substance was prescribed as a drug for the particular case under discussion, and not whether it can be considered as food or drug in general. (5) Never let the Ministry's ideas override your own considered opinion on how best to practise medicine.

I can reassure Dr. Edelman that I am unrepentant in my wickedness. Indeed, since the matter was brought up I have not hesitated to prescribe the very same preparation whenever I thought a patient really needed it.—I am, etc.,
Cambridge.

A. S. PLAYFAIR.

**SUPPLEMENT TO THE
BRITISH MEDICAL JOURNAL**

T. MOONEY.

WOOLWICH DIVISION.—At St. Nicholas' Hospital, Plumstead, S.E., Tuesday, October 30, 8 p.m., clinical meeting. Members of the Greenwich and Deptford and Dartford Divisions are invited.

BRITISH MEDICAL JOURNAL

Government Medical Officers in Cyprus	-	-	-	-	178
Correspondence	-	-	-	-	178
Diary of Central Meetings	-	-	-	-	180
Branch and Division Meetings	-	-	-	-	180

4. So far as the terms of these personal contracts relating to remuneration are concerned, therefore, they are merely the formal agreement with the individual members concerned of those particular rates of remuneration which, on the last occasion on which the basis of remuneration was reviewed in the light of the Spens recommendations, were found to accord with those recommendations. If, however, the Spens recommendations do in fact require some form of periodical adjustment of the scales of remuneration in certain events, and those events occur, effect would have to be given to that requirement, and the individual personal contracts would then have to be amended accordingly. This follows from the fact that continuing compliance with those requirements still remains as an overriding contractual obligation of the Government to both branches of the profession as a whole. In short, the requirements of the Spens recommendations, whatever they may be, remain at all times the paramount and governing consideration in relation to remuneration. The only question left is, What are the requirements involved in those recommendations?

3. This obligation is therefore a general overriding obligation to the profession as a whole, and one which exists independently of the particular obligations created by the personal contracts which serving members of both branches of the profession have entered into with executive councils, regional hospital boards, boards of governors, and hospital management committees, as the case may be. So far as the rate of remuneration is concerned, all that these personal contracts do, and all that they are intended to do, is to give the individual practitioner or consultant concerned that particular rate of remuneration which will, at the time when such contracts are originally entered into, or are subsequently amended, accord with the requirements of the Spens recommendations. Thus, following the Danckwerts Award, the rates of remuneration previously payable to general practitioners under their personal contracts for the years ending March 31, 1949, 1950, and 1951, were altered by

5. The vital question in issue here is whether the recommendations envisage and require periodical adjustments from time to time of the remuneration in the light of any subsequent changes in the value of money or increases in incomes in other professions that may occur, at any rate where these changes are of a substantial character. The profession submits that they do. On the other hand the view expressed by the Minister at the meeting on August 1, 1956, was that the Spens recommendations only settled the terms of entry into the Service, presumably meaning thereby that once the scales of remuneration (based on 1939 values) had been increased by whatever was the true "betterment factor" applicable at the date of the inception of the Service (July, 1948) there was then a full and complete

2702

implementation of the Spens recommendations as regards the "betterment factor," and no future or further adjustment under that head was either envisaged or required by those recommendations.

6. It is submitted that it can be clearly demonstrated that this view of the Minister is unsound, and that the profession's view is the right one. This can be done in three ways. First, by reference to the actual wording of the Reports and recommendations themselves; secondly, by reference to what has hitherto, and before the present differences arose, been clearly accepted by the Ministers themselves to be their true effect; and, thirdly, by reference to the construction placed upon those recommendations by Mr. Justice Danckwerts in making his award.

7. It is convenient to begin with the first Spens Report relating to the general practitioners. This Spens Committee was appointed in February, 1945, and their terms of reference required them:

(a) To recommend the range of total professional income of a registered medical practitioner in any publicly organized service of general practice; and (b) to frame their recommendations with due regard to the desirability of maintaining in the future: (i) the proper social and economic status of general medical practice (i.e., when operating in a publicly organized service), and (ii) its power to attract a suitable type of recruit to the profession (i.e., when operating in a publicly organized service).

8. Since it was common knowledge when the Committee was set up that the proposal was to bring such a publicly organized service into being as a permanent feature of our national life, but at some then unspecified future date, the wording of the terms of reference makes it abundantly clear that the ranges of professional income the Committee were asked to recommend should be such as would be likely to maintain the proper social and economic status of general medical practice, and its power of recruitment, not merely at the time when the service was brought into being but indefinitely in the future. Clearly, therefore, it was the Committee's task to produce a long-term policy, and the tenor of the whole of the wording of their Report shows that they understood that this was so, and framed their recommendations accordingly.

9. The Committee recognized, however, at the time when they reported, that there had been a change in the value of money as compared with 1939, and, further, that increases had "in fact taken place in incomes in other professions" (paragraph 6 of the Report). They confessed their inability to express an opinion as to what adjustments of pre-war incomes were necessary to produce corresponding incomes at the date of their Report, and therefore said that:

"Throughout this report our recommendations are, therefore, those which it appears to us would have been necessary for the purposes of our remit had we been reporting in 1939."

10. This method of approach provides a valuable clue to the intention of the Committee in relation to the specific scales which they subsequently set out in their formal recommendations. In effect what they say is that our task is to recommend scales which, after the National Health Service comes into operation and the general practitioners' section of the profession becomes engaged in it, will maintain both the proper social and economic status of that section, and also its recruiting power in the future. We were also directed to have due regard to normal financial expectations of general medical practice in the past, and, with the aid of statistics supplied by Professor Bradford Hill for the years 1936, 1937, and 1938 (see paragraph 6 of the Report), we find ourselves able to recommend what the scales of remuneration should have been if this had been 1939 instead of 1946. We will therefore begin with those 1936/1938 scales and first consider those figures (but still as if we were reporting in 1939 and not 1946) in the light of the two objectives of maintaining the proper social and economic status of the profession, and its recruiting power in competition with other professions, as well as in light of length of training period, danger to health, and other matters such as the degree of individual responsibility involved. On that footing their conclusion was (see para-

graph 8 of the Report) that these 1936/1938 scales showed in two respects that they were too low even in 1939, and they said:

"We consider that unless conditions are substantially improved in both these respects, and on the basis of a pre-war value of money, the social and economic status and the recruitment of general medical practice would not, in the long run, be maintained."

The Committee then indicated what adjustments and new scales would have been requisite in 1939 in order to obtain that substantial improvement which they considered necessary for the maintenance of both economic status and recruiting power; but they still did so purely on the basis of a 1939 standard in respect of both these matters, and quite independently of the further adjustments they indicated would also be necessary to translate those new scales into such others as the subsequent change in the value of money and the subsequent increases in income of other professions would make requisite.

11. It is clear, therefore, that what the Committee were in effect saying was this. Our task is to determine "what ought to be the range of total professional income of a registered medical practitioner in any publicly organized service of general medical practice"; that is to say, not merely at some specific time, but generally for the future. The ranges we are to determine must also be such that they will enable both the proper social and economic status of general medical practice and its power of recruitment to be maintained, not only presently but in the future as well. We in fact do this by determining what would have been the proper scales of net remuneration necessary in 1939 to satisfy these last-mentioned requirements, including the future element in them, and we must then leave to others the problem of the necessary adjustment of these scales to present conditions. Therefore, what we determine is that the proper scales of net remuneration in a publicly organized service of general medical practice should at all times be calculated by reference to the 1939 standards we have laid down, and therefore should at all times be whatever are the then equivalents of those 1939 scales, that equivalence to be determined by two factors—namely, the subsequent change in the value of money and the subsequent increases in incomes of other professions; and it is only in this way that the two objectives of maintaining throughout the future both the proper economic status and recruiting power of general medical practice as against other professions will be achieved (see the last sentence of paragraph 6 of the Report).

12. It is submitted that this conclusion is amply confirmed by the fact that in their terms of reference there was a specific direction to the Committee to have due regard "to the desirability of maintaining in the future the proper social and economic status of general medical practice and its power to attract a suitable type of recruit to the profession." These words can only mean that it was the duty of the Committee, in framing their recommendations, to ensure the achievement of these two objectives not merely at the inception of the Service but indefinitely in the future. The words "in the future" are not subject to any limitation, and it would be contrary to common sense and to all sound appreciation of the meaning of language to subject them to some arbitrary limitation which is not contained in the terms of reference themselves.

13. It is further supported by the wording of their first and principal recommendation, which reads:

"(1) A scheme should be devised which will ensure that between 40 and 50 years of age approximately 50% of general practitioners receive net incomes of £1,300 or over, and which will also secure, so far as practicable, that between 40 and 50 years of age approximately three-quarters receive net incomes over £1,000, that approximately one-quarter receive net incomes of over £1,600, that slightly less than 10% receive net incomes over £2,000 and that, in a small proportion of cases, it is possible to obtain net incomes of at least £2,500. . . . Here also, as in the body of the Report, we are expressing our recommendations in terms of the 1939 value of money."

Since this recommendation was expressed on that basis, and also on the basis of 1939 circumstances in general, it

is obvious that the two objectives of status and recruiting power which the Committee designed that it should achieve throughout the future would not in fact be achieved unless the proposed scheme in fact contemplated periodical adjustments for changes in the value of money and incomes of other professions as and when substantial changes of that kind occurred. Throughout the body of the Report the Committee constantly make reference to these two objectives, and it is unthinkable that having deliberately expressed their recommendations in 1939 terms, and as being subject to adjustment to present conditions, the Committee did not intend that these 1939 scales should always be paramount, and so therefore would require to be translated from time to time into such different sums as any subsequent changes of the nature in question might from time to time require.

14. It is also helpful to refer to two other passages in the Report (although there are many others) which demonstrate that, in relation to the two expressed objectives, the Committee must have had in mind the necessity for continuing periodical adjustment of their figures in the light of subsequent changes in money values and increases in other professional incomes:

(1) In paragraph 13 of their Report, the Committee say:

"If the recruitment and status of the profession are to be maintained men must be able to feel that more than ordinary ability and effort receive an adequate reward."

How can that be secured if a reward once fixed in terms of money is permitted to depreciate in real value because the value of money itself has declined, or if no account is taken of increases in incomes of competing professions?

(2) In paragraph 14 of their Report the Committee say that they do not think it necessary that the percentage of incomes over £2,000 should be increased, but that they think it is certainly necessary that this percentage should be maintained. The £2,000 is of course expressed in terms of the 1939 value of money. How can the desired percentage of such incomes be maintained in the absence of adjustments to deal with the changes in the value of money as they from time to time occur?

15. Finally, on this particular aspect of the case, it should be pointed out that the Committee were well aware of the possibility of one type of periodical adjustment that might from time to time become necessary. That is, in connexion with the ratio of practice expenses, to which reference is made in paragraph 21 of their Report. There the Committee point out that their recommendations (on a 1939 standard) are in terms of net, not gross, incomes. In fact, right up to the present day the necessity for periodical adjustment in respect of practice expenses has never been anything but clearly recognized by the Ministers, and the amount of these practice expenses is of course bound to vary with subsequent changes in the value of money as and when such changes occur. The gross amounts payable to practitioners in fact incorporate two factors—namely, a reasonable sum to cover expenses, and the amount they are to receive net for themselves. It would indeed be an odd result if one factor is clearly to take account of all subsequent changes in the value of money and the other is not.

Interpretation Hitherto Adopted by the Parties Themselves

16. In the first place reference can be made to the written "pleadings" of both sides in the Danckwerts adjudication in 1952, when the adjudicator was asked to "determine the size of the Central Pool," not merely at the inception of the service but for all years up to date, the last completed year then being the year ended March 31, 1951.

17. In paragraphs 37 and 38 of their written case before the adjudicator the General Medical Services Committee asked the adjudicator to fix the size of the Central Pool for the nine months ending March 31, 1949, for the year ending March 31, 1950, and for the year ending March 31, 1951. In paragraph 24 (b) they specifically claimed that the amount of the Central Pool as previously fixed for each quarter of

a year was wrong, because it took no account of the extent to which the "betterment factor" varied from quarter to quarter. In paragraph 25 (1), where they state that the amount of the "betterment factor" is one of the points in dispute, they clearly implied that this factor might be different for the different years concerned. It is also clear from paragraphs 38 and 39 that the General Medical Services Committee were contending that the "betterment factor" should be adjusted year by year from the inception of the Service onwards in the light of changes in the value of money, just as the amount paid into the Central Pool in respect of practice expenses requires to be adjusted year by year in the light of evidence as to the proportion of general practitioners' gross receipts which is absorbed by practice expenses. We have been unable to find anywhere in the written case of the Ministers, or in the reported speech of the Attorney-General, any point at which this principle of periodical and continuing adjustment was controverted. The argument of the Government on this part of the case appears to have been confined to disputing the quantum of the adjustments which ought to be made, the suggestion of the Government apparently being that, if the remuneration of the professions generally fails to keep up with the fall in the value of money, the remuneration of the medical profession should not do so either (see the shorthand notes: the Attorney-General at day 3, pages 24 and 40, and Mr. Grant's observations on the fallacies of such an argument at day 1, page 10, and day 3, page 44).

18. In fact, in paragraph 8 of the Ministers' supplemental case (which was a reply to the Committee's main case), it was merely objected by the Ministers that it was not practicable to make an adjustment for "betterment factor" at such frequent intervals as quarterly. The objection in this form is quite inconsistent with the view that, whatever adjustment of the "betterment factor" was to be made, it was a once and for all adjustment, because it amounts to a tacit admission that periodical adjustments are in fact required.

19. Bearing in mind also that the adjudicator was asked to determine the size of the Central Pool for all years up to date, it is not without significance that, in paragraph 49 of their written case, the Ministers gave particulars of the periodical changes in the value of money during the period from July, 1948, up to December, 1951, and also in the Price Index figures from June, 1947, to December, 1951. In paragraph 56 (in relation to increases in incomes of other professions) they also gave the different increases for different dates. Surely these varying figures would have been put forward on the footing that a different "betterment factor" might be shown to apply to each of the separate years concerned in the adjudication.

20. An equally important admission is to be found in the evidence given by Mr. Danielli (Deputy Accountant-General to the Ministry of Health) at day 2, page 49, during his re-examination by the Attorney-General. He was dealing generally with the question of the method of calculating the amount of the Central Pool, and how it was to be done after the adjudication was over. He was asked to explain it in more detail and the answer he gave was:

"What I had in mind was this. After this adjudication was over and the adjudicator had given us a figure which he regards as an appropriate one for the Central Pool, then that figure would be taken as the basis of our pool payments and adjusted to take account of changes in the population year by year, adjusted at certain intervals which we should have to agree with the profession, because you cannot do this sort of thing every five minutes to take account of a major change in practice expenses and again at intervals to take account of any future major change in, shall we say, the value of money. That is what I think we had in mind."

21. That this was no slip on Mr. Danielli's part, but a completely accurate statement, is confirmed by the N.H.S. (General Medical and Pharmaceutical Services) Regulations, 1954 (S.I. No. 669 of 1954), and the March 31, 1955, edition of the Ministry of Health Handbook for General Medical Practitioners. In the case of general practitioners the major

part of their remuneration consists of a capitation payment. This may be enhanced by an additional capitation payment called a "loadings payment," and paragraph 1 of Part II of the First Schedule to those Regulations provides that the amount of both those capitation payments is to be determined by the Minister after consultation with the general practitioners' organizations. Paragraph 178 of the *Handbook* then states that these capitation payments are made out of the Central Pool, and it also states that the method of calculation of the Central Pool was revised as a result of the Danckwerts adjudication in 1952. Paragraph 179 of the *Handbook* then goes on to say that the Central Pool is now calculated on the basis of the net remuneration appropriate for general practitioners in 1939 (as recommended by their Spens Committee in 1946) *together with a betterment factor taking account of changes in the value of money since that time*. It also states that this amount is then adjusted to take account of changes in the number of general practitioners, their estimated practice expenses, their estimated remuneration from other sources, and the superannuation contributions made by the Exchequer. Paragraph 180 of the *Handbook* then goes on to say that, after the payments derived from the Central Pool have been made, any balance of money in the Pool at the end of each financial year is "distributed to doctors in proportion to their respective earnings by way of capitation fees and loadings"; in other words, by way of an additional capitation payment.

22. The significance of this is clear. The major ingredient in the total remuneration payable to each practitioner is obviously the capitation payment, whether general, "loading," or residual. But, since the actual amounts of these capitation payments are not specifically fixed by the Regulations and are payable out of the Central Pool, it must follow that their amount for any year will in the end always depend upon, and be conditioned by, the total amount of the Central Pool itself for that year. And since, as stated in paragraph 179 of the *Handbook*, the amount of the Central Pool itself for every financial year is now to be calculated for that year in accordance with the Spens recommendations of 1946 (including a betterment factor taking account of changes in the value of money since that time), it must equally follow that if and whenever such changes occur the amount of the Central Pool and consequently the capitation payments will change to a corresponding extent. This is therefore what is now publicly represented by the Minister in his *Handbook* to be the present position, and it is in complete accord with the profession's view, and contrary to the view expressed by the Minister at the meeting on August 1, 1956.

Interpretation Adopted by the Adjudicator

23. In his opening speech in the adjudication proceedings (day 1, page 4) Mr. Grant suggested that the Adjudicator might deal with the need for periodical adjustment by laying down a formula. To this the Government objected, but it is quite clear that the objection was not based on the contention that periodical adjustment is wrong in principle (see Mr. Danielli at day 2, page 49, and the Attorney-General at day 3, page 41). Mr. Grant returned to the point at day 3, pages 42 and 43. At the top of page 43 the Adjudicator says that he might have to indicate the appropriate betterment factor for a year earlier than the year ended March 31, 1951. Mr. Grant, agreeing, says that it would be a different figure, and the Adjudicator says: "That is what I had in mind." Thus the Adjudicator was asked (and without any objection from the Government) to indicate not only the appropriate betterment factor for the year ending March 31, 1951, but also that for an earlier year—that is to say, on the basis that this factor might be a different one for different years. This in fact was precisely the basis on which the Adjudicator proceeded in making his award, his betterment factor for the year ended March 31, 1951, being 100% and his betterment factor for 1948 being 85%. The Adjudicator's award is thus a clear and

binding decision, as between the Government and the medical profession, that on the true construction of the Spens Report it requires periodical adjustment of general practitioners' net remuneration in the light of any then changes in the value of money and the incomes of other professions.

24. The Government accepted the results of the adjudication; and as already indicated the current edition of the *Handbook for General Practitioners* (revised to March 31, 1955) states the present position with regard to the betterment factor as one which takes account of changes in the value of money since 1939.

Consultants and Specialists

25. It can now be fairly briefly demonstrated that continuing periodical adjustment of remuneration, in the light of changes in the value of money and changes in incomes in other professions, is also required by the Report of the Spens Committee on the Remuneration of Consultants and Specialists.

26. That Committee was appointed in May, 1947. It also was directed by its terms of reference to have due regard (*inter alia*) "to the desirability of maintaining the proper social and economic status of specialist practice and its power to attract a suitable type of recruit, having regard to other forms of medical practice." These words can only mean that it was the task of the Committee (as it was the task of the corresponding committee on the remuneration of general practitioners) to produce a long-term policy, and again the report of the Committee shows clearly that they addressed themselves to that task.

27. Here also the Committee were instructed to have due regard to what had been the financial expectations of consultant and specialist practice in the past, and they also began with statistics prepared under the guidance of Professor Bradford Hill as to the professional incomes of consultants and specialists in the pre-war period. Although they did not report until May, 1948, they also framed their recommendations in terms of the 1939 value of money, with an almost identical provision as to the adjustments that would be necessary in view of the change in money values and the increases in incomes of other professions. Thus, paragraph 2 of the report concludes with these words:

"We leave to others the problem of the necessary adjustments to present-day values of money, but we desire to emphasize as strongly as possible that such adjustments should have direct regard not only to estimates of the change in the value of money but to the increases which have in fact taken place since 1939 in incomes both in the medical and other professions. In our judgment it is only if corresponding changes are made in the incomes of consultants and specialists that the recruitment and status of the various branches of specialist practice will be maintained."

28. Here again the adjustments the Committee must have had in mind would be those for the time being necessary to maintain the 1939 standards they were laying down, because their recommendations are that all the various grades of practitioners with whom they are concerned "should receive" (which must mean should receive at all times during the existence of the Service) certain specified salaries, which were, however, expressed in terms of the 1939 value of money. It is impossible to give effect to recommendations framed in these terms without continuing periodical adjustment of the actual salaries for the time being paid if those salaries do not at that time properly represent the same salaries expressed in 1939 value of money. Moreover, this requirement must have been an inherent part of the Committee's recommendations, otherwise those recommendations would not have been consistent with the terms of reference of the Committee, because (1) they would have ignored the problem of maintaining the proper social and economic status of specialist practice and its power to attract a suitable type of recruit, and (2) they would have been inconsistent with the recommendations (by that time accepted by the Government) of the Committee on the remuneration of general practitioners. So far from ignoring

the need to keep a proper balance between general practitioners and consultants, the Committee had the point well in mind, as is apparent, for instance, from the second sentence of paragraph 11 of their Report.

29. In fact, the need for continuing periodical adjustments can be shown to be implied in the wording of the Committee's Report, and two examples may be sufficient for this purpose:

(1) In paragraph 9 of their Report the Committee say that in arriving at their recommendations for potential specialists they had in mind that intending specialists who do not possess private means should not be called upon to pass through a stage of comparative penury and hardship or be tempted to spend too much time in supplementing their income from other sources. How can these objectives be secured if the scales which the Committee have fixed are not subject to adjustment from time to time for changes in the value of money?

(2) In paragraph 12 of their Report the Committee justify a maximum figure of the order of £5,000 for clinical work by saying that "if the best possible recruits are to be attracted to specialist practice there must remain for a significant minority the opportunity to earn incomes comparable with the highest that can be earned in other professions." How can this opportunity be preserved if the cash remuneration of that minority of consultants and specialists is not adjusted by reference to changes in the value of money and the effect of such changes on the remuneration of other professions? And how in the absence of such adjustments would it be possible to achieve the Committee's declared object of maintaining the position of British medicine in a competitive market which the Committee pointed out includes the Dominions and the United States of America?

Conclusion

30. Having regard to all the above considerations, therefore, it is submitted that the profession's view on the vital point in issue is right, and that neither in the Reports themselves nor in any of the attendant circumstances in general can any support be found for the contrary view expressed by the Minister at the meeting on August 1, 1956.

EXECUTIVE COUNCILS ASSOCIATION (ENGLAND)

MINISTER AT ANNUAL MEETING

The annual meeting of the Executive Councils Association (England) was held on October 18 and 19 at the County Hall, London, under the presidency of Brigadier W. LESLIE, of Cornwall.

The Conference was addressed by the Rt. Hon. R. H. TURTON, Minister of Health, for the first time since his appointment. He said that when he arrived at his office he found piles of regulations, amending regulations, and amendments amending the amended regulations on every conceivable subject dealt with by executive councils, and a spring-cleaning operation was started to consolidate them. The changes were the result of long and detailed consultations with representatives of the professions engaged in the Service, and he thanked them for their help.

Referring to the conclusion of the Guillebaud Committee that the basic structure of the Health Service was sound, Mr. Turton said that the Government had accepted this conclusion, but, he added, the machinery should be improved. The Committee had acquitted the Health Service of any charge of widespread extravagance, but it was undeniable that the Service had suffered from the country's financial difficulties, and the finding that the level of hospital capital expenditure was well below the pre-war level should remove all complacency from the outlook. His own task was to repair the deficiencies of the Service at a time when the need to economize was greater than before.

The General Practitioner

Generally, continued the Minister, he made it a rule not to deal with questions of remuneration on these occasions, but because there seemed to be some widespread misunder-

standing about the doctor's pay claim he would do so. He then made the statement reported in last week's *Supplement* (page 167). He felt so strongly that the general practitioner was the pivot of the whole Health Service that he regretted that there should be any feeling that he was guilty of ingratitude.

The success of the home health service, Mr. Turton went on, depended on the clinical leadership of the general practitioner, who, for his success, required a team to help him. The key to that success lay in the relations between the general practitioner and other members of the team. The Cranbrook Committee was appointed to review the present organization of the maternity services, which were an example of the difficulty of making the services work as one.

Cost of Drugs

The examination of prescriptions for the first four months of this year showed that in every case there was an increase in cost compared with last year. In April, 1955, the average was 4s. 3½d.; in April this year over 4s. 7½d.

The Minister propounded four questions, the answers to which, if known, might help in finding a new approach to the problem. These were: Does the instruction and training of the medical student and young doctor sufficiently arm him to face the difficulties of present-day prescribing? What is the influence exerted by the hospitals, both on young doctors and on doctors established in practice whose patients are referred to hospital? Should more be done about pressure from patients? What about the pressure on the doctor of the modern methods of salesmanship which the drug houses bring to bear on him?

Health Service Through the Ages

Brigadier LESLIE, in his Presidential Address, first traced the concern of nations for the health of their peoples from the dawn of written history. Looking to the future in this country, he said that the cure of disease was often an expensive process to the nation, as regards both cost of treatment and loss of productive working hours. There was still a great deal of sickness-incidence which might be prevented. The general-practitioner service could, and would if it had the time, do much to educate the public in health matters. With a list of 3,000 patients the general practitioner had all he could do to attend to the immediate needs of his patients; he had no time to do more than the actual treatment demanded. He would like to see a considerable reduction in the numbers of patients for whom the general practitioner was responsible, subject to adequate financial adjustments. By giving more time to the general practitioner to instruct his patients in even the rudiments of preventive medicine, extra expense incurred by the financing of the Health Service would be more than offset by a decrease in the number of working hours lost through illness, and a considerable fall in the drug bill.

FEES FOR LOCAL AUTHORITY WORK

The Association has requested the Associations of Local Authorities to open negotiations on a revision of the part-time fees agreements of 1947 and 1951 on the remuneration for medical practitioners undertaking work for local authorities. It has now been agreed that these negotiations should take place in a special subcommittee of Committee C of the Medical Whitley Council, and the first meeting will be held during November.

The Ministry of Health has notified executive councils (E.C.L. 56/56) that members of executive council staffs who are Army reservists and are called up for service under the arrangements recently announced in Parliament should be regarded as eligible to receive the balance of civil pay under Section 46 of the Reserve and Auxiliary Forces (Protection of Civil Interests) Act, 1951.

PRIVATE PRACTICE

The Private Practice Committee of the Association met on October 17, when Dr. ALEXANDER BROWN, Linton, Cambridge, was re-elected chairman for the ensuing session. The Committee appointed Maritime, Forensic Medicine, G.M.C. Elections, and Private Beds Subcommittees.

Drugs for Private Patients

A joint meeting was arranged at the invitation of the General Medical Services Committee to discuss the matter of drugs for private patients. Action was initiated in connexion with various resolutions of the Representative Body. Problems arising from the medical examination of elderly drivers are to be discussed with the Accident Offices Association. The appropriate associations of local authorities are to be invited to consider the new scale of payments to practitioners called in by the police. Legal advice is to be sought concerning the responsibility for doctors injured while attending accidents.

Car Parking

A reply from the chairman of the expert committee on car parking in Central London to the representations made on behalf of the medical practitioners in the area was considered, as were other matters relating to traffic problems, including the use of special car labels and a report of the recent public inquiry in Wolverhampton at which the local profession had had legal representation provided by the B.M.A. It was decided that no immediate action was called for, but that the position in both areas should be watched.

Approved Schools

Information had been received from a number of medical officers of approved schools which led the Committee to decide to seek forthwith an increase of the remuneration for duties at these schools, which fall outside the scope of the National Health Service.

Hire Purchase Restrictions

It was reported that, as a result of representations made by the Association, the Board of Trade is to permit hospital patients to hire television sets for shorter periods than nine months.

Matters which are still under consideration by the Committee include the remuneration of medical officers of private and public schools, and the stamping of the names of private practitioners on National Insurance certificate forms.

GOVERNMENT MEDICAL OFFICERS
IN CYPRUS

PAY DISPUTE SETTLED

New salary scales for Government medical officers in Cyprus have been agreed upon between the Government of Cyprus and the Cyprus Branch of the B.M.A., with the concurrence of the Association's Overseas Committee. This ends a pay dispute between the B.M.A. and the Government of Cyprus which has been going on since 1951. Advertisements for posts in the island have been the subject of an *Important Notice* in the *Journal* since May, 1953.

The new salaries, which were introduced in September and are retrospective to January 1, 1956, are as follows: senior specialists, £1,900 (fixed); specialists and district medical officers, £1,452 by £48 to £1,644; medical officers class 1, £1,236 by £42 to £1,404 by £48 to £1,548; medical officers class 2, £900 by £30 to £1,020 by £36 to £1,200.

Expatriate officers receive an additional allowance of 20% of salary. Consulting practice is also allowed, and negotiations are still in progress on the proportion of fees which may be retained by the medical officer.

Correspondence

Because of heavy pressure on our space, correspondents are asked to keep their letters short.

Senior Registrars and Consultant Appointments

SIR,—The subject of increased consultant appointments is certainly a very important one in which many of us are interested. However, it would be a pity if the real issues were obscured by Dr. Horace Joules's letter (*Supplement*, October 20, p. 163). My own experience, in the same hospital region as Dr. Joules, is that the patients' position is nothing like so black as he paints it. In most specialties patients are given early appointments and are admitted expeditiously. I could name several hospitals in which surgical patients are given a date for admission when they are first seen, and where it is exceptional for any patient (other than by his own personal choice) to wait longer than six weeks for even a minor operation.

The North-West Metropolitan Region is probably better supplied with hospital beds than any other region in the country. It may be that more beds are still needed in some areas for some specialties; but, by and large, the problems are due to having beds in the wrong places and also to the uneconomic and inefficient conditions under which many hospitals are compelled to work. Despite this, one is surprised to find how well many of these institutions are coping with their difficulties. Whilst not everyone would support the recommendations of some of the Ministry working parties (many of which had too little time to investigate the real problems of the areas they visited), I am sure that there are many hospitals which could provide more consultant posts. The late Mr. Philip Mitchiner (who was a member of one of the Ministry working parties) told me about the serious shortage of consultant staff in some of the hospitals he had visited. In particular, he mentioned many of the former county council hospitals, in which we agreed that much excellent work was being done under very great difficulties. I note that there are still shortages of staff in many of these hospitals, but I have always understood from the regional boards that their failure to make new consultant appointments was largely attributable to insufficient money being available. I cannot agree with Dr. Joules that the medical profession has resisted the making of new appointments. On the contrary, in all types of hospital and in all types of medical committee I repeatedly hear the strongest possible expressions of opinion about the need for more consultant staff in many branches. There is also widespread criticism of the tendency of the regional boards to secure labour on the cheapest possible basis.

Dr. Joules does singular disservice to his professional colleagues by the tone and gravamen of his letter. His imputations about part-time consultants and the Central Consultants and Specialists Committee are unworthy of the high position which Dr. Joules holds. I myself know many whole-time consultants who do far fewer hours of work for the hospital service than their part-time colleagues. But the conditions in various specialties are so different that it is often unwise to draw such comparisons. It is surely better to subdivide doctors (like the rest of mankind) into good, mediocre, and bad, and to admit that all varieties can be found everywhere. Fortunately, however, ours is still a profession with a high sense of vocation and sound traditions, and most of us try to do our best despite the discouraging conditions with which we are often faced.

The whole of Dr. Joules's letter, but especially the last paragraph, strikes one as sanctimonious and prejudiced. Surely, Sir, if any cynicism exists it is abundantly demonstrated in Dr. Joules's own letter?—I am, etc.,

Radlett, Herts.

R. S. MURLEY.

What is Excessive Prescribing?

SIR,—With reference to the points raised by Dr. P. R. Myerscough (*Supplement*, October 13, p. 155), I do not defend extravagant prescribing. My thesis is that extravagance in prescribing consists, in the main, in writing too many prescriptions and ordering unduly large quantities; and that the discriminating use of "expensive" drugs may, in the long run, prove an economy. "Costly" and "extravagant" are by no means synonymous terms, as the Treasury would have us believe.

With regard to the hospital figures, I remarked that the data were not conclusive, but they seemed to suggest a possible correlation between drug costs and length of stay which is worth fuller investigation. Dr. Myerscough's alternative suggestion may be correct, or may be a contributory factor—the data are not sufficient to decide one way or another. Hence the need for further analysis.—I am, etc.,

Horsham, Sussex.

F. F. MARCHBANK.

Admission to Hospital

SIR,—Dr. C. J. Cobbe's letter (*Supplement*, October 20, p. 165) seems to require some explanation from the emergency bed service. It is true that the E.B.S. is reluctant to accept cases from anyone other than the doctor who has seen the patient, 18 years of experience having shown that to do so results in confusion and difficulty. As the patient was not in hospital, the house-physician should have asked Dr. Cobbe to refer the case to the E.B.S. himself.

Our records show that the house-physician, to whom Dr. Cobbe refers, telephoned the service at 2.46 p.m. to ask for the case to be admitted to some other hospital. Our operator said that she must speak to the patient's doctor first, and at 2.48 p.m. she rang Dr. Cobbe's house. The number was engaged and she rang again at 2.51 p.m. and spoke to Mrs. Cobbe, who had no knowledge of the case. As the case clearly admitted of no delay the operator rang the hospital at 2.53 p.m. and decided to take on the case at once, even though it was not possible to speak direct to Dr. Cobbe. At 2.55 p.m. Mrs. Cobbe kindly rang the service to give information she herself had obtained from the hospital. The service then rang eight hospitals in turn, asking them to admit the patient, and the eighth accepted at 3.34 p.m. An ambulance was called, and at 3.43 p.m. Mrs. Cobbe was informed of what had been done. At 3.50 p.m. Dr. Cobbe rang the service and thanked it for its help.

The fact that it took over half an hour to find a bed, though to be regretted, was unavoidable, but, since the hospital which the patient had been attending apparently did not think that the urgency of the case warranted setting up an extra bed, the service could hardly insist on another hospital doing so. The service therefore made persistent inquiries until a hospital was found which would voluntarily accept the case. This is what took the time.

As to the extraordinary statement that a hospital "had to ask leave of the E.B.S. to take a patient into their own hospital," I can only say that it is wholly untrue.—I am, etc.,

G. F. ABERCROMBIE,

Chairman,

Emergency Bed Service Committee.

London, S.E.1.

SIR,—On reading the letter of Dr. C. J. Cobbe (*Supplement*, October 20, p. 165) and in fairness to the emergency bed service I should like to relate the following experience.

Early this year I was called to see a patient who showed signs and symptoms of a perforated duodenal ulcer. I phoned the E.B.S. from the patient's home asking for urgent admission. Before I had finished writing the letter to the hospital admitting officer the E.B.S. had found a bed at the local teaching hospital and had ordered the ambulance. On leaving the patient five minutes later I was met by the ambulance-men carrying the stretcher upstairs. In my experience this is not an isolated case of E.B.S. efficiency.

On the rare occasions when I have tried to get a patient admitted to hospital without calling on the E.B.S. there has

always been a delay of at least half an hour before the admitting officer could be contacted. In my opinion this is a waste of time, particularly as one can always state a preference for a particular hospital when giving the details to the E.B.S., which I consider a most useful institution.—I am, etc.,

London, W.8.

P. F. LISTER.

Remuneration Claim

SIR,—Dr. M. Curwen's letter on unity in the profession (*Supplement*, August 25, p. 110) should be heeded, but it does not analyse the causes of the situation. Although England is 13,000 miles and 5 months away from me now, recent reaction to the Minister's cunning manoeuvre shows that doctors labouring in the N.H.S. are still as I remember them—frustrated and jealous of each other. One of the few letters you have published from junior G.P.s was mine (*Supplement*, April 28, p. 251), and it may have prompted Dr. Curwen's comment that we "must realize that there is nothing new in having to make do on a small income in one's early years of practice." Surely we all accept that, but before 1948 one factor keeping the income small was the necessity for the purchase of a share of goodwill, and this did mean that after a while the conscientious and popular G.P. owned something of substantial value which had been and could be increased. Now the junior partner has to buy his way into a practice, in effect, by accepting a small share of the income and doing a large share of the work, but at the end of that stage he owns nothing but the right to employ a younger man in the same way. He cannot move to another town without starting at the bottom again.

Practitioners who were principals before 1948 feel, illogically but naturally, that the young partners are being given something for nothing. Incidentally, many laymen have told me they cannot believe that doctors in England are as poor as they claim when they see most of them driving expensive cars.

Young medical friends to whom I have written in the old country are highly impressed when they read that here G.P.s do operations, give anaesthetics, and take x-rays. To do so in the N.H.S. merely takes up time and increases expenses for no financial return. As a result, there is no comparison between the standards of general practice in the two countries.

Payment by service and the right to buy and sell goodwill are two basic essentials which will have to return to make the N.H.S. tolerable.

If any of your readers remain complacent, a brief taste of freedom in a country such as this would certainly change their views.—I am, etc.,

Victoria, Australia.

ARNOLD GEORGE.

Remuneration of S.H.M.O.s

SIR,—In my letter on S.H.M.O. remuneration (*Supplement*, October 20, p. 164) I stated that prior to 1954 the maximum salary of an S.H.M.O. was 70% of that of the consultant maximum. The figure should have been 64%, as the consultant maximum at that time was £2,750. The falling ratio in earnings has therefore existed since the inception of the scheme.

Dr. H. G. McGregor (p. 159) discovered in the S.E. Metropolitan Region that as many senior registrars become S.H.M.O.s as consultants. These well-qualified and well-trained recruits to the S.H.M.O. grade become dissatisfied when they realize that their more fortunate colleagues receive increments $2\frac{1}{2}$ times their own, and that as a result their salary ratio will fall from 75% to 64%.—I am, etc.,

Swansea.

J. H. THOMAS.

SIR,—I should like to congratulate Dr. J. H. Thomas on his masterly review of S.H.M.O. remuneration (*Supplement*, October 20, p. 164). He has lucidly exposed the injustice of the present salary scale, which lets a young S.H.M.O. start on a salary amounting to 75% of a consultant's of the same age, and yet after ten years' experience awards him

D. R. THOMPSON.

present. The following films were shown at the conclusion of the business: "Nephrosis in Children," "An Effective Burn Treatment," "Gait," "How to Catch a Cold."

2703

OPHTHALMIC GROUP COMMITTEE

The first meeting of the new session of the Ophthalmic Group Committee was held on Friday, October 12. Mr. O. GAYER MORGAN was re-elected chairman of the committee, and he welcomed two new members, Mr. Ramsay Garden and Mr. J. Gibson Moore. The chairman was reappointed representative of the committee on the Central Consultants and Specialists Committee, and Mr. W. H. Whiting as representative on the Central Medical Recruitment Committee.

Information to Opticians

The committee considered a request that opticians should be supplied by the hospital ophthalmologist with information about the diagnosis and disposal of cases referred by them to hospital through the patient's family doctor. If such information could be supplied, should the prior consent of the patient be obtained? It was reported that the Central Ethical Committee had considered the matter and come to the conclusion that it would be essential to obtain the consent of the patient and the ophthalmologist before steps were taken to transmit the relevant information to any optician, and failure to adopt this procedure would be highly unethical. A second point to be considered was the burden and expense to the hospital service of writing two letters for every patient. It was pointed out that only the general practitioner could refer a patient to hospital and that the ophthalmic specialist should reply only to the general practitioner, who presumably would exercise his discretion with regard to the optician who had referred the case to him. It was agreed to inform the Ethical Committee accordingly.

Sight-testing of Dependants of Service Personnel

The Committee heard with satisfaction of the proposal of the Ministry of Health that in future the Supplementary Ophthalmic Services machinery should be available to dependants of Service personnel who had been given sight tests by Service ophthalmologists not on ophthalmic lists and who wished to obtain glasses from civilian opticians subject to the conditions and charges applying to the Supplementary Ophthalmic Service. Special forms generally similar to O.S.C.2 (but different in colour) would be issued to ophthalmologists by the Service departments, who would indicate the Service authority for paying claims. The executive council should check the claim forms in the normal way and forward them for payment to the appropriate command or unit. The applicant would pay the optician a charge similar to that authorized by the National Health Service Act, 1951, but O.S.C.15 should not be used for a receipt. The Service ophthalmologist was to be advised of the general conditions which would apply to the testing of sight and the supply of glasses in the National Health Service. It was not anticipated that there would be many cases falling under these arrangements, which would, at the outset, be confined to dependants of men in the Army and Royal Air Force.

Procedure for Investigation of Complaints

It was reported that the Minister of Health had recognized the British Medical Association and the Faculty of Ophthalmologists jointly as an organization for the purpose of making the appointment of ophthalmic medical practitioners to ophthalmic investigation committees. It was also stated by the Ministry that it was likely that these committees would be reappointed annually.

Flat Lenses

It was reported by the Ministry of Health that most of the manufacturers of flat spectacle lenses had announced their intention to cease production of these lenses on September 30, and that the Ministry was going into the

matter with a view to deciding the best method of providing for the change without waste of existing stocks of flat lenses or causing inconvenience to the public and others. The views of the Group were asked for in view of the possible effect of the development on prescribing by ophthalmic medical practitioners. As there appeared to be no adequate alternative source of supply arrangements were being discussed on the assumption that curved lenses would ultimately be provided under the National Health Service, except when flat lenses were advantageous to the patient. Steps were being taken to even up the stocks of prescriptions available, and an amended statement of fees and charges would be issued to come into operation at an appropriate date.

At its last meeting the committee considered a draft revised O.S.C.2 form and put forward various suggestions to the Ministry, some of which had been accepted.

COLLEGE OF GENERAL PRACTITIONERS

MEMORANDUM ON MATERNITY SERVICES

The Council of the College of General Practitioners has submitted a memorandum to the departmental committee of inquiry into the maternity services in England and Wales (the Cranbrook Committee). The College's evidence was prepared by a special committee under the chairmanship of Dr. ANNIS C. GILLIE.

The tenor of the memorandum is that the maternity services would be co-ordinated and improved if general practitioners were encouraged, and given the opportunity, to assume greater responsibility for pregnant women. Views on administrative arrangements are not expressed, the council stating that it has concentrated upon the ways in which the general-practitioner obstetricians can most help their patients clinically.

Recommendations

The closely reasoned arguments conclude with the following recommendations:

That if the family doctor does not wish to attend his patient during delivery he should himself make the necessary obstetric arrangements, and keep in touch with the mother before and after the baby is born.

That in order to maintain their skill general-practitioner obstetricians should be able to admit their patients to hospital and attend them there, with consultant advice whenever this is required. Maternity units with general-practitioner beds should be established where they are lacking.

That the staffing of local health authority antenatal clinics should be by general-practitioner obstetricians; and that health visitors and midwives should attend antenatal and post-natal sessions conducted by doctors in their own surgeries. Further thought should be given to the development of educational and training facilities at local health authority antenatal clinics.

That young practitioners who have not had the benefit of a resident hospital post in obstetrics should be encouraged to achieve obstetric skill by all other possible means.

That particular attention should be directed to schemes which involve admitting patients to hospital for delivery and returning them to their own homes during the next few days.

That an obstetric record card should be used by general practitioners.

That integration of the three parts of the maternity service, which is vital to the interests and security of the mother, should be secured by the family doctor, and that opportunities for his or her contact over patients with the midwife, health visitor, and specialist obstetrician should be developed in every possible way.

TRAINING OF HOME NURSES

A committee is to be set up to consider schemes for the training of home nurses to be submitted by all the training bodies, and to advise the Minister of Health whether he should approve them. In announcing this plan at the annual general meeting of the Queen's Institute of District Nursing held in London on October 30, the Minister said that such schemes would have to be of a minimum length of four months, or three in the case of nurses having certain qualifications and experience. Nurses trained under approved schemes will receive certificates to that effect.

The Minister said he believed one effect of this policy would be that a number of nurses not at present able to get training, because they were employed by local authorities who were neither members of the Institute nor served by associations affiliated to it, would now be able to attend courses approved by the advisory committee. He recalled the Working Party's report on the training of district nurses (see *Supplement*, September 10, 1955, p. 63), which stated that about half the registered nurses in the home nursing service had had no special district training.

Proposing a vote of thanks to the Minister, Mr. A. H. M. Wedderburn, chairman of the general executive committee of the Queen's Institute of District Nursing, said that he had "sounded the death-knell of one of the most cherished ideals of the Queen's Institute." Their earnest hope had been that there should be officially recognized a single and high national qualification for the district nurse. He deplored the fact that there was to be an officially blessed alternative—a "semi-processed article"—to the Queen's training. He reaffirmed the opinion expressed in the minority report of the Working Party, signed by members of the Queen's Institute, that the shorter courses recommended in the majority report were insufficient fully to equip the district nurse without the omission of one or other essential aspect of the minimum content of training agreed to in the majority report.

N.O.T.B. ASSOCIATION

At a meeting of the Council of the National Ophthalmic Treatment Board Association, held on October 12, it was agreed that more should be done to keep the general practitioner fully informed of the facilities available under the supplementary ophthalmic service, particularly the medical eye centres sponsored by the association.

The council received a satisfactory report on the inspection of three N.O.T.B. medical eye centres. These inspections are carried out from time to time by the medical appointments committee without prior notification.

TRADE UNION MEMBERSHIP

The following is a list of local authorities which are understood to require employees to be members of a trade union or other organization:

Metropolitan Borough Councils.—Fulham, Southwark.
Non-County Borough Councils.—Crewe.

A Ministry of Health memorandum (H.M.(56)86) to hospital authorities explains that resident and non-resident hospital staff, if not exempted, are liable to pay the prescription charge for drugs and dressings supplied by the hospital unless they are admitted as in-patients. It is stated, however, that no charge should be made if drugs are administered on the hospital premises as part of immediate treatment to staff who have an accident or become ill on duty; but if further supplies are needed for follow-up treatment at home or in residential quarters the charge becomes payable.

Correspondence

Because of heavy pressure on our space, correspondents are asked to keep their letters short.

The Thinking Public

SIR,—Surely it is time that the politicians and the general public realized that the health scheme is functioning comparatively well only through the unflagging efforts of the grossly underpaid hospital staff and the determination of the general practitioners not to allow the work to overcome them.

On being informed one morning by a frequent attender that she had been waiting half an hour in my surgery, I remarked that general practitioners were overworked and underpaid. After careful consideration of my question as to how much she thought we were paid per patient per year, she replied £10 to £12. Such a reply certainly surprised me, so during the course of the following week I asked the more intelligent patients what they thought a G.P.'s remuneration per patient per year was, and the lowest estimate given was £5 to £6 and the highest (on two occasions) was £20. My hairdresser, who said he could do 100 haircuts on a busy day, thought we received £6.

Further inquiries revealed that some patients thought we were paid for each visit and consultation, and others that, in addition to our capitation fees, etc., the benevolent Government paid for our cars, petrol, dispenser, receptionist, and cleaner.

Taking into consideration the overall number of visits and consultations given each patient yearly, 30s. would, in my opinion, be very reasonable indeed.—I am, etc.,

Chesterfield.

K. E. McIVER.

Keeping Up With the Times

SIR,—The Joneses are out of sight. The Government publication *Annual Abstract of Statistics* published recently shows that wages have increased between 1938 and 1955 from £1,920 million to £6,750 million, an increase of approximately 250%, and salaries from £910 million to £3,380 million, a matter of approximately 266%. We may make *The Times* newspaper a present of its figure of 137% as our own increase, and still say that justice has not been done to us.—I am, etc.,

Launceston, Cornwall.

DONALD M. O'CONNOR.

Recruitment to the Dental Profession

SIR,—The report of the Committee on Recruitment to the Dental Profession will be welcomed by many concerned with dental education and practice as a valuable contribution towards the solution of a problem of great public importance. It is, however, regrettable that a little more space was not devoted in the report to the various steps taken to raise dentistry from a trade to a profession in the nineteenth century. Undue compression is probably responsible for statements (appendix VIII, page 60) that are misleading if not quite contrary to fact.

Without minimizing in any way the enormous influence exerted by Sir John Tomes, it would be unjust and historically quite untrue to neglect the contributions of his colleagues. Among the most prominent of these were Sir Edwin Saunders, W. A. Harrison, and T. A. Rogers, all of whom played quite as great a part as Tomes in the foundation and management of the Odontological Society and the Dental Hospital of London. Saunders in particular must be regarded as the "father" of the Dental Hospital of London, and in the sphere of professional organization and educational work his importance is not less than that of Tomes.

The Dental Hospital of London (now the Royal Dental Hospital, not the National Dental Hospital) owed its foundation in 1858 to the Odontological Society, one of

the original aims of which was to establish a dental hospital and school. The Dental Hospital of London opened on December 1, 1858, and the London School of Dental Surgery on October 1, 1859. The National Dental Hospital and School (now University College Hospital Dental School) was not opened until November 11, 1861. It arose out of the Metropolitan School of Dental Science (founded October 5, 1859), which was in turn the protégé of the short-lived College of Dentists in England (founded February 14, 1857). The College of Dentists in England represented one of the two rival groups working towards dental reform in the middle of the nineteenth century, the other being the Odontological Society. In 1863 the College of Dentists, lacking sustained support, amalgamated with the Odontological Society.

If any institution can be regarded as the true precursor of the Dental Hospital of London it is the London Institution for Diseases of the Teeth, founded by Edwin Saunders, W. A. Harrison, and James Snell in 1840. The history of this Institution is obscure, but it lasted for about 12 years and there is definite evidence that it received pupils.² A London Dental Dispensary, established in Clarence Gardens, Regent's Park, in 1855 by Charles James Fox, did good work for some years, but there is no evidence that it served in any way as a teaching centre.

There is no doubt whatever that the first dental hospital (as distinct from small and short-lived dispensaries) was the Dental Hospital of London, and that the first dental school, with a regular curriculum and full facilities for clinical instruction, was the London School of Dental Surgery. These two institutions are now represented by the Royal Dental Hospital and School of Dental Surgery (University of London), the hospital being one of the constituent hospitals of the St. George's Hospital Board and the School being a school of the University of London.

One other point which I might mention here: in appendix III of the report, the number of students shown as qualifying in the year 1953-4 from the Royal Dental Hospital is given as "nil," whereas in fact the number was 62, comprising 61 L.D.S., of whom 15 also graduated B.D.S., and one B.D.S. These figures of degrees and diplomas are available in the Returns of the University Grants Committee.—I am, etc.,

London, W.C.2.

C. BOWDLER HENRY,
Chairman of the School Council,
Royal Dental Hospital of London.

REFERENCES

¹ Report of the Committee on Recruitment to the Dental Profession, 1956. H.M.S.O., London.

² The Forcers, July 27, 1844, p. 149.

Present State of Practice

SIR,—Your correspondent Dr. R. B. Tulk-Hart (*Supplement*, October 20, p. 164) is anxious about the National Health Service, and encourages doctors to express their views on paper. As a doctor in general practice who qualified since the appointed day, I find I differ from him on all points.

(1) The N.H.S. may be a political pawn, but this does not degrade the medical profession itself, which can still maintain its own standards without political interference. (2) There is in fact a strong incentive to use one's skill and knowledge in general practice, which is a branch of the profession which can utilize both. Financial incentive is not the only one, and a doctor's special interests can usually be indulged if he chooses to see his patients by appointment. (3) I think the statutory forms are designed to cause the doctor the minimum of trouble. His private forms are left to his discretion to issue or not in any form he chooses. (4) There should be no tendency for the public to dictate to the doctor. A doctor who allows his patients to dictate to him has only himself to blame. (5) Any lowering in status of the individual doctor would be as much the fault of the individual doctor as anyone else.

The charge that the National Health Service encourages the cossetting of minor illnesses, and thereby has an adverse

effect on the moral fibre of the people, is a serious one. If by cossetting is meant that the patient is encouraged to seek advice early for minor symptoms, this is surely an excellent thing which has always been encouraged by the profession. If by cossetting is meant the exhibition of elegant placebos and unnecessary certificates, this would quickly help to turn the surgery into a busy sorting office.

At present there is some incentive to listen attentively, examine thoroughly, and treat adequately. Particularly does this apply to the anxiety problems which occur in various disguises in connexion with most illnesses. Inadequately handled, they will develop into more serious neurotic conditions and provide the bulk of practice work. Properly treated, the patient may remain at work and develop sufficient insight for symptoms to disappear, or at least become tolerable. An approach of this sort, which takes the patient's personality into account, does not absolve the doctor from making a thorough physical examination and making any necessary investigations. It does not therefore make him liable to miss symptoms of organic disease. It does mean that he is less likely to miss symptoms of neurosis which, untreated and unconsidered, will quickly breed chronic patients returning week after week to fill the waiting-room.

I believe the task of keeping as large a number of people as possible as well as possible to be useful work, and is the type of work which is practised in and encouraged by the National Health Service.—I am, etc.,

London, N.W.1.

J. MARK HODSON.

Filling of Practice Vacancies

SIR,—Under the present system, applications are received by the local executive councils, who prepare a short list, interview selected candidates, and choose the successful person, whose name is sent to the Medical Practices Committee in London.

A much fairer method would be for applications to be sent in the first place to the Medical Practices Committee in London, who would prepare a short list which could be sent to the local executive council; the latter would interview the candidates advised by London, and make its selection. This would put an end to the canvassing and lobbying that goes on at present, as each candidate's application would receive an impartial scrutiny without any local prejudice or favouritism. It is of fundamental importance that justice should not only be done but should manifestly be seen to be done.—I am, etc.,

Leeds, 7

ISAAC ROSE.

Compensation

SIR,—I feel that the subject of "compensation" for loss of goodwill has dropped out of the picture while we are bargaining with the Minister for a fair remuneration. There is a danger that this may be allowed to go by default, and I beg to bring the following facts to your attention.

A large number of ex-Service doctors somehow found money in 1946 to re-establish themselves in general practice. Let us assume the average amount paid for a practice to be £3,000—i.e., 14 years' gross income. Even accepting the Danckwerts betterment figure of 100% (which is out of date), such a practice would represent a capital asset of £6,000; in other words, there would have been a capital gain of £3,000 on which no tax would have been paid. Instead a paternal Minister has provided us with an "income" of some £80 per annum, from which tax has been deducted at the source.

There can surely be no other section of the community with whose money a Government department has played ducks and drakes with such disadvantage to the recipients. I would strongly urge consideration of the following points. (1) The application of a betterment factor to the compensation figure. (2) The immediate payment of the whole sum to any practitioner taking in a partner and thereby diminishing his income. (3) The provision of a realistic value of

interest on the money that is being withheld by the Minister. In these days it is foolish to consider 2½% as bearing any true relationship to money on loan.—I am, etc.,

I. M. SEGAL.

Seven Kings, Essex.

Emergency Call Service

SIR,—May I express my astonishment at the "concern" of the General Medical Services Subcommittee (Scotland) at their recent meeting, lest the emergency call service be developed in Scotland (*Supplement*, October 27, p. 171)? Is it because changes are distasteful to us conservative-thinking Scots? If not, what are the real objections to such a scheme?

From previous letters published in the *Supplement* it would appear that the London practitioners connected with the scheme are satisfied that it favours everyone concerned: (1) the public, who often, when the occasion might justify a night call, refrain from disturbing their doctor, (2) the practitioner, who would have more leisure and thereby provide more efficiency in his work, and (3) the doctor on call, who might find such duties suitable to his temperament or circumstances or both.

In my humble opinion, it is only a question of time before a readjustment of our working conditions takes place. If we do not bring about changes ourselves, they may be forced on us; nay, we may even clamour for outside intervention, with all its attendant disadvantages.—I am, etc.,

JOSEPH VERRICO.

Glasgow.

Admission to Hospital

SIR,—I read with interest Dr. C. J. Cobbe's letter (*Supplement*, October 20, p. 165), and, while agreeing that this particular case was unfortunate, would like to state my appreciation of the services given by the emergency bed service.

I also remember the days of "common-sense independence" of the past; when I, or my wife, would spend an hour or more at the telephone trying to admit a patient to hospital. I count the E.B.S. as one of the great blessings of present-day general practice. For years I have not had a single refusal for admission, provided I have given a full history of the case in question. Their staff is always courteous and helpful; indeed, it is a pleasure to hear their voices, and in cases of great difficulty the doctor in charge has always managed to arrange things.

In my opinion the E.B.S., the district nurses, the local laboratories, who will often assist with an occasional investigation, and the casualty officer, through whom one can by-pass the long waiting-lists of the out-patient departments, help to make general practice enjoyable.—I am, etc.,

I. J. SACHS.

London, N.W.3.

Technicians' Remuneration

SIR,—I am in complete agreement with every word of Dr. Duncan Irving's letter (*Supplement*, October 13, p. 157) and would like to emphasize the dependence of the medical profession, and particularly the radiologists, on the radiographers. I know that approaches have been made by the radiological societies and the appropriate branch of the British Medical Association, but no reply has ever been received except that "it is in the hands of the Whitley Council." This is quite inadequate, as no real improvement in radiographers' remuneration has ever been made.

There are two further points I would add. First, the retiring age for radiographers is 60, whereas that of nurses and other technicians is 55. This is grossly unfair, as a radiographer's work is extremely responsible and exhausting. Secondly, radiographers are required to be available for emergencies at a rate of pay which is inferior to that of any other grade of hospital employee. Dr. Irving's statement that a campaign for improvement in technicians' salaries should take precedence over any medical remuneration claim is timely and excellent, and I hope that the medical profession will enthusiastically adopt this suggestion.—I am, etc.,

GRACE BATTEN.

London, S.W.10.

Cost of Prescribing

SIR,—Certain aspects of the present drug bill of the N.H.S. would seem to warrant more publicity than they appear to have received hitherto.

Many G.P.s, some of them established in practice for several years, have told me that they have no notion of the cost of the ordinary dressings and drugs as well as the antibiotics, etc., that they prescribe daily. Those of us who are dispensing G.P.s know these costs only too well. Surely it would be worth while to emphasize them to prescribing G.P.s more clearly than at present.

One seldom sees mention of the saving to the Ministry of National Insurance effected by expedited recovery of patients through the use of antibiotics, etc., which saving frequently amounts to many times the cost to the N.H.S. of seemingly expensive remedies. This saving might well be brought to the notice of the politicians.

More publicity should be given to the lot of the needy patient, whether old-age pensioner or otherwise, who is not in receipt of outdoor assistance and at present has to pay the 1s. prescription tax and will presumably have to pay the proposed new additions as well.

It appears to be taken for granted that dispensing G.P.s will shoulder the additional clerical work of more complicated tax-collecting (with still no remuneration or thanks).—I am, etc.,

Desford, Leicestershire.

B. W. THOMPSON.

Remuneration of S.H.M.O.s

SIR,—Dr. J. H. Thomas (*Supplement*, October 20, p. 164) clearly expounds the basis of the dissatisfaction of S.H.M.O.s with their salary scale. It can do no harm to reiterate that not a small minority but some 33% of the specialist service of the country comprises this grade, in which increasing experience is rewarded by diminishing returns relative to our consultant colleagues' scale, and in which the incremental rate of £50 per annum is the lowest of any grade in the hospital service. Theoretically, all S.H.M.O.s are eligible to apply in open competition for consultant appointments, but the majority are fully aware that their present appointments represent, for them, the end of the road. It must be evident that such a prospect, under present conditions, is bound to be a matter of grave concern.

All the disadvantages inherent in the whole-time consultant post apply equally to the S.H.M.O., and those part-time consultants who have recently had experience of the iniquities of Schedule E will readily appreciate what a large difference in financial outlay on telephone and car expenses, etc., this makes. The present mileage allowance, which, I believe, was fixed when petrol sold at 3s. 9d. per gallon, is said to be adequate, on figures supplied by the national motoring organizations. Does this, however, take into account the fact that the whole-time man can claim mileage from home to base only for emergencies and where an official journey from base is made the same day, and then at a reduced rate, whereas the part-time man can claim for every journey at the full rate? Does it, either, take into account the fact that no allowance against income tax on capital depreciation is made to the whole-time specialist?

In addition, we are debarred from merit awards and from private practice, and our first eight domiciliary visits each quarter carry no fee, although there can be few S.H.M.O.s who are asked to do more than eight such visits per quarter. We cannot combat any rise in the cost of living by raising private fees.

The Annual Representative Meeting has adopted the resolution that the S.H.M.O. scale should be 80% of the consultant scale at all points (*Supplement*, July 14, p. 43). This we regard as demanding of urgent implementation before the main remuneration claim of the whole profession is finalized. If the S.H.M.O. scale is not so related by ratio, we fear that the gap between it and the consultant scale will grow wider still. The A.R.M. also adopted two

resolutions of importance to S.H.M.O.s. The first of these (p. 45) urges the abolition of the eight unpaid domiciliary visits. The second, proposed by Mr. Lawrence Abel (p. 49), states: "All medical grades of so-called 'whole-time' hospital staff should be allowed to pursue the practice of their profession in their off-duty hours." This principle, if implemented, would go far towards preventing the introduction of a full-time salaried service for the whole profession, and might possibly furnish grounds for the escape of the whole-time man from Schedule E.

What the members of the S.H.M.O. group of the B.M.A. would like to see is some indication that the deliberations of the A.R.M. are of some influence in improving their lot. Such indication is badly needed to counteract the growing cynicism of the "have-nots" of the profession.—I am, etc.,

Newport.

R. VERNON JONES.

Association Notices

Diary of Central Meetings

NOVEMBER	
13 Tues.	Forensic Medicine Subcommittee, Private Practice Committee, 3 p.m.
14 Wed.	Library Subcommittee, Science Committee, 11.30 a.m.
14 Wed.	Private Practice Committee, Drugs for Private Patients—Discussion with G.M.S. Committee, 2 p.m.
14 Wed.	Welsh Committee (at Crown Hotel, Shrewsbury), 2.15 p.m.
15 Thurs.	G.M.S. Committee, 10.30 a.m.
15 Thurs.	Dermatologists Group Committee, 2 p.m.
16 Fri.	Joint Committee of the B.M.A. and the Magistrates' Association, 2 p.m.
19 Mon.	Study Leave Subcommittee, Central Consultants and Specialists Committee, 11.15 a.m.
20 Tues.	Alternative Edition Subcommittee, Joint Formulary Committee, 11 a.m.
21 Wed.	Editorial Subcommittee, Joint Formulary Committee, 11 a.m.
22 Thurs.	Central Consultants and Specialists Committee Executive, 2 p.m.
22 Thurs.	International Relations Committee, 2 p.m.
22 Thurs.	Psychological Medicine Group Committee, 2 p.m.
23 Fri.	Registrars Group Council, 2 p.m.
28 Wed.	Emergency Call Subcommittee, G.M.S. Committee, 11 a.m.
DECEMBER	
20 Thurs.	G.M.S. Committee, 10.30 a.m.

Branch and Division Meetings to be Held

ALDERSHOT AND FARNHAM DIVISION.—At Farnham Hospital, Thursday, November 15, 8.15 p.m., clinical meeting.

BIRMINGHAM DIVISION.—At 154, Great Charles Street, Birmingham, Thursday, November 15, 8.30 p.m., joint meeting with British Dental Association.

BLACKBURN DIVISION.—At White Bull Hotel, Blackburn, Tuesday, November 13, 8.15 p.m., meeting. B.M.A. lecture by Dr. J. H. Cyriax: "Manipulative Medicine."

BLACKPOOL AND FYLDE DIVISION.—At Savoy Hotel, Blackpool, Wednesday, November 14, 7.15 p.m., dinner; 8.30 p.m., lecture by Sir Zachary Cope: "Regional Diagnosis of Acute Abdominal Disease."

BROMLEY DIVISION.—At Farnborough Hospital, Wednesday, November 14, 8 p.m., meeting. Clinical discussion to be introduced by Dr. J. D. S. Hill and Dr. D. I. Williams: "The Mind and the Skin."

CROYDON DIVISION.—At 43, Wellesley Road, Croydon, Tuesday, November 13, 8.30 p.m., general meeting. Address by Dr. W. G. Oakley: "Virtues and Vices of Some Modern Therapeutic Preparations."

EAST HERTS DIVISION.—At Hertford County Hospital, Thursday, November 15, 8.30 p.m., clinical meeting.

EAST YORKSHIRE BRANCH.—At Quern House, 68, Park Street, Hull, Wednesday, November 14, 8.30 p.m., meeting. Lecture by Dr. W. R. Bett: "An Alcoholic Excursion Through the Ages."

ENFIELD AND POTTERS BAR DIVISION.—At Robin Hood, High Street, Potters Bar, Friday, November 16, 8 for 8.45 p.m., meeting. Clinical papers by Dr. E. W. W. Ellis: "Warts"; Dr. J. C. Henry: "Morbus Cordis—Two Interesting Cases"; Dr. R. B. L. Ridge: "Relaxation in Labour."

GUILDFORD DIVISION.—At Royal Surrey County Hospital, Guildford, Thursday, November 15, 8.30 p.m., meeting. Lecture by Dr. F. E. Camps: "Drink and the Driver."

HENDON DIVISION.—At Hendon Hall Hotel, London, N.W., Tuesday, November 13, 8.45 p.m., meeting. Dr. R. A. J. Asher: "See How They Come"—Roundabout Presentations of Illness.

HUDDERSFIELD DIVISION.—At Board Room, Huddersfield Royal Infirmary, Monday, November 12, 8.15 p.m., general meeting.

ISLE OF WIGHT DIVISION.—At St. Mary's Hospital, Newport, Sunday, November 18, 3 p.m., joint meeting with Isle of Wight Pharmaceutical Society. Subject: "Common Problems." All members of the medical and pharmaceutical professions are invited.

KINGSTON-ON-THAMES DIVISION.—At Nurses' Home, Kingston Hospital, Tuesday, November 13, 8 for 8.30 p.m., meeting. Address by Mr. Wylie McKissock: "Intracranial Haemorrhage and Thrombosis."

LEIGH DIVISION.—At Courts Hotel, Church Street, Leigh, Tuesday, November 13, 8.30 p.m., annual general meeting. Address by Dr. J. A. Finnigan: "'Transithal' in Dental Anaesthesia."

LEWISHAM DIVISION.—At Hither Green Hospital, Sunday, November 18, 10.30 a.m., clinical meeting.

MANCHESTER DIVISION AND MANCHESTER LOCAL MEDICAL COMMITTEE.—At Midland Hotel, Manchester, Wednesday, November 14, 8 p.m. to 1 a.m., medical dinner-dance.

NUNEATON AND TAMWORTH DIVISION.—At Red Lion Hotel, Atherstone, Tuesday, November 13, 8.45 p.m., supper meeting. Two short films followed by a talk by Dr. W. Williams: "Antibiotics."

REIGATE DIVISION.—At Redhill County Hospital, Tuesday, November 13, 8.30 p.m., meeting. Dr. D. A. Robertson: "Hypertension." He will open a discussion on the treatment with hypotensive drugs and other methods.

SCARBOROUGH DIVISION.—At Board Room, Scarborough Hospital, Thursday, November 15, 8.30 p.m., meeting. Special B.M.A. lecture by Dr. R. H. Mole: "Radiation and Living Things."

SHROPSHIRE AND MID-WALES BRANCH.—At Board Room, Royal Salop Infirmary, Shrewsbury, Wednesday, November 14, 8.30 p.m., meeting of Clinical and Pathological Section. B.M.A. lecture by Dr. R. Bodley Scott: "Diagnosis and Treatment of the Anaemias."

SWINDON DIVISION.—At Goddard Arms Hotel, Swindon, Wednesday, November 14, annual dinner and dance.

WIGAN DIVISION.—At Haigh Hall, Wigan, Wednesday, November 14, 7.30 for 8 p.m., annual dinner and dance. Non-medical guests invited by members will be welcome.

WILLESDEN DIVISION.—At Physical Medicine Department, Willesden General Hospital, Harlesden Road, N.W., Friday, November 16, 9 p.m., general meeting. Dr. S. Left: "Medicine in the U.S.S.R." (illustrated). Members of Wembley and Hampstead Divisions are invited.

Meetings of Branches and Divisions

DUMFRIES AND GALLOWAY DIVISION

The annual general meeting was held at Ernespie House Hotel, Castle Douglas, on June 24, 1956. Dr. J. Watson was in the chair and 10 members and what the minutes record as "four adherents" were present. The following officers were appointed for 1956-7:

Chairman.—Dr. R. N. Rutherford.
Vice-chairman.—Mr. J. Neilson.
Honorary Secretary, Treasurer, and Public Relations Officer.—Dr. J. B. Wilson.

The secretary of the Danish Society in Scotland, Mr. Lauritz Hvas, gave an address on "Social and Health Services in Denmark." Two films on the treatment of acute respiratory paralysis in cases of poliomyelitis were shown.

NORTH LANCASHIRE AND WESTMORLAND BRANCH

The seventh annual meeting was held at Preston on June 7, 1956. The following officers were elected for 1956-7:

President.—Dr. R. M. Corbet.
Vice-presidents.—Dr. W. A. Simpson and Mr. J. McFadzean.
Honorary Secretary and Treasurer.—Dr. John Wilkie.

Dr. Corbet in his presidential address spoke on "Midwifery—Past and Present."

NORTH WALES BRANCH

The 107th annual meeting was held at the Imperial Hotel, Llandudno, on May 31, 1956. Dr. Ivor H. Davies was in the chair and 32 members were present. The following officers were elected:

President.—Dr. A. Maddock Jones.
President-elect.—Dr. K. Evans.
Honorary Secretary and Treasurer.—Mr. A. H. Holmes.
Joint Secretary.—Mr. W. Macfarlane.

The president gave an address on "Cerebrospinal Fever," which was followed by a discussion.

SWANSEA DIVISION

The annual meeting was held at the Swansea Hospital on June 7, 1956. Dr. Joan C. Owen was in the chair and 32 members were present. The following officers were elected:

Chairman.—Dr. I. P. G. Howells.
Vice-chairman.—Dr. H. William Howell.
Honorary Senior Secretary and Treasurer.—Dr. Idwal Pugh.
Honorary Junior Secretary.—Dr. W. O. Williams.

SUPPLEMENT TO THE BRITISH MEDICAL JOURNAL

LONDON SATURDAY NOVEMBER 17 1956

CONTENTS

Proceedings of Council	187	H.M. Forces Appointments	194
Tax Assessment of Part-time Consultants	194	Association Notices	194

British Medical Association

PROCEEDINGS OF COUNCIL

The Council of the British Medical Association met at B.M.A. House on November 7, Dr. S. WAND, Chairman of Council, presiding.

The CHAIRMAN, referring to the absence of Dr. E. A. Gregg, late Chairman of Council, made a sympathetic reference to Dr. Gregg's tragic bereavement.

Later in the meeting Dr. I. D. GRANT, chairman of the Representative Body, said that members of Council would have felt a very deep personal loss by the death of Miss Gregg. It had been suggested that it would be fitting to have some small memorial to her in the House in recognition of her valuable service to the Association, as the Chairman's lady for the past seven years. The Council unanimously decided to associate itself with this proposal, and the details were left to be arranged by the Office Committee.

The CHAIRMAN also referred to the absence of Dr. A. Talbot Rogers, chairman of the General Medical Services Committee, who had had an operation. He was progressing very well indeed and sent his best wishes to the Council. It was agreed to send a message to Dr. Talbot Rogers and to Dr. Mary Esslemont and Dr. J. C. Macarthur, who were also absent through illness.

The CHAIRMAN then welcomed Dr. Arthur Kelly, general secretary of the Canadian Medical Association. Dr. T. C. Routley, Immediate Past President of the Association, was also present from Canada.

Letters of thanks were reported for hospitality during the Annual Meeting, and in commenting on them the CHAIRMAN paid a tribute to the work of members of the staff and their ladies in making overseas visitors feel at home.

The CHAIRMAN said that it had been suggested that the Association might associate itself in some way with what was being done to alleviate the distress in Hungary, and it was agreed to leave it to him and to the office to make inquiries.

Preliminary Business

The election of Dr. S. Wand as Chairman of Council made him an *ex officio* member, and a vacancy in the Council membership resulted. After correspondence with the Association's solicitors, and the obtaining of the opinion of Counsel, it seemed that the only method by which the vacancy could be filled, as Dr. Wand was elected by the Representative Body, was to call a Special Representative Meeting. This being impracticable, the vacancy on the Council would continue until the next A.R.M. The correspondence was passed to the Organization Committee, so that it might consider the amendment of the By-laws to remove the defect which had come to light.

It was reported that Dr. Wand attended the annual congress of the Royal Netherlands Medical Association in

October as the Association's representative, the CHAIRMAN adding that he received warm hospitality.

An invitation was received from the Danish Institute in Great Britain on behalf of the Danish Government for members of the British Medical Association to take part in 1957 in a study tour of medical services in Denmark, the programme to be arranged by the Institute in co-operation with the Danish Medical Association. It was agreed to accept the invitation.

Visit to the Caribbean Branches

The Council had before it the report by Dr. I. D. GRANT of his visit to the Caribbean Branches. It was obvious said the CHAIRMAN, that Dr. Grant had grasped the problems of these Branches in their entirety, and that he was a magnificent ambassador. The Council would offer him its warm thanks.

The report was referred to the Overseas Committee.

Visit to the U.S.S.R.

A report, written by Dr. J. G. M. Hamilton, of the visit to Russia was received. (See *Journal*, November 3, p. 1049.)

The CHAIRMAN paid a tribute to the efficient arrangements made for the visit by Dr. E. Grey-Turner and other members of the staff. Dr. HAMILTON said that the visit was carried through in an atmosphere of cordiality. Those taking part were received most hospitably and their wishes were paramount in the making of arrangements. It was a unique experience, and he was grateful to the Council for being allowed to represent the Association on this occasion.

A report from Professor Charles Wells of his attendance at the Congress of the Pakistan Medical Association was also received with appreciation.

Representation on the British Red Cross Society

The Council was informed that, in response to an inquiry initiated by the Chairman of Council, the British Red Cross Society had invited the Association to put forward a representative to be nominated for election to the Council of the Society. The Council gratefully accepted this invitation, and it was left to the Chairman to select a suitable representative.

Representation on Other Bodies

The Council accepted an invitation to nominate a general practitioner representative to serve on the Medical and Scientific Committee of the National Institute for the Deaf.

Dr. H. H. D. SUTHERLAND was nominated for this purpose, and Dr. ANNIS GILLIE was appointed to represent the Association in connexion with the centenary appeal of the Ranyard Mission. Representatives were reappointed to a number of other outside bodies.

A point had been raised that there was a paucity of academic representation on the Central Medical Recruitment Committee and that the Association in making its own nominations might consider giving specific representation to, or even consulting, university medical opinion. It was agreed that the Minister of Health should be asked to consider enlarging the Committee by the addition of one or two university representatives.

Fifth British Commonwealth Medical Conference

It was reported that the fifth British Commonwealth Medical Conference would be held in London in July, 1957. The Council appointed the Chairman of Council to act as President of the Conference. The Chairman of the Representative Body, Dr. E. A. GREGG, Mr. T. HOLMES SELLORS, and the Editor of the *British Medical Journal* were appointed as delegates.

Future Annual Meetings

It was reported that doubts had arisen as to whether all the necessary accommodation for the Annual Meeting could be provided in Margate in 1958, and the Council decided with regret to abandon the Margate plan and to hold the meeting in Birmingham in 1958 at the invitation (originally made for 1960) of the Midland Branch. An invitation from the Torquay Division to hold the meeting in Torquay in 1960 was accepted.

Remuneration Claim

It was reported that a reply was awaited from the Minister of Health to the Negotiating Committee's document on the legal aspects of the claim (see *Supplement*, November 3, p. 173).

Dr. J. A. L. VAUGHAN JONES said he thought an opportunity had been lost and there was a danger of the profession splitting apart. It should have been the responsibility of the Association in the intervening period to have done something to weld the profession together. He was pleased to see the leading article in the *British Medical Journal* of November 3 (p. 1043). There was a considerable degree of discontent at the way the profession had been left in the dark. It might be said that there was nothing to tell them, but something should have been done to bind the doctors together. At the Council dinner the 70,000th member of the Association was applauded; they had the numbers, but had they the morale? There were a lot of staff officers, but there were not the people to bring the troops up behind. He thought the Council was responsible for bringing the troops into action as and when required, and he would urge the Council to do something to improve the morale of those who must support it.

Dr. A. V. RUSSELL reinforced what Dr. Vaughan Jones had said. In his small area he was asked what was being done; there was a great deal of unrest and uneasiness. He had heard it said, "I suppose the Government will get away with it as usual; we shall never stick together; the Minister will divide the profession and nothing will be done." There was no doubt that a national crisis would be called up as another reason for postponing any settlement or for justifying the Minister's refusal for providing Parliamentary time to consider the problems of the medical profession. "What we require is unity; it is there if you make use of it. The rank and file of the periphery are looking for leadership; they do not know what to do." Dr. Russell added that in the twelve months before the entry into the National Health Service there was an amount of unity in the profession which had never existed before or since. He was sure that the leading article in the *British Medical Journal* would be received as a sign that something was being done, and that steps were being taken to safeguard their interests.

Dr. R. HALE-WHITE said that whatever committee or combination of committees might be considering this remuneration claim he was quite sure that it was to the Council that the members looked for assurance on whether things were going well or ill. The Council had a responsibility to the 70,000 members to tell them what was happening.

Mr. H. H. LANGSTON endorsed what had been said. The time had come when the Council should give a lead to the profession in the sense of initiating local meetings and discussions on the remuneration position. In the consultant field there was a good deal of scepticism and unrest, and questions were being asked whether they would not do better as consultants separately from the rest of the profession. Meetings should be initiated in the Divisions which would keep the members informed and impress upon them that the Association, which represented all branches of the profession, would give a lead and that their best purposes would be served by working together.

Dr. W. E. DORNAN said that he heard the Minister of Health deliver his speech at which he made reference to the remuneration claim. It was an unfortunate place [the annual conference of the Executive Councils Association (England)] at which to make any reference to the remuneration problem, because it had been the custom for that conference to refuse to accept discussion on remuneration in any part of the service. In the absence of the Secretary, he saw the Deputy-Secretary, Dr. Stevenson, and persuaded him to put the matter right if and when he was asked to address the conference. He hoped the Council felt that Dr. Stevenson did right. (Applause.) The same evening there was a divisional meeting in Sheffield which he, Dr. Dornan, addressed, and he was able to bring the members right up to date. As a result the whole meeting passed a resolution backing the Negotiating Committee in every way. If other members of Council did the same thing it would be very helpful.

The CHAIRMAN asked if any member of the Negotiating Committee would like to say something about this.

Dr. A. BEAUCHAMP said that the history was quite plain; it had been published in the *Journal*. When the statement was sent to the Ministry it was referred by the Minister for legal advice at the highest level. That was where the delay had arisen, and not very much could be done about it. Anybody reading last week's *Journal* would realize that the case was quite unanswerable from the legal and moral point of view. He did not think the Negotiating Committee could do any more at the moment than wait for the opinion of the law officers of the Crown.

The curious thing was that criticism had gone outside the remuneration claim, and had become criticism of the service itself. If this was sufficiently widespread—and he believed it was—the Negotiating Committee would have to ask the Council, as representing the British Medical Association, to take some action. He hoped a reply would soon be received; if it was unfavourable when it was received the fight would begin.

Dr. W. WOOLLEY did not think the Negotiating Committee should be criticized. As members of Council they should be kept closely in the picture, and the moment a reply was received every member of Council should be informed.

The CHAIRMAN said that as one of those who went to the Ministry he knew nothing more than anybody who had read the *Journal*.

Mr. H. H. LANGSTON moved that the Council should initiate meetings of the Divisions to discuss the remuneration issue, and that a document should be prepared and circulated as a basis for such discussion.

Mr. S. F. LOGAN DAHNE seconded, stressing the feeling in the Reading Division of deep anger at the attitude adopted by the Minister and his remarks at the Executive Councils Association conference.

Dr. I. D. GRANT could not see any reason for calling meetings of the Divisions until Council members were certain of their own attitude in this matter and until they had some adequate information to give to the Divisional meetings. The Negotiating Committee should do everything possible to obtain from the Minister a definite reply. He should be told that the matter was urgent and that his law officers should give it urgent consideration. When the reply was received there should be a special meeting of Council at which the matter would be discussed fully and completely.

It would then be time to go to the Divisions and consider what should be done.

Dr. BEAUCHAMP said that if this was a proposition he would second it. Dr. RUSSELL said that no one would disagree with what was proposed, but the Negotiating Committee should let the Minister know that the matter was one of urgency, while Dr. F. M. ROSE thought there was no doubt Mr. Langston's suggestion was right. The Minister intended to throw dust in the eyes of the public.

Dr. A. BROWN supported Dr. Grant; it was useless going to the Divisions until the Council knew what it wanted. Once an answer was obtained from the Ministry they could make up their minds what to say to the Divisions.

Dr. H. H. D. SUTHERLAND said that if the legal opinion of the law officers of the Crown was that the Minister had a contractual obligation to fulfil nobody would be more pleased than the Council. But if they said that there was no contractual obligation the difference of legal opinion must go to the highest possible legal authority available for decision.

Mr. LANGSTON said he saw fully the force of what Dr. Grant had said. Perhaps he could withdraw his original motion and suggest that the Minister be asked for an early reply to the documents sent to him, and that this reply be followed by the calling of a special meeting of Council to consider it. This would be followed by special meetings of Divisions to hear the views of Council and if necessary by local meetings convened by the Guild.

Dr. GRANT said he would be willing to accept this. He thought Sir Russell Brain and other members of the Negotiating Committee not members of Council should be invited to attend a special meeting, as well as the Committee's legal advisers.

The CHAIRMAN said that a letter had been written to the Minister within the last few days, urging him to send an early reply. In regard to the Minister's speech at the Executive Councils Association, he referred to correspondence which had taken place between the Minister and himself on the matter. Some of the newspaper reports had conveyed a wrong impression of what the Minister had actually said—perhaps as a result of a highly compressed summary issued by the Ministry to the press. A third point was the present international situation, and to devise machinery at the moment might create difficulties later on. The fourth point was that two autonomous committees had joined together in a negotiating committee, and the action proposed would override the two committees without consultation. He wondered whether that was the intention of Council, or if the intention really was to inform the profession that the Council was determined to proceed with this issue, that all steps had been taken to do so, and that there was nothing more to report except that the Minister was being pressed for a reply. If the reply was unsatisfactory the action to be taken was a matter of common sense and would be carried out if the international situation permitted. Should not the action of the Council be to pass a message to the Negotiating Committee, stressing the urgency of the matter and indicating that the Council was willing and anxious to take such action as it could to facilitate a successful outcome of the claim? The debate would be reported to the Negotiating Committee, and it would be made clear in the *Journal* that the Council was seized of the situation, and would take such action as would bring the whole profession behind it. In the event of an unsatisfactory reply being received from the Minister the Council would be called to receive a report from the Negotiating Committee.

Mr. A. LAWRENCE ABEL said that not only should there be meetings of the Divisions but there should be a mass meeting of the profession.

The action proposed by the Chairman of Council was approved.

Resolutions from A.R.M.

The Council considered the action to be taken on various resolutions referred to it by the Representative Body. The

question of attributable illness in reference to all members of the profession was referred to the Science Committee. With regard to the request to consider ways and means of establishing convalescent homes for members of the profession, counsel's opinion had been obtained, and counsel did not think that the funds of the Association could be expended even in an appeal for funds for such a purpose.

Mr. A. LAWRENCE ABEL thought that the maintenance of the health of the profession was in the interests of the profession and the matter should be looked at again. It was agreed to refer it to the Organization Committee for consideration.

A resolution asking the Council to discuss with the Government the formation of a major "Casualties Service" covering the whole country was referred to the Central Consultants and Specialists Committee.

A request that the Council should examine and report on the working of the Medical Acts, 1858-1950, in view of the decision of the General Medical Council to promote a Consolidation Bill, was considered.

Dr. H. GUY DAIN said that the proposed Bill was putting into order the existing provisions; it was not possible to put in any alterations.

Dr. R. FORBES said that there was a job here to examine the operation of the Medical Acts. A number of criticisms were made against the existing Acts; there were difficulties in relation to their working, and he thought there should be an *ad hoc* committee to look into this and report.

This was agreed, and an *ad hoc* committee was appointed, consisting of the officers of the Association, Dr. A. Brown, Dr. H. Guy Dain, Dr. W. E. Dornan, Dr. R. Forbes, Dr. E. A. Gregg, Dr. R. Gibson, and Mr. A. Dickson Wright, with power to co-opt.

The Representative Body accepted the recommendations of the Committee on Remuneration Policy, among them being a recommendation that the Government should be urged to set up forthwith an independent committee of inquiry to consider the range of remuneration of medical officers in the public health service. Dr. J. G. M. HAMILTON asked if it was suggested that the Minister should be urged to set up a "Public Health Spens." Had any action been taken on this?

The SECRETARY replied that a letter had gone to the Secretary of the Ministry of Health bringing the resolution to his notice, and he had replied that as this was a matter which concerned local authorities, not the Ministry alone, it would be necessary for the Ministry to consult the local authority associations.

Another recommendation of the Committee on Remuneration Policy was that further efforts be made to secure a more satisfactory alternative to the Industrial Court as a means of settling disputes by arbitration, and it was agreed that the Committee on Arbitration Machinery should be reappointed to consider this matter.

Increased Cost of Prescriptions

The CHAIRMAN asked for the views of the Council on the proposals to increase the charges for prescriptions. The policy of the Association was that the charge should be abolished. A local medical committee had sent a resolution protesting against the proposed charge of 1s. per item and stating that any charge should be on the prescription form only.

Dr. F. GRAY said that a deputation from the General Medical Services Committee went to the Ministry on October 31; the deputation included the Deputy Chairman of the Committee (Dr. Davies) and himself. Attention was directed to the proposed method of increasing the payment for prescriptions, and reasons were given why it was considered the method proposed was quite inappropriate. These were that the charges would fall on people according to the sort of illness they had—diabetics, patients with skin conditions, for instance, would find themselves paying a great deal more for necessary medicaments. This was an intolerable burden to place upon them and was a discrimination

between one class of patient and another in a matter quite outside the patient's control. One patient might get a particularly expensive drug for 1s., while another patient needing four or five drugs would pay four or five times as much, perhaps for the whole of his life.

Dr. J. C. ARTHUR pointed out that dispensing doctors would find it difficult to administer this; it was difficult enough with the 1s. charge. Dr. ROSE said that the relationship between the patient and the doctor, and the patient and the chemist, would be affected. Dr. BROWN, as a dispensing doctor, supported this observation. He would prefer an increased charge per prescription.

The CHAIRMAN asked if anyone wished to speak in favour of these charges and the way they were being imposed. Could he take it that the Council was opposed to the charges as indicated by the Minister, and that the points to be pressed were that he did not consult the profession, that the Association was opposed to the imposition of any charge at all, and that if he insisted on increasing the charges it should be in the form of a charge per prescription?

Dr. RUSSELL said that, if the Government wanted to lower the expense of the National Health Service, would it be a possibility to draw up a list of life-saving drugs which would be free to all, leaving other things to be paid for by the patient?

This suggestion was supported by Mr. A. LAWRENCE ABEL.

The CHAIRMAN said that such a suggestion could not be made to the Minister without the approval of the Representative Body.

After further discussion the Council authorized the Chairman to meet the Minister, and, after making it quite clear that the Association's policy was against any charges for prescriptions, to discuss with him possible methods of applying the charges with the least possible hardship to the patient.

COMMITTEE REPORTS

The report of the General Medical Services Committee was presented by Dr. BEAUCHAMP. He drew attention to the Committee's recommendation, which was accepted, that the Council appoint a special committee to prepare the Association's evidence to the committee to be set up by the Minister of Health to undertake an inquiry into the cost of prescribing in the National Health Service. It was also reported that discussions were proceeding between the G.M.S. Subcommittee (Scotland) and the Department of Health with a view to the establishment of a separate committee on similar lines to investigate the cost of prescribing in Scotland.

Agreement had been reached on the method of determining the practice expense ratio, and the final size of the Pool for 1954-5 had been determined. The balance due to the profession was £4½m., and this would be distributed—an average payment of £200 per doctor—at the end of the year.

With regard to the amendment of the N.H.S. (General Medical and Pharmaceutical Services) Regulations, Dr. R. G. GIBSON drew attention to the point that a doctor with patients at a school or institution could be compelled to give a list of such patients periodically to the local executive council, and patients could be removed arbitrarily from the list when pupils left school. Although a pupil might come off the school institution list he might still be the doctor's patient. This was not the doctor's job, it was the executive council's job. They should ask the schools for names of pupils on a doctor's list, and they should tell the doctor if they were about to take a name off his school list in order that it could be put on the list of the family doctor. He hoped the Council would ask the General Medical Services Committee to look at it again and to consider more carefully the effect of some of these regulations.

Dr. BEAUCHAMP said that the Committee had tried to get this altered. It was a method of curbing inflation.

Dr. E. A. GERRARD asked the position with regard to making up the pay of hospital employees who were called up, and the SECRETARY replied that the Ministry had issued a circular with regard to making up the pay of health ser-

vice employees in the hospital service called up as reservists and advised the use of the discretion given under the Act of Parliament to make up civilian pay.

The report was approved.

Central Consultants and Specialists Committee

Mr. T. HOLMES SELLORS moved the receipt of the report. He put forward a recommendation at the request of the Venereologists Group Committee, to which the G.M.S. Committee had no objection, that an inquiry be made of general practitioners and consultants in selected areas—seaports, inland cities, rural areas, and part of the London area—regarding the extent to which treatment of venereal diseases was undertaken outside hospital clinics.

Dr. ROSE drew attention to the resolution of the Representative Body calling upon Council to press for substantial increases in the remuneration paid to house-officer grades in hospitals. The Committee reported that action was being taken to remedy the "absolute" under-payment of house officers. There were good grounds for seeking an improvement in the relative level of remuneration of fully registered house officers, but Dr. ROSE pointed out that those referred to in the resolution were the pre-registration group doing their first two house jobs. If the Committee was not careful there would be a greater difference than now between the groups. The difference in remuneration for the highest of the pre-registration group was more than £200 less than that of the senior house officer. He moved that this be referred back. Dr. GRAY seconded.

Mr. HOLMES SELLORS said that one had no idea what the outcome of the claim for remuneration would be. There was real hardship on the men who had been in the Services and who were wanted back in the hospital service and who were not doing the compulsory pre-registration year. Everyone would like a great deal more than they were getting, but if there was to be any relative increase, if people were to be got back into the hospital service, it should be for the post-registration people.

Dr. ROSE said that the instruction of the Representative Body was to deal with this particular group. He had said nothing about the efforts for a general increase. The position of the young newly qualified doctor was quite serious.

Mr. HOLMES SELLORS said that the committee would have another look at it.

Dr. J. B. TILLEY referred to the Joint Committee's reply to the Ministry regarding the Guillebaud Committee's recommendation that closer liaison should be effected between the hospital and the local authority by the appointment of the medical officer of health, or a member of his staff, as a member of the medical staff of a hospital and as a member of the hospital medical committee. The Joint Committee had agreed upon the desirability of improving liaison between the two services and would support any practical steps to promote it, but it did not consider that it would be attained by this proposal. He said that this view had caused considerable disquiet in the Public Health Committee. The views of various committees had been asked and were reported to the Liaison Committee of the three committees dealing with the health services; no agreement was reached and the matter was referred back to the Public Health Committee, which reaffirmed its views. Although the Association's views had not yet been settled, the Joint Committee had already gone to the Ministry and made representations. He realized that the Council was not responsible for the actions of the Joint Committee, but it was a grave disappointment to find that the Joint Committee did not co-operate.

Dr. H. D. CHALKE said that there was considerable discontent in the public health service as a result of recommendations of this sort. The Society of Medical Officers of Health went to considerable lengths to maintain an excellent liaison with the B.M.A., but insufficient attention was paid to the fact that the B.M.A. was not just an association of consultants and general practitioners. There had been other examples, and it might lead to many people leaving the Association. Much harm had been done.

Mr. HOLMES SELLORS said that this comment of the Guillebaud Committee ran contrary to the whole practice in the past of not allotting a person to a medical committee. It was always hoped to achieve liaison with the public health authorities in the best possible manner, but it was fundamental that a person should not automatically be appointed or directed on to a medical committee.

The CHAIRMAN said he took it the public health medical officers were not so much concerned with what happened in this case as the fact that something had been taken to the Ministry before the Council had had an opportunity of discussing it.

Dr. TILLEY agreed that that was the point.

Dr. CHALKE asked if this could be moved back for further consideration.

Mr. HOLMES SELLORS said that it was an opinion expressed on the Guillebaud Report by the Joint Committee, but he would take it back.

Dr. CHALKE asked that there should be an item on the Council agenda in the near future to discuss the question of association between the Society and the British Medical Association. He was informed that it was open to him to submit notice of a motion in accordance with the Standing Orders.

The CHAIRMAN asked Dr. TILLEY if he would be satisfied if Mr. Holmes Sellors took this back to his Committee and offered comments on it in the near future. Dr. TILLEY said he would accept this. There was no further discussion on the Report, which was accepted.

Public Health Committee

Dr. J. B. TILLEY presented the report of the Public Health Committee. It was agreed that a special committee of the Association should be set up to consider pure milk supplies for the nation, and it was left to the Committee to determine how best this should be done. With regard to immunities how best this should be done. With regard to diseases, grants found to be suffering from communicable diseases, the Committee had studied the report of the Joint Tuberculosis Council and recommended that an immediate approach be made to the Government. The proposals for setting up a two-tier appeals machinery for Northern Ireland had been rejected by the Northern Ireland Government, and they were now back where they started. All the Committee could suggest was that the Northern Ireland Government should again be asked to consider the possibility of an Appeals Committee comparable with the Regional Appeals Committees in Great Britain. As an interim measure it was proposed that the appeals now pending should be heard by an independent arbitrator.

With regard to the appointment by the Home Secretary of the Children and Young Persons Committee (the Ingleby Committee) the Committee was disturbed that the medical membership did not include a representative of the public health service. A recommendation that the Council should urge the Home Secretary to increase the membership so as to include such a representative, and that the Association should present evidence to the Ingleby Committee, was carried, as was a request that the Public Health Committee should be represented on any special committee appointed to prepare the Association's evidence.

The remainder of the Report was accepted without comment.

Private Practice Committee

Dr. A. BROWN, chairman, presented the Report of the Private Practice Committee. With regard to the fee for the examination of emigrants, Dr. BROWN said that the Committee recommended that the Australian and Canadian Governments should be asked to notify intending emigrants that the fee for the examination and report on an adult or an unaccompanied child would be £2 2s.

Dr. A. SCOTT thought this was a wrong policy. If they charged £2 2s., emigrants to Canada would go to Canadian medical officers and have it done for nothing. Dr. HALE-WHITE assumed that this was a suggestion, not a command, that the charge should be £2 2s. Dr. GRANT said that there

was a complete *impasse* with the New Zealand Government on this, and the ultimate agreement was that it should be left to the doctor and person concerned. He suggested that this might be done in the case of Canada and Australia.

Dr. BROWN said that the Committee felt they must stick to their standards, whereupon Dr. SCOTT moved the reference back of this part of the report.

Dr. I. D. JONES said that the Committee had spent considerable time in the last two years settling these fees. The fee to be paid by any member of the public for a comprehensive examination and report should be £2 2s.; whether that fee was paid by the patient was a matter for negotiation.

Dr. GRANT suggested that the Governments of Canada and Australia should be asked to delete the amount of the fee from the form and to say that it was payable by the intending emigrant and leave it to the doctor to charge what seemed suitable, the recommendation of the Association being that it should be £2 2s. He moved an amendment accordingly, and this was agreed to. A similar arrangement was approved in respect of medical examinations carried out for the United Kingdom Commercial Travellers' Association.

Occupational Health Committee

Dr. J. A. L. VAUGHAN JONES presented the report. Recommendations that the 1957 conference of Advisory Councils on Occupational Health be held at B.M.A. House next April, and that active steps be taken to promote the establishment of new advisory councils, were adopted.

Dr. T. C. ROUTLEY informed the Council that at the World Medical Association meeting in Havana a few weeks ago a world committee covering the subject of occupational and industrial health was set up as a result of the representations which Dr. Vaughan Jones had made.

The Report was accepted.

Finance Committee

Mr. L. DOUGAL CALLANDER, Treasurer, presented the report of the Finance Committee. He said that in the majority of instances the budget provision for the "spending" committees and departments had proved to be sufficient, but there was a much smaller balance at the end of August than was expected, because of an overall deficit on the publications and loss on the Catering Department. He was, however, hopeful that there would ultimately be a surplus of £10,000 to £12,000 on the year's working, taking into account the increased cost of salaries and wages, the cost of the General Medical Council election, the visit to Russia, and the subsistence allowances. It was anticipated there would be a surplus of £1,500 to £2,000 from *Family Doctor*, and it was hoped that the catering position would be rectified. With regard to the *Journal*, he would like to point out that every new member increased the cost of the *Journal*. Even with the vast increase in membership the balance of income was not sufficient for the amount of money being turned over. He hoped that the income would be increased next year. As the leases fell in, steps were taken to increase rentals, and the increased subscription income had saved him from having to ask the Council to consider raising the subscription. He would ask the Council to consider very carefully before setting up *ad hoc* committees.

The Report was adopted, as was the report of the Estates Committee. Mr. CALLANDER announced that the London County Council had given permission to proceed with the building on the Burton Street site, but there were still negotiations proceeding with regard to rehousing one or two of the remaining tenants with the local authority. In presenting the report of the Catering Committee, he said that the year had been difficult because of wages and the increased cost of food, and the matter was being watched carefully.

All these reports were adopted.

Organization Committee

Dr. R. G. GIBSON, presenting the Committee's report, paid a warm tribute to Dr. Pridham, who had left the chair of the Committee after 11 years' service. He had carried out his duties in a tactful and able way, and had made the Committee a happy one. There were now 70,400 members of the Association, and the Committee was giving careful consideration to the interests of the young practitioner. Additional activities were being fostered in the Divisions, and it was hoped to encourage young practitioners to take a larger part in the life of the Association.

Recommendations, which were adopted, were put forward in respect of subsistence allowances. Advice had been taken from other organizations, and the Committee believed its proposals to be fair. They were as follows:

Over 8 hours and under 24 hours away from home	12s. 6d.
Over 24 hours or overnight away from home (less a standard deduction of 25s. if sleeper was claimed)	45s. 0d.

This scale was to be put into operation as from the close of the Annual Meeting, 1956, and to be reviewed at the conclusion of the 1956-7 session in the light of experience. The details of the method of payment were to be left to the central office in consultation with the Treasurer. An estimate had been made that the cost would be for Council meetings £350, centrally arranged committee and subcommittee meetings £2,570, and the Annual Representative Meeting £3,900, making a total of £6,820. This did not take into account attendances at meetings of the General Medical Services Committee. It was hoped that, following the procedure adopted for travelling expenses, the cost of subsistence allowances would be met from the National Insurance Defence Trust. If not, the total expenditure from Association funds would be increased by some £500 to £600 per annum.

The Council approved the scheme brought forward by the Committee for the formation of a Roll of Fellows of the B.M.A. It was intended that this would grant a distinctive status for outstanding services given by members to their Divisions or Branches. The Committee also considered a resolution of the Representative Body with regard to changing the date of the A.R.M. to the autumn, and recommended that no change should be made in the existing procedure.

Office Committee

Dr. S. WAND (Dr. Grant in the chair) moved the report of the Office Committee. The Council approved a recommendation that the Gold Medal of the Association for Distinguished Merit be awarded to Sir Henry Hallett Dale, in recognition of his distinguished services to medicine in the field of physiology and pharmacology. A recommendation that the Representative Body be invited to elect T. C. Routley, Toronto, a Vice-President of the Association, in recognition of his distinguished services to the Association was also approved.

Dr. WAND drew attention to the proposals of the Committee to recognize the outstanding services of members of the office staff. Miss G. B. Offord, of the secretarial department, had served for 41 years on the staff of the Association. She had been most loyal and efficient, and had a remarkable record of attendance at work. Mr. G. A. Peck had given notable service which the Committee recommended should be recognized by a gratuity. This was agreed to.

Association's Publications

Dr. J. G. M. HAMILTON, chairman, presented the report of the Journal Committee. He said that the Committee considered the resolution of the Annual Representative Meeting that the *Supplement* should be published in separate form, or that it form the centre pages and be easily detachable for reference. To publish the *Supplement* separately would

cost £6,100 more a year, and the Committee did not consider this additional expenditure to be justified at present. With regard to binding it in the centre pages, such a method would be highly undesirable from a production point of view, and from a journalistic point of view it would be revolting; the combined product would be deplorable because the important centre pages would be broken into by the interposition of the *Supplement*, and those who tried to detach the *Supplement* for filing would invariably tear the adjacent *Journal* pages. Possibly the majority of members would prefer to have the *Supplement* where it was. The Committee recommended that no action be taken in this matter.

Referring to the financial side of the *Journal*, Dr. Hamilton said that unavoidable departures from the budget had been caused by the increase in inland postage, which had cost £1,600 to the end of August, and the need for additional pages in the *Supplement*. Advertisement revenue, however, was higher. There was an increase in printing charges of just over 14% for the *Journal* and between 14 and 20% for the other journals. Wages in the printing industry, subject to a cost-of-living bonus, were now stabilized until April, 1959. Speaking of the position as at October 31, Dr. Hamilton said that the Business Manager had made a cautious guess that by the end of the year there might be a small overall surplus on the publications.

The report was adopted.

Dr. ANNIS GILLIE presented the report of Family Doctor Committee. The Committee had carefully considered its terms of reference, and recommended that they should continue as before, with the deletion of the phrase "as a temporary measure." This was agreed to.

The Committee reported that a new and satisfactory printing contract had been entered into which would come into action in January, 1957. It was hoped that through changes in the type of paper there would be a saving on paper costs. The Committee considered carefully a proposal to print the magazine in Holland, which would effect a very considerable saving on printing costs, and, in reply to questions as to the reason for deciding against it, Dr. GILLIE said that it was felt there was additional security in having the magazine printed in this country from the point of view of the date of publication. There might be delays and heavy cost incurred in getting the copies here at the right time.

Dr. I. D. GRANT asked if the Committee would consider sending copies of *Family Doctor* to the Caribbean; they had never seen this publication, and it might result in some further orders.

Dr. HALE-WHITE asked if the *Family Doctor* publication books and pamphlets, on various subjects, could be purchased on the bookstalls, and Dr. GILLIE replied that that was so, or they could be obtained from the office or from chemists.

The remainder of the Report was approved.

Other Reports

The Chairmen of the Constitution, Amending Acts, Central Ethical, Compensation and Superannuation, Scottish, Charities, Drug Addiction, and the Edinburgh Meeting (1959) Steering Committees reported on action taken and the reports were approved without discussion. Reports of representatives to various conferences were also received and accepted.

Major-General J. C. A. DOWSE, moving the report of the Overseas Committee, drew attention to the view of the Committee that the various overseas branches should be visited at regular intervals by a representative of the parent body. Past experience had proved this to be a valuable means of maintaining liaison and stimulating membership. The Committee recommended that arrangements should be made for such a visit to the East and Central African Branches—Kenya, Tanganyika, Uganda, Zanzibar, Nyasaland, Northern Rhodesia, Manicaland, Mashonaland, Matabeleland, Midlands, and Mauritius—during 1957. This was agreed to with

the proviso that the timing of the visit must depend on the international situation. In response to a suggestion made by General DOWSE, the CHAIRMAN OF COUNCIL expressed his willingness to be the Association's representative.

A report was received of the proceedings of a deputation to the University Grants Committee relating to the remuneration of university medical teachers and the provision of negotiating machinery. It was agreed that the Non-professional Medical Teachers' and Research Workers' Group Committee should in future deal with this matter, with power to co-opt professors if found necessary.

It was also reported that the Special Commissioners of Income Tax had allowed the appeals by the part-time consultants in all five test cases against assessment under Schedule E. The Inland Revenue had appealed against this decision, and the appeal would be heard in due course by a Judge of the High Court.

The Council rose at 7.15 p.m.

COUNCIL DINNER

The State and doctors should do more to foster cultivation of the will to keep fit, said the President of the Association, Dr. ALEXANDER HALL, when he proposed "The Common Health" at the Council Dinner on November 6. In his response the Minister of Health, Mr. R. H. TURTON, described the general practitioner as the only person who could bridge the three "streams" of the National Health Service. The dinner was held in the Great Hall at B.M.A. House, the Chairman of Council, Dr. S. WAND, presiding.

Immeasurable Quality

Dr. HALL, quoting Disraeli's words: "The health of the people is really the foundation on which all their happiness and all their power as a state depend," said he was sure that by the health of the people Disraeli did not mean anything that could be measured against the number of working days that lost through illness or the size of the nation's drug bill. He meant the physical, mental, and spiritual well-being of the people, not a thing purveyed to them by the State but a quality of body, mind, and spirit developing and abiding in them as a reaction to the conditions in which they lived and worked.

The State had done much to improve living and working conditions since Disraeli spoke those words. There was, however, a danger that the State's efforts, while they made for greater happiness, failed to evoke the response which added to the power of the nation. While the happiness of the people might to some extent depend on what they got out of the kitty, the power of the State depended on what people put into the kitty.

In cultivation of the will to be and keep fit, the family doctor, the medical officer of health and his team, the school medical officers, and the industrial medical officers could help. Dr. Hall had been impressed by the universal agreement on the success and value of the method of direct health talks in factories, instituted by the late James McKenzie. Might not similar direct talks in the home, the school, the community centres, and so forth pay equal dividends?

"Do not let us be deluded into thinking that free hospitals, free this, that, and the next thing in the way of medical treatment can alone provide the answer to the problem of the common health," declared Dr. Hall. The Minister in the great department of State, and practising doctors in more intimate touch with the people, had a common purpose. They must do more to foster health culture, both physical and mental, as well as treat the sick.

Team Work

The MINISTER OF HEALTH said that Dr. Hall had recalled the words of that founder of a great deal of Conservative

philosophy, Disraeli. It was in that same speech that Disraeli used the phrase: "*Sanitas sanitatum, omnia sanitas*."

One of the difficulties in the National Health Service was the fact that three streams flowed in parallel lines. In the Minister's judgment, only the general practitioner could bridge those three streams. If there was to be success, he must be the clinical leader. He would do his best to establish the general practitioner in that position. Such leadership, however, demanded considerable qualities.

"I realize," Mr. Turton continued, "that the close relationship between doctor and patient is the most vital principle of your profession. I shall always respect it, and I am sure that no Minister of Health should ever interfere with it." The medical profession and the Ministry could do a great deal if they worked together. The Minister knew that the Association would constantly have disagreements with him—that was inevitable; "but, however much we disagree," concluded Mr. Turton, "I want you to realize that I have complete confidence in your profession and that I am always grateful for the great work which you are doing for the common health."

Seventy Thousand Members

At the conclusion of the Minister's speech a unique ceremony took place. Dr. ALEXANDER RAEBURN GRIEVE, a recently qualified practitioner whose application for membership of the Association in September brought the membership figure, for the first time, to the total of 70,000, was introduced by the Chairman, Dr. WAND, who presented him with a copy of Ernest Muirhead Little's *History of the British Medical Association*.

Retiring Officers

Proposing the toast of the retiring officers, Dr. WAND referred to the long history of service to the Association of Dr. E. A. Gregg, who retired as Chairman of Council in July, and who was unable to be present at the dinner. The words "upright, courageous" described him. The hearts of those present would go out to him over the recent death of his daughter. Sir John McNee, Past-President, was out of the country, on the business of the General Medical Council; he was a man, said Dr. Wand, who had made a great contribution to the science of medicine. Dr. T. C. Routley, immediate Past-President, had made, with Mrs. Routley, his 51st crossing of the Atlantic specially to be present at this dinner. Mentioning Dr. Routley's work for the Canadian Medical Association, the World Medical Association, and the World Health Organization, as well as for the British Medical Association, Dr. Wand remarked that he could truly be called a great man in great places.

In the absence of Sir John McNee the toast was responded to by Lady McNEE. She had been told that it was unprecedented for the response to be given not by the Past-President but by the Past-President's lady. Lady McNEE added that she intended to be even more unprecedented and return thanks on her own behalf. She had had a wonderful time, and the visit to Canada had been the crown of a very happy year.

In his response to the toast Dr. ROUTLEY said that it was not only a high honour to be President of the Association but a rich and rewarding experience. In Canada now they were planning the "invasion" of these islands in 1959. Dr. Arthur Kelly, General Secretary of the Canadian Medical Association, was in Britain discussing plans for the Edinburgh meeting in that year.

The toast of the guests was felicitously proposed by Dr. IAN GRANT, Chairman of the Representative Body. Dr. J. F. LOCKWOOD, Vice-Chancellor of the University of London, responded.

A programme of music was played during dinner by the string orchestra of the Royal Army Medical Corps (by kind permission of Colonel H. C. Benson), under the Director of Music, Major L. D. Brown.

TAX ASSESSMENT OF PART-TIME
CONSULTANTS

COMMITTEE'S INTERIM ADVICE

The Crown have appealed against the decision of the special commissioners that part-time consultants should be assessed under Schedule D in respect of the whole of their professional earnings (see *Supplement*, August 18, p. 103, and August 25, p. 109). The special commissioners now have to state cases for the High Court by whom the appeal will be heard. From the High Court there may be an appeal to the Court of Appeal, and thence to the House of Lords. Thus a considerable time may necessarily elapse before a final decision is obtained.

Following discussions with the Board of Inland Revenue, it is now possible for the Central Consultants and Specialists Committee to advise consultants on the position pending the final outcome of the test cases.

Temporary Status Quo

Save in exceptional cases, those part-time consultants at present assessed under Schedule D will continue to be so assessed and those now under Schedule E will remain under that Schedule. If the special commissioners' decision is upheld, and it is decided that part-time consultants should be wholly assessed under Schedule D, all open Schedule E assessments—i.e., those in respect of which a notice of appeal has been given—will be abandoned by the Crown and the liability will be dealt with under Schedule D. In the meantime consultants under Schedule D will continue to pay tax as before. Those paying tax under P.A.Y.E. will continue to do so and the tax paid will be available, if necessary, to satisfy the Schedule D assessments.

If payment of tax under P.A.Y.E. was not made, substantial arrears might accrue while the test cases were under appeal and consultants might have to find large sums to pay the tax which had mounted up.

Notices of Appeal

Many consultants who have been changed to Schedule E have already given formal notice of appeal against their assessments. Those who have not done so should give notice of appeal to their inspectors within 21 days of the date of the notice of assessment.

In some cases P.A.Y.E. may have been applied but assessments under Schedule E may not have been raised. In such cases notice in writing under Section 158 of the Income Tax Act, 1952, should be given to the inspector. This notice, which should be given by April 5, 1957, should require the inspector to raise a Schedule E assessment in respect of the fiscal year 1951-2, if P.A.Y.E. was applied in that year. When this notice is complied with and the notice of assessment is received a notice of appeal should be sent to the inspector within 21 days. A similar notice should be given by April 5, 1958, requiring an assessment for the fiscal year 1952-3, and again notice of appeal should be given when the notice of assessment is received. The inspector will arrange for a Schedule D assessment to be made for the same year covering all the professional earnings to protect the Revenue in case it is ultimately decided that the hospital emoluments for that year are not assessable under Schedule E. On receipt of this Schedule D notice of assessment the consultant should give notice of appeal to the inspector against this assessment as well.

The Schedule D and E assessments having been made and formal notices of appeal having been given, no further action will need to be taken and the principle of the final decision on the test cases will be applied to every open appeal. Inspectors will be instructed that no steps should be taken to set down the appeals for hearing.

It should be emphasized that payment of tax under P.A.Y.E. is a separate question from assessment to tax and will not prejudice any assessment against which notice of appeal has been given.

Loss Relief Claims

At the hearing before the Special Commissioners it was argued on behalf of the consultants that even if hospital remuneration was properly assessable under Schedule E all the consultant's professional expenses should be taken into account in making the Schedule D assessment on his other professional income. In view of their decision it was unnecessary for the special commissioners to rule upon this argument. However, if the final decision proved to be that the special commissioners were wrong but that the argument referred to above was correct, many consultants would make a loss or an increased loss (for tax purposes) in their private practice. To protect their position, therefore, such consultants assessed under Schedule E should give notice to their inspector of their intention to claim loss relief under Section 341 of the Income Tax Act, 1952. This notice should be given by April 5, 1957, and can only relate to the fiscal year 1955-6. A similar notice should be given by April 5, 1958, in respect of the year 1956-7.

Consultants are advised to refer this report to their accountants.

H.M. Forces Appointments

ROYAL NAVY

Surgeon Commander H. L. Belcher, O.B.E., has retired. Surgeon Lieutenants I. H. Colley, P. R. Morgan, and H. J. McLoughlin to be Surgeon Lieutenant-Commanders.

ROYAL NAVAL VOLUNTEER RESERVE

Surgeon Commander R. G. Reid, V.R.D., has retired. Surgeon Lieutenants W. B. Dawson, C. M. Flood, C. A. Pragnell, and J. F. Adams to be Surgeon Lieutenant-Commanders.

ROYAL ARMY MEDICAL CORPS

Lieutenant-Colonel F. M. Lipscomb, O.B.E. (retired, re-employed), has ceased to be employed as Physician and Surgeon, Royal Hospital, Chelsea, and has been regranted the honorary rank of Colonel.

Major G. F. Anderson has retired. Captains B. J. Mahony, W. J. Gourley, and D. Magner to be Majors.

ARMY EMERGENCY RESERVE OF OFFICERS

ROYAL ARMY MEDICAL CORPS

Honorary Major H. J. Hambury (formerly Emergency Commission) to be Captain, relinquishing the honorary rank of Major.

Association Notices

Diary of Central Meetings

NOVEMBER

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| 19 Mon. | Study Leave Subcommittee, Central Consultants and Specialists Committee, 11.15 a.m. |
| 20 Tues. | Alternative Edition Subcommittee, Joint Formulary Committee, 11 a.m. |
| 20 Tues. | Special Whitley Subcommittee on Fees for Part-time Medical Work for Local Authorities, 11.30 a.m. (Staff Side, 11 a.m.) (at 14, Russell Square, W.C.). |
| 21 Wed. | Editorial Subcommittee, Joint Formulary Committee, 11 a.m. |
| 22 Thurs. | Central Consultants and Specialists Committee Executive, 2 p.m. |
| 22 Thurs. | International Relations Committee, 2 p.m. |
| 22 Thurs. | Psychological Medicine Group Committee, 2 p.m. |
| 23 Fri. | Chairman's Subcommittee, Constituent Committee, 11 a.m. |
| 23 Fri. | Registrars Group Council, 2 p.m. |
| 23 Fri. | Joint Subcommittee of Rehabilitation and Film Committees, 4.30 p.m. |
| 28 Wed. | Emergency Call Subcommittee, G.M.S. Committee, 11 a.m. |
| 28 Wed. | Amending Acts Committee, 2 p.m. |
| 29 Thurs. | Maternity Medical Services Committee, 1 p.m. |

DECEMBER

- | | |
|-----------|---|
| 5 Wed. | Film Committee, 2 p.m. |
| 6 Thurs. | Central Consultants and Specialists Committee, 10.30 a.m. |
| 20 Thurs. | G.M.S. Committee, 10.30 a.m. |

SUPPLEMENT TO THE
BRITISH MEDICAL JOURNAL

LONDON SATURDAY DECEMBER 1 1956

CONTENTS

Remuneration Claim	201	Petrol Rationing	203
Coal Gas Poisoning	201	General Medical Services Committee	203
Forensic Medicine	202	Correspondence	204
Library Opening Hours	202	H.M. Forces Appointments	207
Prescription Charges	203	Diary of Central Meetings	208
Sighthill Health Centre	203	Branch and Division Meetings to be Held	208

REMUNERATION CLAIM
MINISTERS' REJECTION

The following letter has been received by Dr. A. Macrae, Secretary of the Negotiating Committee, from Sir John Hawton, Permanent Secretary to the Ministry of Health

"On September 12 a memorandum was submitted setting out further particulars of the Negotiating Committee's views on the legal aspects of the claim for increased remuneration.

"I am instructed to say that this memorandum has now been fully examined. Ministers remain of the opinion that no contractual obligation such as has been alleged by the Negotiating Committee exists and that no action based on such a claim could succeed. If the Committee are not prepared to accept the Ministers' views as to this, no doubt the matter can be brought before the courts for adjudication."

The Negotiating Committee met on November 28 to consider the Ministers' reply.

COAL-GAS POISONING
B.M.A.'s INQUIRY

On March 2, 1955, the Council empowered the Science Committee to set up a subcommittee "to inquire into the problem of accidental death and ill-health from coal-gas poisoning, and to make recommendations." At its meeting on November 7 the Council approved the report,* and a summary of it follows.

In recent years, the subcommittee found, there had been a progressive increase in the number of accidental deaths from coal-gas poisoning in Great Britain. In 1931 there were 175, in 1951 there were 589, and the provisional figure for 1955 is 892. But the increase must be viewed in conjunction with two facts—first the amount of gas sold in Great Britain has increased by 85.7% during 1931-55, and the proportion of old people in the population has also increased.

The toxicity of the coal gas depends on the percentage of carbon monoxide in it. This varies in different parts of the country and at different times. When and where toxicity

*The members of the subcommittee were: Dr. W. N. LEAK, general practitioner, police surgeon, division medical officer, I.C.I. (chairman). Dr. H. D. CHALKE, medical officer of health, Camberwell, and divisional medical officer, L.C.C. Professor ESTHER M. KILLICK, professor of physiology, University of London. Mr. J. R. NICHOLSON-LAILEY, chairman of the Science Committee. Dr. A. LLOYD POTTER, division medical officer, I.C.I. Dr. C. KEITH SIMPSON, forensic pathologist, reader in forensic medicine, University of London. Dr. F. H. TYLER, forensic medical officer, West Midlands Gas Board. The subcommittee co-opted the following: Miss BERYL F. CROUCH, S.R.N., health visitor, L.C.C. Mr. G. H. FUIDGE, chief physicist, South-eastern Gas Board.

is higher, the number of casualties might be higher, and this assumption is being investigated by the Gas Council. During cold and windy weather when windows are closed and ventilation is diminished there is an increase in fatalities. While the percentage of carbon monoxide in coal gas may rise slightly at such times, this alone cannot account for the larger number of casualties. Thus decreased ventilation is a very important factor.

A comparison of the circumstances surrounding gas poisoning deaths in 1934-8 and 1946-50 shows that the biggest percentage increase in the second five years over the first is due to taps being left open on lighting and cooking burners (228 to 937 deaths, or 311%). The next highest percentage increase concerned defective internal pipes, meters, and fittings (66 to 195 deaths, or 191%). Deaths due to taps left open on fires increased from 99 to 269 (172%) and on cooking ovens from 154 to 442 (187%). Deaths associated with flexible tubing increased from 77 to 194 (152%) and deaths due to the mistaking of taps close together increased from 22 to 46 (109%). Escapes of gas outside the home (that is, from main pipes) caused 47 deaths in the first five years and 82 in the second, an increase of 74.5%. Deaths in industry decreased from 100 to 89 (11%).

Liability to Gas Poisoning

Two groups of investigations specially made for the subcommittee show how elderly people are particularly prone to fall victims to gas accidents. The first of these was a survey of a sample of old people living in a metropolitan borough. Nearly all of them used gas cookers; some 19% of these required attention, though only 1½% (4) needed to be replaced because of serious defects. A rough assessment of the old people's capabilities based in part on information from the subjects themselves suggested that 10% were likely to be especially prone to accidents with gas appliances, owing to sensory or motor defects.

The second group of investigations was to determine the sensitivity of old people to the smell of town gas. Between 40 and 50 patients of the geriatric unit of a London hospital were tested for their capacity to detect and identify the smell of gas (as well as other odours). The subcommittee found that the results had to be treated with some reserve, one reason being that some patients who were most anxious to please were prepared to smell gas in any mixture submitted to them. Moreover, most of the patients were in bed and did not find it easy to use the apparatus comfortably. The results suggested, however, that the minimum detectable concentration of gas for women over the age of 65 is much higher (2.5 parts per 1,000) than that for the age 20-50 (0.7 parts per 1,000), and that the variation is very much greater.

Rescue and Prevention

The only safeguard for more than short exposures to gas is an air-line or oxygen breathing apparatus. A canister gas mask is of strictly limited benefit. The main stop-cock in every house should be within easy reach, windows and doors should be opened immediately to allow gas to disperse, and bare lights or sparks must be avoided. Administration of pure oxygen should be started as soon as possible and artificial respiration performed if necessary. The subcommittee suggests that every fire and ambulance station should be provided with a mechanical respirator. The Gas Council is studying the possibility of giving gas a more pungent smell, but it is thought that tear gas would be ineffective as a warning when people were asleep, and a sneezing substance might increase the risk of bronchial trouble after exposure to gas. Communal meters—a known danger—are being rapidly replaced. Taps which have to be pushed in before they can be turned are the safest type. Various automatic devices are being studied or are already on the market to ensure that when gas is emitted it shall be lit. The law makes it mandatory on the local authority to look after the health and welfare of old people, and any changes required to make gas appliances safer, and more handy for these people would be a justifiable expense. The subcommittee's recommendations are given verbatim below.

Recommendations

- (1) The main stop-cock to the gas supply in a house should always be easily reached and well marked.
- (2) The precautions needed to promote safety in rescuing cases of coal-gas poisoning should be more widely known.
- (3) Self-acting artificial respirators should be available at every fire station and ambulance station.
- (4) Research should continue on the practicability of reducing the carbon monoxide content of coal gas and the influence of this on the incidence of coal-gas poisoning.
- (5) The Gas Council should continue its efforts to discover a yet more distinctive or pungent smell to make the presence of coal gas still more obvious.
- (6) Communal meters should be replaced by individual ones as quickly as possible.
- (7) The installation of gas-pipes and appliances by private contractors should conform to the standards laid down by the Gas Council, and the appliances supplied should pass suitable tests for safety in use.
- (8) Attention should specially be paid to flexible tubing and its connexions and any worn or faulty tubing should be replaced.
- (9) Gas boards should cut off the supply of gas when there is any reason to believe leaking fittings or unsafe appliances are being used.
- (10) Safety gas-taps should be fitted to all appliances, and as soon as possible some convention should be adopted by makers of appliances to denote by colour or some other device the tap for oven, hot-plates, etc.
- (11) The proper spacing of taps to avoid confusion should also be attended to, and blind or partially blind people should have appliances in which the various taps are distinguishable by touch as well as by position.
- (12) Automatic ignition and/or safety devices which prevent the escape of unburnt gas if the flames are blown out or the gas is not ignited should be further developed and popularized. Every effort should be made to sell such appliances at prices competitive with those not so fitted. Special efforts should be made to produce for old people who are accident-prone a small oven or cooker fitted with such a device, to be made available on the easiest terms possible.
- (13) The ventilation of old and converted property should receive careful attention.
- (14) People should be warned of the dangers of stopping up ventilators, etc., when coal-gas appliances are used (quite apart from the general danger to health of this practice).
- (15) All over the country steps should be taken to bring the hazards from coal gas to the attention of statutory and voluntary workers among the aged. This could be done through their central co-ordinating bodies, the Women's Voluntary Services, the National Council of Social Service, etc. Meetings should be arranged with the local officers of the area gas boards so that co-operation and collaboration can be achieved.

(16) In the same way, doctors, district nurses, health visitors, and others should be asked to notice the gas appliances used by their patients and be made aware of the willingness of the gas board to correct any defect observed.

(17) All local authorities should do their utmost to see that the gas appliances of old people are properly suited to their requirements, and more use should be made of statutory powers to achieve this result.

(18) Educative but not alarmist publicity should be provided through press, radio, and television to indicate the dangers in the use of coal gas, particularly to the aged and infirm, and also to explain how easily many of these dangers can be avoided. The public should be induced to demand and suppliers urged to provide safety devices which comply with the standards of established safe practice.

FORENSIC MEDICINE

The Forensic Medicine Subcommittee of the Private Practice Committee met recently and reappointed Dr. D. TEARE as its chairman for the session.

Mileage Allowance

In connexion with the Coroners (Fees and Allowances) Rules, 1955, it was learnt that the Home Office had expressed doubt whether the provision of a travelling allowance for the performance of a necropsy could be made in a local authority schedule, as previously was the case. Following representations made by the Subcommittee, it was understood that the Home Office now intended to amend these Rules to provide for these travelling expenses. A deputation was appointed to attend the Home Office to urge that these allowances should be in accordance with Association policy.

Model Schedule

An interview is to be sought with the associations of local authorities to discuss a model schedule of fees, allowances, and disbursements payable by coroners under Section 25 of the Coroners Act, 1887.

It was reported that representations that higher fees should be paid to highly qualified pathologists for post-mortem examinations of special difficulty had not found favour with the Home Office—a view which the Subcommittee deplored.

Appointment of Coroners

The Committee endorsed the view of a B.M.A. Division that the appointment of a whole-time local authority employee to the post of coroner was undesirable, and that the office should be held by an independent person.

Many inquiries had been received whether fees for certificates issued at the request of the police in cases of sudden death should be claimed from the police or coroner. It was the unanimous view of the Committee that until death had been certified the matter could not be one for the coroner, and if the doctor had been called by the police they alone were responsible for his fee.

It was reported that in one B.M.A. Division there had been discussions with the local police, who had experienced difficulty in finding a doctor to examine a person charged with driving a car while under the influence of drink. It was the view of the Committee that the solution was for the police to make police-surgeon appointments remunerated in accordance with the revised B.M.A. scale.

Witnesses' Allowances

Representations are to be made to the Home Office concerning the inadequate fees paid to witnesses called by the prosecution in non-indictable cases in England and Wales.

LIBRARY OPENING HOURS

The need for fuel economy has made it necessary to change the hours during which members may use the Library. Until further notice, the Library will open at 9 a.m. and close at 5.30 p.m.

PRESCRIPTION CHARGES

The London Executive Council passed a resolution on November 22 disapproving the Government's intention to increase the prescription charges from 1s. per prescription to 1s. per item. In the council's opinion the proposal was a serious threat to the principle of a free National Health Service and the additional charges would discriminate unfairly.

SIGHTHILL HEALTH CENTRE

The third annual report of the Sighthill Health Centre, Edinburgh, records the appreciation of the general practitioners of the facilities provided. There has been an increase of 371 in the lists of centre doctors, the total for 11 principals now being 17,100. The scope of the laboratory work has extended from urine testing, haemoglobin estimations, and blood counts, to blood urea and blood-sugar estimations. This year a sterile syringe service has been started under the supervision of the chief pharmacist. Another innovation, not yet fully developed, is an old people's health and welfare club whose 60 members meet one afternoon a week to "play games, take part in Scottish country dancing, listen to talks on health subjects, and see health and other interest films." Admission to membership includes medical examination. Applicants must be recommended by the person's family doctor, and treatment for any conditions discovered is arranged through him.

The centre is said to be becoming the recognized meeting-place of all social workers in the area, and co-operation between them is developing successfully.

PETROL RATIONING

Further instructions on petrol rationing and the medical profession have been issued by the Ministry of Health.

General practitioners should apply for a supplementary allowance to the regional petroleum officer, as stated in last week's *Supplement* (p. 196). Should any difficulty arise, doctors in the National Health Service should ask their local executive council for supporting evidence. It is expected that in such cases the council will consult the local medical committee. Private practitioners should apply for supplementary coupons to the regional petroleum officer. The Association has approached the Ministry of Fuel and Power about arrangements for private practitioners in case of difficulty.

Hospital Medical Staff

Boards of governors and regional hospital boards will be issued with a supply of coupons to cover the various services for which they are responsible. "For private cars used on hospital business . . . by their employees," a Ministry circular states, "a comprehensive allowance will be made." Boards will be responsible for allotting coupons from this comprehensive allowance as seems best to them. Inquiry at the Ministry of Health revealed that the term "employees" covers hospital medical staff. Hospital medical staff should therefore apply to their board of governors or regional board for supplementary petrol coupons for their N.H.S. work.

Consultants and specialists should apply to the regional petroleum officer for supplementary coupons for their work outside the National Health Service. As with general practitioners in private practice, the Association has approached the Ministry of Fuel and Power about arrangements in cases of difficulty. It is hoped that information about this will be available shortly.

Local Authority Medical Officers

Local authority medical officers should draw their supplementary coupons from their local authority.

REGIONAL PETROLEUM OFFICES

Region	Address	Area Covered
London North	Government Buildings, London Road, Stanmore, Middlesex	London north of the River Thames, and the counties of Essex and Hertfordshire lying within the Metropolitan Police area
London South and Eastern	Government Buildings, Ruskin Avenue, Kew, Surrey Block D, Government Buildings, Brooklands Avenue, Cambridge	London south of the River Thames, and the counties of Kent, Surrey, and Sussex The counties of Norfolk, Suffolk, Cambridge, Huntingdon, Isle of Ely, Bedford, and those parts of Hertfordshire and Essex lying outside the Metropolitan Police area
South Western	Block 2, Government Buildings, Flowers Hill, Bristol, 4	Cornwall (including the Isles of Scilly), Devon, Gloucestershire, Somerset, and Wiltshire
Southern	Block 3, Government Buildings, Whiteknights Park, Reading	Berkshire, Buckinghamshire, Dorset, Hampshire (including the Isle of Wight), and Oxfordshire
Wales	Block 2, Government Buildings, Tyglas Road, Llanishen, Cardiff	Anglesey, Brecknockshire, Carmarthenshire, Cardiganshire, Carmarthenshire, Denbighshire, Flintshire, Glamorganshire, Merionethshire, Monmouthshire, Montgomeryshire, Pembrokeshire, and Radnorshire
Midland	Severn House, Suffolk Street, Birmingham	Herefordshire, Shropshire, Staffordshire, Warwickshire, and Worcestershire
North Midland	Block 7, Government Buildings, Chalfont Drive, Nottingham	Derbyshire (excluding the Boroughs of Buxton and Glossop, the urban districts of New Mills and Whaley Bridge, and the rural district of Chapel-en-le-Frith), Leicestershire, Lincolnshire, Northamptonshire (including the Soke of Peterborough), Nottinghamshire, and Rutland
North Western	Block E, Government Buildings, Heyhouses Lane, Lytham St. Annes, Lancs	Cheshire, Cumberland, Lancashire, Westmorland, and in the county of Derby the boroughs of Buxton and Glossop, the urban districts of New Mills and Whaley Bridge, and the rural district of Chapel-en-le-Frith
Northern	Government Buildings, Kenton Bar, Newcastle-upon-Tyne, 3	Durham, Northumberland, and the North Riding of Yorkshire
North Eastern	Government Buildings, Ring Road, Halton, Leeds, 15	The East Riding and the West Riding of Yorkshire; and the city of York
Scotland	Government Buildings, Broomhouse Drive, Saughton, Edinburgh	Scotland

GENERAL MEDICAL SERVICES COMMITTEE**INCREASED COST OF PRESCRIPTIONS**

A meeting of the General Medical Services Committee was held at B.M.A. House on November 15, with Dr. A. B. DAVIES, acting Chairman, in the chair.

It was stated that Dr. Talbot Rogers was making good progress and hoped to be back again in the New Year. Dr. F. G. Tomlins, of Chingford, was co-opted to the committee as a representative of unestablished principals, and Dr. R. D. Jones, of Cheadle, as representative of assistants.

Remuneration

Attention was drawn to newspaper reports of an address given by the Minister of Health to the Conference of the Executive Councils Association (England) (*Supplement*, October 27, p. 167). The Minister had spoken of "a pleasant surprise for the doctors," and this had been taken up by the Press in such headings as the *Birmingham Post's* "Minister's Reply to Doctors' Pay Claim." The Chairman of Council had pointed out to the Minister that such a statement gave the general impression that the profession's claim for additional remuneration had been partially met, whereas the Minister's reference was to the adjustment to present-day values of money of that part of the pool that dealt with practice expenses. This had nothing to do with the present remuneration claim, and indeed was already

provided for under a system of investigation agreed upon with the British Medical Association.

The committee endorsed with applause the prompt action taken by Dr. Wand.

Central Pool, 1954-5

A statement was submitted by the accountants on the calculation of the final settlement due to general practitioners in the National Health Service for the year 1954-5. The amount of the balance due was £4,257m. The number of doctors in the Service during 1954-5 was 21,133. The amount required to provide a net income of £2,222 per doctor was £46,958m., and the amount for practice expenses was £23,549m.—making a total gross income of £70,507m. The remuneration already received was £66,250m.

Charges for Prescriptions

Report was formally made that the Government had decided to alter the basis of the shilling prescription charge, making it payment per item instead of payment per prescription. Representatives of the committee had met the Ministry of Health on November 15, and had protested in the first place that the change in prescription charges had been decided without previous consultation with the profession. It was emphasized that the introduction of the new charges would cause hardship to certain patients. Patients with certain types of illness would be particularly hardly affected by having to make in future a relatively heavy payment solely for several necessary items. Moreover, many patients would not go to the National Assistance Board, however difficult their circumstances. The new charges might well have an effect on treatment, for doctors were bound to take into consideration the financial position of their patients, and might feel debarred from prescribing something because the patient could not afford an extra shilling. The deputation placed on record its opposition to the Minister's proposals, and asked that its views should be made known to the Minister.

In the course of a somewhat lengthy discussion a strong feeling was evident in the committee that the policy that there should be no charge at all for prescriptions should be reaffirmed. Dr. J. A. PRIDHAM urged that persons suffering from specified conditions should be excepted from the new provisions. It was also urged that now was the time to draw up a list of life-saving drugs which would be free to all, leaving other items to be paid for by the patient. The majority attitude was that all drugs should be free.

The Committee then adopted a resolution confirming its adherence to the Association's policy that there should be no charge for prescriptions and that the Committee was therefore particularly opposed to the Government's present proposals which sought to extend the existing charge in a manner which would discriminate against certain categories of patients.

Corticotrophin (A.C.T.H.) Supply

A communication was read from the Ministry of Health pointing out that up to the present A.C.T.H. had been bought by the Ministry direct from the manufacturers and had been issued free of charge to selected hospitals. The Minister was anxious to reduce restrictions on supply so far as possible, but had been advised by experts that, in view of the variability both in strength and in activity of different products and indeed of different batches of the same product, therapy should be controlled by biochemical measures only available in hospitals. In the interests of the patient, therefore, the Ministry could not contemplate a general release, at least for the present.

It was stated that the demand for A.C.T.H. was not great and had tended to decrease. In these circumstances it seemed to the Committee that there could be no objection to such an arrangement.

The Committee indicated its general concurrence, but expressed the hope that a general practitioner could obtain further supplies of A.C.T.H. directly from the hospital in cases where it was known that the consultant in the case wished it to be continued.

Correspondence

Because of heavy pressure on our space, correspondents are asked to keep their letters short.

Senior Registrars and Consultant Appointments

SIR.—Dr. H. Joules's letter (*Supplement*, October 20, p. 163) regarding the consultants is indeed timely. From my experience I have no doubt that the establishment of consultant physicians and surgeons is too small to deal with the mass of work which awaits their care. The surgical consultants are extended to the full with major operations, while large numbers of otherwise well patients with chronic appendices, herniae, varicose veins, and piles, etc., wait for months, or possibly years, for attention. They are frequently operated on by house officers and surgical registrars where consultants are fortunate enough to have their help. Earnest though these men are, they are often without the necessary training and supervision.

I think that it is a national need that the office of assistant physician and surgeon be reintroduced, and that our registrars, who have carried the burden of emergency and night work for so many years, be given status and reasonable security after their arduous and expensive training. Another factor is that our consultants should not be so fatigued that they lose freshness, and have not time for reading, attending meetings, and contributing to their specialty for which their great experience fits them. I earnestly hope that the appointments of assistant physician and surgeon be revived.—I am, etc.,

London, W.1.

HAROLD DODD.

SIR.—I wish to draw attention to the present-day plight of the so-called trainee specialists of the National Health Service. There is much to suggest that the chances of promotion from senior registrar to consultant are less at this moment than at any time, and, though it is freely stated that in 10 years all will be well, the present situation is none the less critical.

I quote statistics abstracted from "Consultants and Other Specialist Staff in the National Health Service" (*Supplement*, June 30, p. 409).

I have arbitrarily surveyed the state of affairs pertaining to five specialties—i.e., general medicine, general surgery, anaesthesia, obstetrics and gynaecology, and orthopaedic surgery.

The absorption of senior registrars into consultant practice depends on three factors: (1) expected retirement vacancies, (2) unexpected retirement and death vacancies, (3) new appointments. It is obvious that one can only consider appointments resulting from (1) and (3). For the purposes of simplicity a consulting post is accepted as having a nine-session basis. It is noted that there are a limited number of consultants over retiring age with a varying number of sessions.

TABLE I.—State of Affairs at June, 1955

A	B	C	D	E	F	G
Specialty	Total Number of Registrars	No. of Consultants Over Age of 65	No. of Sessions Held by C	Theoretical Number of Posts Held by C on 9-session Basis	Excess Senior Registrars Over June, 1955	Year of Absorption on Basis of Retirement at 65
General surgery...	203	46	246	27	176	1964
...medicine	205	35	206	23	182	1966
Anaesthesia ..	62	13	84	9	53	1961
Obstetrics and gynaecology ..	104	20	144	16	88	1965
Orthopaedics ..	67	12	40	4	63	1967

Table I demonstrates that, on the basis of senior registrars being entirely absorbed by retirement vacancies, at the

best it will be many years before the present senior registrars are absorbed.

TABLE II

Specialty	Absorption Time
Anaesthesia ..	5 years
Medicine ..	10 "
Surgery ..	8 "
Obstetrics and gynaecology ..	9 "
Orthopaedic surgery ..	11 "

Table II considers only the present number of senior registrars, and does not, of course, include any further replacement appointments until such time as absorption is complete.

Following the war numerous new consulting posts were made; this trend is now ceasing. Table III demonstrates that there is a progressive decline in the introduction of new consulting posts.

TABLE III.—All Specialties are Considered Here

	Increase in Number of Consultants Over Previous Year	Percentage Increase
1950 ..	514	8.9
1951 ..	243	3.9
1952 ..	386	6.0
1953 ..	217	3.2
1954 ..	146	2.0
1955 (½ year) ..	80	1.1

If we consider the five specialties analysed here, we find that in 1950 there was an increase of 230 consultants, but in 1954 this number had fallen to 77 (of which 34 were in anaesthesia). Should this trend continue it is obvious that new appointments can have little effect on improving the over-all picture, and, with the present social structure of our country, income tax, etc., it is unlikely that there will be many premature retirements.

It is unnecessary for me further to highlight the unpleasant facts as demonstrated above; it is sufficient to say that drastic action is required now. I have been assured that these facts are widely appreciated. However, I regret that I can find little evidence of any positive action being taken, and this is not a self-resolving complaint.

I suggest the following measures: (1) Some form of guarantee of future employment should be made to senior registrars, and present contracts should be extended beyond the four-year period if necessary. (2) Replacement senior registrar appointments should be reduced to a practical minimum until the present excess is absorbed. (3) A greater number of new consulting posts should be made, which could, if necessary, be made non-recurring. (4) Salary scales should be reviewed. At present there is only slight difference between registrars and senior registrars, but considerable difference between senior registrars and consultants. I would suggest that a suitable salary would be £1,100 on appointment, rising by £200 a year up to £1,700 by the fourth year. (5) Further information should be divulged by the Minister of Health showing his appreciation of the problem and the measures he intends adopting.—I am, etc.,

Oxford

T. H. MORGAN.

SIR.—Of course Dr. H. Joules is right in his letter (*Supplement*, October 20, p. 163) in writing of senior registrars, and so is Dr. J. H. Thomas in his letter on S.H.M.O.s in the same issue (p. 164). My only comment is that they have shown dignified restraint in the expression of feeling.

In this context let me say that the term "exploitation" would best describe the prevailing feeling among too many of our colleagues, not only senior registrars and senior hospital medical officers but non-consultant hospital medical staff at all levels. It is no exaggeration to say that the bulk of non-consultant hospital doctors are frustrated and dissatisfied under the present iniquitous terms and conditions of service. Why do we so complacently tolerate a state of affairs that is in fact intolerable? Some of us strive hard to draw attention to the very real grievances, injustices, and

hardships among our junior colleagues, but unfortunately it is a time-consuming battle against conflicting interests. I hope, however, that the struggle will not be in vain.—I am, etc.,

London, N.20.

F. STEEL.

Admission to Hospital

SIR.—From Dr. G. F. Abercrombie's letter (*Supplement*, November 3, p. 179) it seems clear that a hospital may, without outside authority, set up an extra bed for an urgent admission if it so desires. This is the point I wish to bring out.

I do not criticize the efficiency of the E.B.S. in arranging admissions, and would like to reaffirm in writing my verbal appreciation of that service's help on the occasion I mentioned in my last letter (*Supplement*, October 20, p. 165) and on other occasions.—I am, etc.,

London, W.5.

C. J. COBBE.

Payment of Compensation

SIR.—Now is not the time, I suppose, to push forward salary claims, but I can see no reason why the vexed question of compensation should not be calmly considered again, even in these times. Many doctors with large commitments of various kinds, such as educating their children at university level and employing the various help which is necessary after middle age, find themselves in the "red." This, of course, has been accentuated by the credit squeeze, and they therefore have to find 6% of the amount that they are overdrawn.

The suggestion I have to make is this: Assuming that the compensation amounts to £5,000, the Government should pay back annually 6% of this amount—i.e., £300. The interest for the following year would be reduced proportionately. In this way compensation can be paid back in easy stages and no great strain would be placed on the resources of the Exchequer.—I am, etc.,

Ruthin, Denbs.

TREVOR HUGHES.

Remuneration Claim

SIR.—At a recent Branch meeting I was alone in voting against agreeing to the principle of demanding more pay (although several abstained). To me, it seems obviously unpatriotic to do anything to cause further inflation, and a wage increase for us would do that. I do not see how any Government can honour the Spens recommendations when as policy they are resisting wage claims, and I suggest that it would be a statesmanlike action for us to renounce them. This would also be prudent, as I presume that they can act in reverse, so that the Government could claim on us if there was a slump.

There are, however, several ways in which we could be financially helped without causing inflation; a widows' pension scheme could be introduced so that we could cut down on our insurance policies; our retirement pensions could be increased; interest-free loans could be introduced to cover the purchase of surgery premises, houses, equipment, and even cars; the cost of locums could be provided in cases of sickness and even for holidays. These methods would help to improve the service as well as helping us financially, and I hope would do away with this perpetual bickering over how many decimal parts of a shilling per patient per year the capitation fee should be increased.—I am, etc.,

St. Margaret's Bay, Kent.

R. J. MELHUSH.

Filling of Practice Vacancies

SIR.—Your correspondent Dr. Isaac Rose (*Supplement*, November 10, p. 184) alleges that executive council practice vacancies are filled after canvassing and lobbying in accordance with local prejudice and favouritism. This is a most serious charge, and if Dr. Rose has any concrete evidence he should exercise his right of appeal to the Medical Practices Committee, and bring the facts to its notice. This

would be much better than writing indignant letters to the *British Medical Journal*, which must inevitably leave the suggestion of a sour grape on the mental palate.—I am, etc.,
London, E. 10.

R. A. PARRY.

Remuneration of S.H.M.O.s

SIR,—The report produced by Dr. J. H. Thomas on S.H.M.O.s' remuneration (*Supplement*, October 20, p. 164), in particular the figure showing a difference between the total consultant and total S.H.M.O. salary, is of vital importance. However, the criticism that this figure follows naturally from a difference between two differing grades of pay, and applies equally to any two such grades in medicine or industry, does not stand examination for a moment. Such adjacent grades in industry carry different responsibility in both theory and practice. In medicine this difference in responsibility is purely theoretical. In practice, S.H.M.O.s and consultants work together side by side, often in the same team, with an equal share of responsibility. With S.H.M.O.s doing a third of all the consultant work carried out under the N.H.S., no one could possibly seriously maintain that their third is in any way less important or less responsible than that of their colleagues. In the light of this, the figure of over £33,000 is of importance and is the exact measure of the injustice at present perpetrated on the S.H.M.O.

As originally agreed, the S.H.M.O. grade was to be a dying one. But Dr. H. G. McGregor, in his recent survey (p. 159), has shown that half of the registrars continuing in their specialty have become S.H.M.O.s, and half have become consultants. This makes complete nonsense of the dying-grade claim, and shows clearly that the grade is being used as cheap consultant labour. I commend the consultants' attention to this dilution of their labour. Another criticism of the S.H.M.O.s' claim for better treatment is that this is an inopportune moment to ask for 80% of the consultants' scale. Those who make this criticism have yet to say when an opportune moment may arise. Meanwhile, if we stand aside and await the new medical staffing structure, we can be sure that the Ministry will find a still lower grade of salary and status, instead of a higher one.

Accordingly, I feel that all S.H.M.O.s must keep up their demand for better treatment and for 80% of the consultants' salary scale, and that the best way of doing this is to support the S.H.M.O. Group within the structure of the B.M.A. I have no hesitation in asking those S.H.M.O.s who have not already done so to pay their 6 guineas and join the B.M.A., because the B.M.A., by its efforts through the Group, has already secured an award which those S.H.M.O.s would not have had otherwise.—I am, etc.,

Reading.

J. A. RANKIN.

Notional Lists

SIR,—To precisely what extent do we single-handed practitioners subsidize the "notional list" arrangements, of which our colleagues in partnerships very naturally take advantage? The question arises when one considers the observation of the acting chairman of the G.M.S. Committee (*Supplement*, October 27, p. 169) that, in his opinion, the M.P.U.'s scheme for a pool of locumtenents would be "likely to fall down on finance."

It seems clear that in the majority of cases practitioners in partnership should ordinarily be able so to arrange their affairs that they need not employ locums. Are we not already paying to make this easier for them? There must be many single-handed people like myself who cannot in any circumstances afford an annual holiday. When we do get away we must sponge on the hospitality of our friends because present-day locum fees are so high that we just cannot find the money for hotel charges as well. If the subsidy which perforce we pay amounts to a considerable sum, it would surely be equitable that a similar amount should be used to finance the necessary arrangements to make locums available without charge to single-handed practitioners.

Obviously my suggestion is a very damp squib, if the cost of the "notional list" is negligible, but is it? I cannot remember having ever seen any figures published. It should not be impossible to obtain them.—I am, etc.,

Launceston, Cornwall.

DONALD M. O'CONNOR.

Patients' Beliefs

SIR,—A paragraph in the report of the Edinburgh general practitioners' meeting (*Supplement*, November 10, p. 181) concerning patients' ignorance about the N.H.S. prompts me to report the following incident.

The tax disk on my car bears the letters N.I. (Northern Ireland). A few weeks ago a patient stopped to examine it more closely and then said: "I see the National Insurance people pay for your car as well."—I am, etc.,

Blandford, Dorset.

ASHLEIGH ROUNDHILL.

Increased Prescription Charge

SIR,—Here are suggestions which will satisfy all concerned. (1) Maximum number of items allowed on form E.C.10 to be two. (2) Contract several items which need to be prescribed frequently into prescribing units (counting as one item), thus: "Diabetic outfit No. 1, 2, etc." or "post-operative dressing unit A, B, C," "colostomy dressing unit," etc. (3) Refund charges to those genuinely unable to pay. (4) Inform the public unmistakably and impressively of the small part which "Health Insurance" represents in their weekly contribution to the National Insurance, and point out the large return for it. (5) Relieve the G.P. from all (implied or factual) obligations (a) to consider the cost of drugs, (b) to inquire into the financial status of the patient (quasi means test), (c) to consult the book of categories which allow or forbid prescribing of a drug. These are a waste of time and temper and money, and cause much ill feeling—in short, evil things. May we soon be delivered from them.—I am, etc.,

Hull.

L. M. SEEWALD.

Criticism of the Health Service

SIR,—It is quite apparent that the disquiet felt by many of us since the idea of the Health Service was first mooted, and which has grown with years of working in the Service, is at last coming to the surface. The meeting of general practitioners in Edinburgh voiced this disquiet (*Supplement*, November 10, p. 181), and apparently the Council of the British Medical Association agrees that all is not well (*Supplement*, November 17, p. 187). The time has come now to consider what can be done about it. I think that, as the various Governments have shown that they are not really interested in the welfare of the doctors in the Service, the medical profession should, as a whole, consider how they can make themselves independent of the Health Service and of governments—at least to a certain extent.

I would say that this can only be done by encouraging, in every way, private practice, and we should all consider how this can be done, and should go out of our way to work at all times to increase the public's knowledge of the fact that private practice is still the best relationship between doctor and patient, and always will be. In addition, if the Government will not pay for medicines for private patients, let us try to interest the insurance companies, such as B.U.P.A., in the possibility of launching an insurance scheme for private patients—perhaps to pay the cost of the G.P.'s fees, but certainly to pay for expensive and life-saving drugs and appliances. Coupled with this insurance scheme, of course, should be vigorous publicity for the idea of such premiums being discounted for income tax—a reasonable suggestion in view of the saving to the Exchequer that such a scheme would provide. In addition, the iniquity of the present system of assessing the cost of a private room in hospitals should be exposed. The prices of these rooms should be reduced to make some allowance for the patient's loss in surrendering his right to have free most of those services for which he is surcharged when he chooses to go into a private room.

As doctors, we have worked hard in the Health Service, not because the governments have made us but because we have our duty to our patients, born of long tradition and professional ideals. That is why, to the patients, the Health Service is apparently a success and why it has not ground to a standstill before now. As doctors, however, we have been too quiet about the faults of the system, no doubt because it is difficult to argue against the Health Service without appearing to be mercenary. However, despite the efforts of the administrators to decry us, we are still the experts, and it is our duty to end the "conspiracy of silence." Perhaps the Health Service will be recast; we should work for this also, and this time it should be our scheme that should be adopted. Personally, I would like to see a fee for item of service introduced, and, if possible, that principle should apply also in the hospital service. (How ridiculous it is that we should ever have permitted surgeons, for instance, to be called in at all hours to perform emergency work without special remuneration—and this applies to the general practitioners also.) Nevertheless, even should the Health Service be amended, we as a profession must strive to regain our independence, and the only way that that can be done is by a revival of private practice through all our branches. It was to preserve the independence of the medical profession that men like Lord Horder and many others worked so hard, and we can now see how right they were. Above all, we must realize that, whether we be consultants or general practitioners, medical officers of health or child welfare clinic doctors, the struggle to improve our conditions, if successful, will in the end react to the good of us all, and therefore we must press our case as a united profession.—I am, etc.,

Sevenoaks, Kent.

HUGH R. C. HAY.

SIR,—I have read with interest the criticism of the National Health Service (*Supplement*, November 10, p. 181). Edinburgh is right, medicine should be divorced from politics. The latest example of Government control is the proposed shilling for each item on a doctor's prescription. As far as one can judge by the volume of criticism from doctors in all parts of the country, and from dispensing chemists, this proposal has been made with scant consideration for their views. It has been made because it is in accord with the economic policy of the party in power; its effect on the practice of medicine is evidently of secondary importance.

It is true that the vast majority of patients still labour under the delusion that the weekly stamp covers most, if not all, of the cost of the National Health Service; some speak openly of getting value for their weekly contribution. This was emphasized also in the Guillebaud Report (paragraph 718), but, alas, there was no recommendation with a view to the correction of this horrible fallacy. I believe that, if the finances of the N.H.S. were completely separated from the National Insurance Fund, this would be of benefit to the practice of medicine and ultimately to the Exchequer.

Edinburgh is right—"the present structure of the N.H.S. is fair neither to the patient nor to the doctor." The time has surely come for consideration by the Government and by the profession of the suggestion that a national board or corporation should be established to administer the National Health Service. This suggestion was brushed aside altogether too summarily in the Guillebaud Report, paragraph 730, subsection 5.—I am, etc.,

West Candon, Surrey.

C. P. WALLACE.

Widows' Pensions

SIR,—I feel that there may be many practitioners who are unaware of the precise position of the pension their wives will receive. The very important fact to be remembered is that no widow's pension is payable unless her husband has served ten years in the National Health Service.

Every practitioner who entered the Service on the appointed day (July 5, 1948) still has eighteen months to go

(July 5, 1958) before his wife would be entitled to a pension, should he have the misfortune to die between now and July 5, 1958. By writing to the appropriate authority I have found out that if I die between now and July 5, 1958, my wife would receive no pension at all, but if I died on July 6, 1958, she would receive approximately £270 per annum for life or until she remarried. The discrepancy is very marked.

Until I received the courteous reply to my queries from the authorities I was completely unaware that a widow's pension is one-third of her husband's pension, but it is rated up so that it cannot be less than one-third of that pension a doctor would receive had he served for 20 years. To neutralize the discrepancy I have insured my life from the present time until July 5, 1958, for the sum of £5,500 (this sum invested at 5% would produce £275 per annum) for one premium of £75, and there is some income-tax relief. Lloyds quote 27s. 6d. per cent., but tariff companies quote a higher figure. Obviously the amount varies with the age of the applicant and the sum required to produce on investment a figure equivalent to the estimated pension.

Perhaps most practitioners are more cognizant with the position than I was until I made my inquiries, but should any doctor be made more conscious of some facts of which he was unaware and rectify his affairs by adopting the method I have outlined, for what must be considered a comparatively small sum, then, I feel, this information may be of some help to our profession.—I am, etc.,

Burnham, Bucks.

H. M. JAKES.

POINTS FROM LETTERS

Fining the Doctor

Dr. G. DAVID (London, N.W.4) writes: I have read with interest and amusement Dr. B. J. Bouché's letter (*Supplement*, October 13, p. 157). Overseas doctors view with horror the collapse of the doctor's status in a civilized and cultured country. They wonder how this state of affairs has come about and why we do nothing to remedy it. . . . He who pays the piper orders the tune. We are now . . . subject to the laws, by-laws, and regulations laid down and constantly added to by the Minister. Eight years after the acceptance of the terms of service doctors are being fined and penalized like common offenders of the law. In yet another eight years' time we may be glad to get away with a fine only, for not standing to attention on the entry of one of our registered patients. And why do we not rebel against this not so fantastic prospect? The answer is again a simple one—economic pressure and no guts.

Training of Administrators

Captain J. C. F. HEALEY, R.A.M.C. (B.A.O.R. 26), writes: I note with interest that students being trained for "high administrative posts" in the National Health Service are to receive £520 a year rising by £20 a year. A doctor in his first year in hospital—after six years of training—receives an average of £450. I suppose this might be called the writing on the wall.

H.M. Forces Appointments

ROYAL NAVY
ROYAL NAVAL VOLUNTEER RESERVE
Surgeon Lieutenants K. W. Symons and R. T. Routledge to be Surgeon Lieutenant-Commanders.

ROYAL ARMY MEDICAL CORPS
Captain E. R. Smith-Owen to be Major.

HER MAJESTY'S OVERSEA CIVIL SERVICE

The following appointments have been announced: F. O. Adewole, M.B., Ch.B., D.T.M.&H., Specialist Surgeon, Federation of Nigeria; G. G. Bisley, M.R.C.S., L.R.C.P., D.T.M.&H., D.O., Specialist (Ophthalmic), Medical Department, Kenya; J. O. Mabayoje, L.R.C.P.&S., M.R.C.P., Specialist Physician, Federation of Nigeria; I. H. Marrable, M.R.C.S., L.R.C.P., Senior Medical Officer, Tanganyika; B. Nicholson, M.B., Ch.B., D.P.H., Senior Leprosy Officer, Western Region, Nigeria; D.T.M.&H., M.T. Read, M.B.E., M.C., M.R.C.S., L.R.C.P., D.T.M.&H., Deputy Director of Medical Services, Sarawak (secondment to Brunei); K. M. Basu, M.B., M.R.C.P., H. Wolvetang, M.D.

and M. A. Dalby, M.D., Medical Officers, Gold Coast; H. F. Hamilton, M.B., M.R.C.P., Junior Physician, Medical Department, British Guiana; V. I. Massiah, M.B., B.Ch., I. Dial, M.B., Ch.B., and C. O. King, M.B., Ch.B., Medical Officers, Grade B, Trinidad; K. McCormack, M.B., B.Ch., Medical Officer, Tanganyika; A. E. Norsted-Jorgensen, M.D., Medical Officer, Gambia; L. A. Phillips, M.B., B.S., D.A., Medical Officer (Anaesthetist), S.P.H.S., Fiji; J. A. Sempie, M.B., B.Ch., Senior Medical Officer, St. Kitts Nevis-Anguilla; M. Slade, M.R.C.S., L.R.C.P., Health Officer, Brunei; F. R. Store, M.R.C.S., L.R.C.P., Medical Officer, Cyprus; Janet W. Anderson, M.B., Ch.B., D.Obst. R.C.O.G., Special Grade, Medical Officer, Uganda; D. D. Bryson, M.B., Ch.B., D.P.H., R. G. F. Lampart, M.B., Ch.B., M.P.H., F. N. C. Levy, L.A.H., M.P.H., A. R. L. Russell, M.B., Ch.B., M.P.H., and W. Dunbar-Smith, M.B., Ch.B., Medical Officers of Health, Jamaica; F. A. Campbell, L.R.C.S.I., D.P.M., Superintending Medical Officer (Specialist), Mental Hospital, Trinidad; W. E. Cooper, M.B., Ch.B., Medical Officer, Barbados; T. A. Cox, M.R.C.S., L.R.C.P., Medical Officer, Ministry of Health, Gold Coast; L. Harbin, M.R.C.S., L.R.C.P., and A. A. Waterman, M.R.C.S., L.R.C.P., Medical Officers, Grade "C", Health Department, Trinidad; A. C. Mandal, M.D., T. A. Jorgensen, M.D., and I. A. Susman, M.B., Ch.B., Temporary Medical Officers, Gold Coast; G. A. Parsons, M.B., Ch.B., Medical Officer, Kenya; J. Van T. Riet, M.D., and J. B. McCaffery, L.R.C.P.&S.I., District Medical Officers, Windwards, St. Vincent; P. E. C. Manson-Bahr, M.D., M.R.C.P., and R. B. Heisch, M.B., B.Ch., Senior Specialists, Kenya; D. P. Bowler, M.D., M.R.C.P., D.T.M.&H., Specialist Officer, Grade "B" Paediatrician, Penang, Federation of Malaya; J. K. T. Cherry, M.D., D.P.H., and J. L. Lanceley, M.D., D.T.M.&H., Senior Medical Officers, Uganda; P. R. Cooper, B.M., B.Ch., Deputy Director of Medical Services, Western Nigeria; A. B. Da Costa, M.B., Ch.B., Medical Officer Grade "A", Physician, Trinidad; Geraldine E. L. Cummins, M.B., B.Ch., M.R.C.P., Chest Physician (Specialist), Singapore; E. C. Erok, M.R.C.S., L.R.C.P., J. J. Phillips, M.B., Ch.B., and J. Toner, M.B., B.Ch., Senior Medical Officers, Eastern Nigeria; E. F. Harben, M.B., B.S., Senior Medical Officer, Gambia; G. G. Murphy, M.B., Ch.B., Senior Medical Officer, Health Education, Uganda; A. A. Peat, M.B., Ch.B., M.P.H., Chief Medical Officer, Jamaica; A. Zahra, M.D., D.T.M.&H., D.P.H., Specialist Epidemiologist, Eastern Nigeria; F. J. J. Coleman, M.B., B.S., Medical Officer, Turks and Caicos Islands, Jamaica; J. S. Dodge, M.B., B.S., D.T.M.&H., and G. P. Evans, M.B., Ch.B., Temporary Medical Officers, Northern Nigeria; Minnie Gosden, M.B., B.S., re-employed as Pathologist, Fiji; P. E. Hoogewerf, M.B., B.S., Medical Officer, Kenya; G. A. C. Keenan, M.B., B.Ch., and A. S. Valentine, M.B., B.Ch., Medical Officers, Sierra Leone; P. B. Marshall, M.B., Ch.B., Temporary Medical Officer, Falkland Islands; P. K. Mitra, M.B., D.A., Specialist Anaesthetist, Mauritius; R. V. Steward, M.B., B.S., Medical Officer, British Guiana; R. H. Wittenoom, M.B., B.S., District Medical Officer, Bahamas.

Association Notices

Diary of Central Meetings

DECEMBER

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| 4 Tues. | Financial Advisory Committee, 10.45 a.m. |
| 4 Tues. | Office Committee (following Financial Advisory Committee). |
| 4 Tues. | Office Staff Superannuation Fund Committee, 12.15 p.m. |
| 4 Tues. | Finance Committee, 2.30 p.m. |
| 5 Wed. | Planning Subcommittee, Occupational Health Committee, 10.30 a.m. |
| 5 Wed. | Film Committee, 2 p.m. |
| 5 Wed. | Private Beds Subcommittee, Private Practice Committee, 2 p.m. |
| 5 Wed. | Tuberculosis and Diseases of the Chest Group Committee, 2.15 p.m. |
| 6 Thurs. | Central Consultants and Specialists Committee, 10.30 a.m. |
| 6 Thurs. | Rural Practices Subcommittee, G.M.S. Committee, 2 p.m. |
| 7 Fri. | Otolaryngologists Group Committee, 9.30 a.m. |
| 7 Fri. | Anaesthetists Group Committee, 11.30 a.m. |
| 12 Wed. | Alternative Edition Subcommittee, Joint Formulary Committee, 10 a.m. |
| 12 Wed. | Ethical Review Subcommittee, Central Ethical Committee, 10.30 a.m. |
| 12 Wed. | Central Ethical Committee, 2 p.m. |
| 12 Wed. | Practice Accommodation Subcommittee, G.M.S. Committee, 2 p.m. |
| 13 Thurs. | Journal Committee, 2 p.m. |
| 13 Thurs. | Distribution Subcommittee of Medical War Relief Fund, 2.15 p.m. |
| 19 Wed. | Council, 10 a.m. |
| 20 Thurs. | G.M.S. Committee, 10.30 a.m. |
| 20 Thurs. | Study Leave Subcommittee, Central Consultants and Specialists Committee, 2 p.m. |

Branch and Division Meetings to be Held

ALDERSHOT AND FARNHAM DIVISION.—At Northfield Hospital, Aldershot, Wednesday, December 5, 8.30 p.m., meeting. Lecture by Mr. W. G. Holdsworth: "Burns."

BARNET DIVISION.—At Barnet General Hospital, Friday, December 7, 8.15 p.m., clinical meeting.

BATH, BRISTOL, AND SOMERSET BRANCH.—At Hawthorns Hotel, Woodlands Road, Clifton, Bristol, Wednesday, December 5, 8.30 p.m., annual general meeting. Presidential address: "The Patient."

BOLTON DIVISION.—At Gymnasium of Bolton Royal Infirmary, Thursday, December 6, 8.30 p.m., meeting.

CAMBERWELL DIVISION.—(1) At Gordon Museum, Guy's Hospital, S.E., Wednesday, December 5, meeting. Talk on Museum exhibits by Dr. C. Keith Simpson. (2) Friday, December 7, luncheon at invitation of Messrs. Arthur Guinness, Park Royal. Leave St. Olave's Hospital, Rotherhithe, S.E., 11.30 a.m. Return 4.30 p.m. Guests are invited.

DARTFORD DIVISION.—At Lecture Theatre of the Nurses' Home, West Hill Hospital, Dartford, Thursday, December 6, 8.30 p.m., meeting. Dr. J. D. Kershaw: "Medical Services in the U.S.S.R." (illustrated by slides).

DUDLEY DIVISION.—At Station Hotel, Dudley, Tuesday, December 4, 7.45 for 8.15 p.m., supper meeting. Address by Professor H. C. McLaren: "Gynaecological Carcinoma." Medical guests are invited.

EAST HERTS DIVISION.—At Teaching Unit, Lister Hospital, Hitchin, Thursday, December 6, 8.15 p.m., meeting. Papers by Dr. J. R. B. Williams: "Peripheral Neuritis"; Mr. G. E. Stein: "Sinusitis." Also short papers by Dr. C. G. Fagg, Mr. J. J. Shipman, and Mr. A. G. Young. Members of South Bedfordshire Division are invited.

GLASGOW DIVISION.—At Hall of Royal Faculty of Physicians and Surgeons, 242, St. Vincent Street, Glasgow, Thursday, December 6, 8.30 p.m., meeting. B.M.A. Lecture by Dr. T. Rowland Hill: "Common Lesions of the Spinal Cord; the Investigation and Management of Cases."

GRIMSBY DIVISION.—At Winter Gardens, Cleethorpes, Thursday, December 6, 8 p.m. to 1 a.m., annual dance.

GUILDFORD DIVISION.—At Royal Surrey County Hospital, Guildford, Thursday, December 6, 8.30 p.m., meeting. Lecture by Dr. Macdonald Critchley: "Corporeal Awareness."

HARROW DIVISION.—At the Tithe Farm House, Eastcote Lane, South Harrow, Tuesday, December 4, 8.30 p.m., meeting. Dr. D. P. Stevenson (Deputy Secretary, B.M.A.): "Some Current Problems, Including Remuneration"; Mr. John Pringle (Public Relations Officer, B.M.A.): "The Public Relations Problem." Members of West Middlesex Division are invited.

HASTINGS DIVISION.—(1) At Royal East Sussex Hospital, Hastings, Tuesday, December 4, 8.15 p.m., clinical meeting. (2) At Marine Court Restaurant, Friday, December 7, 7.30 for 8.15 p.m., dinner dance.

HYDE DIVISION AND GLOSSOP MEDICAL SOCIETY.—At Macclesfield Arms Hotel, Friday, December 7, 8.30 for 9 p.m., annual dinner-dance.

KESTOVEN DIVISION.—At George Hotel, Grantham, Thursday, December 6, 7.15 for 7.30 p.m., dinner. Address by Dr. A. E. Clark-Kennedy: "The Dying Patient."

NORTH-EAST ESSEX DIVISION.—At Nurses' Recreation Room, Colchester Maternity Hospital, Lexden Road, Monday, December 3, 8.30 p.m., meeting. Lecture by Mr. M. Bates: "Early Diagnosis of Cancer of the Lung" (illustrated by slides).

RUGBY DIVISION.—At the Grand Hotel, Rugby, Thursday, December 6, 8 for 8.30 p.m., informal supper; 9.30 p.m., B.M.A. Lecture by Mr. A. Lawrence Abel: "Carcinoma of the Breast."

ST. PANCRAS DIVISION.—At Committee Room C, B.M.A. House, Tavistock Square, W.C., Tuesday, December 4, 8.30 p.m., meeting. Dr. A. A. Mason: "Use of Hypnosis in Medicine." There will be a film and practical demonstration. Members of the City Division are invited.

SALISBURY DIVISION.—At Cathedral Hotel, Salisbury, Tuesday, December 4, 8.30 p.m., meeting. Talk by Colonel Alastair Young, R.A.M.C.: "The Medical Aspects of Nuclear Explosions." All medical practitioners are invited.

SCUNTHORPE DIVISION.—At the Blue Bell Hotel, Scunthorpe, Thursday, December 6, 8 for 8.30 p.m., annual dinner.

SHROPSHIRE AND MID-WALES BRANCH.—At Raven Hotel, Shrewsbury, Thursday, December 6, 7.30 for 8 p.m., annual dinner.

SOUTH STAFFS DIVISION.—At Molineux Hotel, North Street, Wolverhampton, Tuesday, December 4, 8 for 8.15 p.m., supper; 9.15 p.m., B.M.A. Lecture by Sir Francis Walshe, F.R.S.: "Traumatic Neurosis." Members' wives are invited.

TROWBRIDGE DIVISION.—At Roundway Hospital, Devizes, Friday, December 7, 8.30 p.m., meeting. Address by Dr. P. H. Addison: "Professional Negligence." Non-members of the B.M.A. are invited.

WAKEFIELD DIVISION.—At Monk Fryston Hall Hotel, Monk Fryston, near Leeds, Friday, December 7, annual dinner-dance.

WEST MIDDLESEX DIVISION.—At Paul's Restaurant, Broadway, Ealing, W., Thursday, December 6, 8 p.m., short programme of medical films.

WEST SOMERSET DIVISION.—At Out-patient Department, Yeovil Hospital, Thursday, December 6, 8 for 8.30 p.m., clinical meeting. Dr. J. G. Howells: "Family Psychiatry and the G.P." Members of the East Somerset Division are invited.

SUPPLEMENT TO THE BRITISH MEDICAL JOURNAL

LONDON SATURDAY DECEMBER 22 1956

CONTENTS

Central Consultants and Specialists Committee	221	Hospitality	224
Malta Medical Services	223	Correspondence	224
Protection of Practices Scheme	224	Diary of Central Meetings	226
Prescription Charges	224	Meetings of Branches and Divisions	226

CENTRAL CONSULTANTS AND SPECIALISTS COMMITTEE

A meeting of the Central Consultants and Specialists Committee was held at B.M.A. House on December 6, with Mr. T. HOLMES SELLORS, chairman of the Committee, presiding. Members stood in silent tribute to the memory of the late Sir Lionel Whitby, formerly President of the Association, chairman of the Joint Consultants Committee, and a member of the Committee.

The CHAIRMAN welcomed Mr. C. E. Kindersley and Mr. A. M. A. Moore, who had accepted the Committee's invitation to serve as co-opted members for the present session.

Resolutions of the Representative Body

The Committee considered a report from its Executive Committee on the resolutions of the Annual Representative Meeting referred to it for consideration.

A resolution that the Association should take active steps to establish a system whereby the family doctor could call in a consultant pathologist to do a post-mortem examination on any of his patients who had died of natural causes and for whom he could issue a death certificate in the usual way, and a further resolution that transport should be available for the removal of corpses for post-mortem examinations at public expense at the request of the general practitioner, were considered. The latter point had already been taken up with the Ministry by the Joint-Committee, and the Chief Medical Officer had said that if the pathologist was satisfied that the interests of research would be served by a post-mortem examination there was no objection to the cost of transport being met by the hospital management committee or the board of governors. On the first point the Executive was doubtful whether it would be practical to press that a hospital pathologist should always be required to carry out a post-mortem examination at the request of a general practitioner. It was decided to ask the Consulting Pathologists Group for its views, however, before the Committee reported to the Council.

Resolutions relating to the employment of general practitioners in hospitals were next considered, and the Executive pointed out that it was the Committee's policy that hospital appointments for general practitioners should be open to all practitioners in the area and filled by competition, except in the case of joint appointments under the trainee-assistant scheme. The report of the Medical Staffing Subcommittee envisaged a much greater use of general practitioners in the hospital service. The Joint Committee had discussed the question with the Ministry, but was doubtful whether more progress could be made until the discussions on hospital medical staffing generally were concluded

and the salaries to be offered to general practitioners working in different capacities in hospitals agreed. Commenting on a resolution that general practitioners should have access to hospital facilities, including beds, the Executive Committee said that this also was the policy of the Committee, but shortage of facilities, and particularly of technical staff, made it impractical for an unlimited ancillary service to be offered at the present time.

The Committee next considered a resolution from the A.R.M. that the Council had failed to implement a resolution passed at the 1955 Annual Representative Meeting which stated that the recommendation contained in the Bradbeer Report (paras. 20-22) for equal tripartite administration of hospitals was not in the best interests of patients, and that under no circumstances should medical and nursing personnel of hospitals be under the control of lay administrators. The Executive recommended that the Central Consultants and Specialists Committee should adhere to the view expressed in its memorandum on the Bradbeer Report: that, while hospital medical staffs must have the final authority in the clinical care of patients, it accepted the principle of tripartite administration in the general running of the hospital. This recommendation was accepted.

The Committee was opposed to a resolution that posts in the mental hospital service should be included among approved house appointments for the pre-registration practitioner, except in cases where there was sufficient scope in general medicine and adequate supervision to justify a house-physician appointment. The Committee promised to keep under review the matter of the length of time taken to fulfil the pre-registration posts required by the Medical Act, 1950. A recommendation that all medical grades on the whole-time hospital staff should be allowed to pursue the practice of their profession in their off-time had already been considered by the Committee and regarded as not being practical.

In reply to resolutions urging that the Council should assume fuller responsibility for all future claims submitted by any section of the profession and that the various sections of the profession be informed of the Council's preparedness to negotiate directly at the request of any section, the Committee decided to inform the Council that in its view the present arrangements whereby each of the main branches of the profession had its own negotiating machinery should be continued. The Committee could not see how the Council could assume a fuller responsibility for Whitley negotiations, but the Council's offer to undertake negotiations on behalf of any section of the profession was welcomed. The Committee would continue to keep the Council informed of matters under discussion in relation to the hospital and consultant services.

PROTECTION OF PRACTICES SCHEME

Following discussions between the G.M.S. Committee and the Minister, regulations for protecting the practices of general practitioners called up for service in the armed Forces during an emergency recognized by the Minister came into effect on December 14.

In general terms, the scheme provides that the number of patients on a doctor's list will remain fixed during his absence, and on his return patients who have left his list but have not changed their address will be encouraged to return to it.

It is assumed that a principal will remain on the medical list and will make, and pay for, all necessary deputizing arrangements. Whilst he is away he will receive his pay and allowances from the Services and his National Health Service remuneration from the executive council. When a doctor joins the Forces the number of patients on his list will be fixed during his absence at a number equal to the average during the quarters beginning April 1 and July 1, 1956, or the two quarters immediately preceding that in which he joined the Forces, whichever is the later. Transfers to the lists of other doctors by patients who have not changed their address will be on a temporary basis. On the doctor's return from the Forces, executive councils will notify all patients, other than those who have changed their address, who were on his list when he joined up but who have transferred during his absence, that their original doctor has now resumed his practice. These patients will be replaced on his list unless they wish to continue on the list of the doctor who has been temporarily attending them. In this event the temporary doctor will be responsible for their treatment, but will receive no capitation fees for them for twelve months. The fees will be paid to the doctor returned from the Forces.

PRESCRIPTION CHARGES

The Ministry of Health has stated that some difficulty has arisen since the introduction of the revised prescription charges because doctors have ordered repeat supplies of a medicine on the initial form.

The correct procedure, which, the Ministry points out, has not been changed by the new regulations, is that when the doctor considers that treatment should continue longer than the first supply of medicine will last he may issue one or more additional orders on separate forms (or carbon copies of the original form) dated at suitable intervals. Each form should be signed. A charge of 1s. is payable in respect of each item ordered on each form.

Certain preparations which are required for immediate and continuous treatment, but which owing to their pharmaceutical nature need to be freshly prepared and supplied in separate containers on successive days, will, as before, be so supplied and only one charge will be payable. These limited types of medicament are those given in Section 4 (viii) and (ix) of Part II of the *Drug Tariff*, and they are those which need special extemporaneous preparation—namely, eye drops, some eye ointments, aqueous preparations of penicillin for external use, and sterile preparations.

HOSPITALITY

A Swiss doctor's daughter, aged 18, would like to visit a British medical family on an *au pair* basis, helping in the house and looking after children. She will be free to come in the spring, 1957.

A Spanish throat specialist's daughter (17) wishes to stay as paying guest with a Roman Catholic doctor's family, preferably in the London area. She would like to visit England after Christmas, and would be willing to arrange holiday exchange with a girl of similar age.

Would anyone interested please get in touch with Brigadier H. A. Sandiford, International Medical Visitors' Bureau, B.M.A. House, Tavistock Square, London, W.C.1.

Correspondence

Because of heavy pressure on our space, correspondents are asked to keep their letters short.

Remuneration Claim

SIR,—A few months ago I supported a small group which considered the economic position of the country unsuitable to allow increased remuneration. Now, though the economic position is worse, I feel that the Minister of Health, by his attitude and manner in refusing to admit the justice of the recent remuneration claim, is forcing the medical profession into the position of a trade union; and that only trade-union methods are likely to be understood by Her Majesty's advisers, who, by accepting the Minister of Health's statement on the claim for increased remuneration, presumably support him. In a word, it is impossible to have a gentlemen's agreement with gentlemen only on one side.—I am, etc.,

West Mersea, Essex.

R. D. REID.

SIR,—Not for the first time I find myself wondering whether I am living with Alice on the other side of the looking-glass. It seems that Sir John Hawton must be there too. What on earth do our negotiators mean by a "contractual obligation" which cannot be "enforced by legal proceedings in the ordinary way"? Surely this is a plain contradiction in terms. By definition a contract must be legally enforceable. If our representatives never thought that we had a strong legal case, have they spent the past few months merely in building up a phony façade?

We were told (*Supplement*, November 3, p. 173) that the Committee was providing a document "setting out . . . the more legal aspects of the case." Did the Committee at that date think that it had in fact no legal basis? Again, Dr. A. Beauchamp is quoted (*Supplement*, November 17, p. 188) as saying that the case was "quite unanswerable from the legal and moral point of view." Was he then of opinion that its justice "could not be enforced by legal proceedings in the ordinary way"?

Must we now face up to the hard fact that the Negotiating Committee fully and freely admits that it has led us into a position where our whole financial well-being depends entirely on the whim of any body of Ministers who may hold office at a given time? If this is so, one is tempted to think of suitable pendant decorations for any lamp-posts which may exist in Tavistock Square.—I am, etc.,

Launceston, Cornwall.

DONALD M. O'CONNOR.

SIR,—With reference to our remuneration, some of us are becoming increasingly confused and irritated by the expressed opinions of the Minister of Health. It should be remembered that on the question of doctors' pay he has to accept the orders of the Treasury. To many of us it seems that the only point at issue is whether the Government is bound by the contract on the basis of the Spens report which it entered into with the profession in 1948. In any other walk of life this could be established by bringing an action to test the validity before the appropriate court of law. This could surely be done by the B.M.A. on behalf of the profession or by one individual sponsored by the B.M.A. What about it?—I am, etc.,

Eastbourne.

P. W. MATHEW.

SIR,—For ten months now investigations of our case and negotiations have been proceeding. The result has been nil. We are now five years behind nearly every other section of the community in regard to our earnings. How much longer is this to be allowed to continue?

Arbitration now will presumably take place on the interpretation of Spens. Let it be at once. If it results in our favour, then we have every right to back pay as from 1951.

DEC. 22, 1956

CORRESPONDENCE

SUPPLEMENT TO THE
BRITISH MEDICAL JOURNAL 225

Also there must be a demand for a considerable reconstruction of the Service to make it workable. If legalities instead of fairness means a decision against us, then we have been led by the nose into a trap against the wish of the majority of us. Let us then resign immediately from the Service, in which there is no possible future for the practice of medicine. We have dallied for five years when it should only have been one. Let us wait no longer.—I am, etc.,

Axbridge, Somerset.

N. H. H. GOLLEDGE.

SIR,—Until recently I was a member of the B.M.A. I cannot afford to continue this membership, as the subscription only adds to my ever-present overdraft. I shall, in the next two months, change my car for one which uses less petrol; I shall have to consider moving house, as I cannot keep up the payments; and I shall have to review my life insurance commitments. I am a "successful" junior partner whose practice has increased steadily in the past four years, but whose net income is worth less than ever.

I, and many like me, are being left in the lurch by the complete inability of the B.M.A. to secure a rapid settlement of a just remuneration claim. I have no doubt that the claim will eventually be met after a weary trail through the courts, but meanwhile I and many others feel rather like those "one-man taxi concerns," whose claims for "hardship petrol" are to be heard in the New Year—long after they have been put out of business.—I am, etc.,

Blackhill, Co. Durham.

F. W. B. BREakey.

SIR,—I am disappointed to find that no one better qualified than I has written about one aspect of the remuneration claim—that is, that the same effect would be achieved by a reduction in taxation.

All of us appear to have got into such a "welfare state of mind" that we have not considered that we, the taxpayers, are paying a vast army of civil servants to take money out of one of our pockets and put rather less into another, because of the cost of the Civil Service administrators. Two examples have forced themselves on my notice, and doubtless there are many others: (1) When a doctor employed by a regional hospital board is ill, he is compelled to claim a sickness benefit. For what purpose? In order that the regional hospital board may deduct from his salary the sickness benefit received. (2) A doctor's wife with a young family is compelled to receive family allowances. For what purpose? In order that the doctor may pay income tax (and possibly surtax) on them.

The purpose of these two "benefits" can only be ease of administration. Any organization administered by civil servants is bound to be arranged according to regulations, framed by civil servants with the object of easing their work as well as achieving uniformity. It is high time that the power and the number of these civil servant administrators was reduced, and the benefit of the consequent economy passed on to the hard-pressed income-tax payers.—I am, etc.,

Swansea.

H. C. M. WALTON.

SIR,—Having long since abandoned any hope for an increase in pay, I had a look at my expense sheet and was horrified at what I discovered. As a rural practitioner I receive a quarterly payment from the mileage fund. The last major revision in its distribution was in June, 1950, when payment by my local executive council was made at the rate of 4.41 pence per unit. At that time petrol was 3s. 1d. a gallon and the price of a typical doctor's car was £550.

Since then there has been a persistent rise in costs, and to-day petrol, as we all know, is 6s. 3d. a gallon and the car sells (to those who can afford it) at £871. Meanwhile the value of my mileage unit has steadily fallen, and last quarter reached a new "low" of 3.91 pence. No doubt you will have had a few letters from some of my richer colleagues impugning my patriotism for mentioning my troubles in a time of national crisis; but there is an old

saying that if the orange is squeezed sufficiently hard the pips will squeak, and I am just a little pip giving vent to a plaintive little squeak.—I am, etc.,

Rye, Sussex.

HUGH MANNINGTON.

Increased Prescription Charge

SIR,—Sir Max Page (*Supplement*, December 8, p. 213) is of course right. Many gallons of useless medicine are poured down many neurotic throats every year. But by and large these throats belong to the middle-aged wives of wage-earners, and a shilling more or less is not going to act as a deterrent. The real worry is the old people. It is not perhaps realized the extent to which this problem has crept up on us in recent years, but it is quite common to find patients of 80 and upwards forming 50% of our daily visiting-list. These poor old things live for the most part on the old-age pension, which allows no margin whatever for shillings, and when their time comes to pass on, whether they die from heart failure or cancer or simply old age, they commonly take about six months to do so. During that time it is our task to ease their passage to the next world with whatever drugs are appropriate, and frequently, as the end draws near, they need quite a number. Many of these people flatly refuse to apply for help to the National Assistance Board, and I am sure that Sir Max would be the first to respect their pride, as we all do. I think we would all be satisfied if the Minister would compromise and allow the shilling to be waived for old people on production of the old-age pension book.—I am, etc.,

Felsted.

PETER A. WALFORD.

SIR,—If Sir Max Page had been in general practice he would not have written the letter which you print in the *Supplement* of December 8 (p. 213).—I am, etc.,

Dorchester.

T. RUSSELL STEVENS.

Central Pool Distribution

SIR,—At the end of this quarter we are to receive from the central pool £44m. due for the year 1954-5. That represents a delay of one and a half years in reimbursing money spent on necessary practice expenses. At, say, 5%, a sum of over £300,000 in interest has been lost to us. No doubt a further sum for the year 1955-6 will be paid in about a year's time, representing another similar sum in interest.

Is there any reason why a considerable portion, say 75%, of the amount due for 1954-5 should not be paid at once as a payment on account of the sum due to us for the year 1955-6? This would enable us to face with a little less dismay the inevitable sharp rise in our expenses now that the price of petrol, among other things, has been substantially increased.—I am, etc.,

Tenterden, Kent.

B. W. WYLLIE.

Shortage of Radiographers

SIR,—May I, as a qualified radiographer and a member of the medical auxiliaries, bring to the notice of your readers the grave shortage of radiographers in the National Health Service which, if allowed to continue, must bring about a breakdown in the diagnostic and therapeutic fields of the Service? It is reported that one of the main causes for this shortage was the very poor prospects offered, together with low salary scales. On November 9, after months of protracted discussions, a new salary scale was finally announced, starting at £420 for a newly qualified radiographer and finishing, after many years of experience, at £750 for a superintendent and £850 for a superintendent in charge of a very large department. Even a teacher of student radiographers receives only £750 at the maximum, and, of course, these salaries are subject to the usual deductions, such as income tax, national insurance, and superannuation. One might argue that it is a fair commencing salary, but what of the married male radiographer who receives only £485 five years after qualifying?

Radiography is certainly an interesting and satisfying job, and one gets a feeling of being a useful and very necessary

member of the diagnostic team—but are these reasons, taken into account with the new but still totally inadequate salary scale, likely to induce modern-day-school-leavers, with certificates in mathematics and physics, to enter our profession? Little is known about us, although it is a plain fact that modern surgery and medicine would be lost without the radiological team. Most hospitals run a 24-hour service, which means that radiographers take it in turn to remain "on call" for emergency duties after the normal working hours. If radiography still fails to attract sufficient new entrants the remaining radiographers will find it is physically impossible to continue this service; in fact, there are at least four London hospitals whose radiographical departments are so understaffed that patients' waiting-lists are growing each day. It is therefore in the public's interest to assist us in our endeavours to make radiography a worth-while career, and so stop the drift of staff abroad and into industry.—I am, etc.,

Berkhamsted, Herts.

R. R. I. BAXTER,
Radiographer.

REFERENCE

¹ *Radiography*, 1956, 22, 270.

Widows' Pensions

SIR,—I found Dr. H. M. Jaques's letter on this subject (*Supplement*, December 1, p. 207) most helpful, because I had feared that a great many widows of medical men would only receive a yearly pittance if their husbands died soon after the qualifying date—July 5, 1958. The widows who are bereaved before the qualifying date will receive all the husband's superannuation contributions plus the 8% added by the Government. This sum should lie somewhere between £1,000 and £4,000, so that the doctor wishing to augment this amount to a total of £5,500, as Dr. Jaques has suggested, need only insure for the difference.—I am, etc.,

Slough, Bucks.

N. C. HYPHER.

S.H.M.O.s and Consultant Appointments

SIR,—Dr. C. B. V. Walker's letter (*Supplement*, November 24, p. 199) describes very adequately the undoubted injustice inflicted on 300 S.H.M.O.s who are actually filling posts acknowledged to be of consultant grade. It should not be overlooked, however, that the overwhelming majority of all 3,000 S.H.M.O.s are labouring under equal if not greater injustice. One recalls, for example, men qualified for consultant posts who have been virtually compelled to accept S.H.M.O. jobs because in their specialty no or very few consultant posts were being made, though the work involved would have required this. Additionally, there are many S.H.M.O.s (some of them pre-1948 men) whose posts have never been graded.

Without multiplying examples, I assert without hesitation that the only fair and feasible way to solve the S.H.M.O. problem is for the whole grade to be reviewed collectively and individually with the principle in mind that the grade should never have been established and should be abolished. This is, I believe, the official policy of the S.H.M.O. Group and its executive committee.—I am, etc.,

Derby.

G. D. WILD.

SIR,—Dr. C. B. V. Walker's letter (*Supplement*, November 24, p. 199) was of great interest, but rather stressed the problem of one group of S.H.M.O.s, whom he divided into three sections. It is apparent, however, that he oversimplified the grading of S.H.M.O.s in not taking into consideration the other large groups who also wish to reach consultant status.

The S.H.M.O. problem, with its steadily increasing numbers and the increasing dissatisfaction being expressed in each copy of your *Journal*, demands a speedy solution which can only be brought about by using the already agreed criteria for redistribution into the consultant ranks—i.e., (1) those who were doing specialist work before the appointed day (July 5, 1948) and who subsequently accepted employment in the hospital service under the National

Health Service Act, 1946, in the same specialty; (2) those who have held for a period of five years an appointment (or appointments) in the S.H.M.O. grade which has involved a large measure of personal responsibility in a hospital ward, out-patient clinic, special department, or specialist unit—e.g., mass radiography, blood transfusion; (3) those who have at least seven years' experience in the specialty (as senior registrars or S.H.M.O.s) and have held an appointment (or appointments) as S.H.M.O.s for a period of three years which has involved a large measure of personal responsibility in a hospital ward, out-patient clinic, special department, or specialist unit—e.g., mass radiography, blood transfusion; (4) those who have held an appointment as S.H.M.O. for at least two years and who hold a major higher qualification (M.R.C.P., F.R.C.S., or M.R.C.O.G.).—I am, etc.,

Liverpool, 16.

J. MCCONNELL.

SIR,—I have learned that it is possible to read a paragraph of my recent letter to you (*Supplement*, November 24, p. 199) in a sense which I did not contemplate, and I beg the hospitality of your columns to make clear the meaning which I attach to the paragraph, which is the one in which I attempted to define the second of the three categories of S.H.M.O.s which I listed.

It is fundamental to the understanding of the grievances of S.H.M.O.s that they look to the complete abolition of the grade, and only regard the proposal of 80% of "consultant" pay as a temporary expedient pending abolition. The question then arises of the class into which those who are not already holding "consultant" posts should be assimilated. It is accepted that S.H.M.O.s are fully trained in their specialty, and so eligible to hold consultant posts within any projected establishment. From which it follows that the logical course in any such reorganization is to recognize that the work is of a consultant nature and should be rewarded accordingly. At the same time there is ground for making a distinction between a recently appointed consultant and his senior who during the years has acquired wide clinical and administrative responsibilities, and this may reasonably be achieved by placing them at different levels on the ladder of seniority. It would not be acceptable to create a hypothetical sub-consultant grade which would perpetuate the injustices and frustrations of the present S.H.M.O. grade.—I am, etc.,

Royston, Herts.

C. B. V. WALKER.

Association Notices

Diary of Central Meetings

DECEMBER

28 Fri. Public Health Committee, 11 a.m.
28 Fri. Assistants and Young Practitioners Subcommittee, G.M.S. Committee, 2 p.m.

JANUARY

2 Wed. Medical Act Committee, 3 p.m.
3 Thurs. Maternity Medical Services Committee, 1 p.m.
4 Fri. Overseas Committee, 2 p.m.
4 Fri. Science Committee, 2 p.m.
8 Tues. Training Subcommittee, Occupational Health Committee, 2.30 p.m.
9 Wed. Remuneration Subcommittee, Occupational Health Committee, 10.30 a.m.
9 Wed. Private Practice Committee, 2 p.m.
17 Thurs. G.M.S. Committee, 10.30 a.m.
29 Tues. Arrangements Committee (Edinburgh, 1959), 2 p.m.

Meetings of Branches and Divisions

MIDLAND BRANCH

The Midland Branch held a dinner at the Grand Hotel, Birmingham, on November 10, followed by a lecture by Professor Thomas Bodkin as invited guest speaker; 255 people attended. Professor Bodkin spoke on "The Doctor's Dilemma—50 Years Afterwards." Professor A. P. Thomson proposed a vote of thanks.

WEST SUFFOLK DIVISION

The B.M.A. lecture was given on October 9 at the West Suffolk Hospital by Dr. W. R. Bett, who spoke on "An Alcoholic Excursion Through the Ages." Sixty-five members and guests were present.

INDEX TO VOLUME II FOR 1956

Entries for original articles, leading articles, annotations, and correspondence are indicated by the use of the symbols (O), (L), (A), and (C), respectively. Some subjects dealt with under various main headings in the *Journal*—e.g., "Annotations," "Leading Articles," "Parliament," etc.—are also set out under these headings.

A

- Abdomen, burst, 159
—peritoneoscopy; evaluation, with report of 136 cases (R. S. Handley and A. W. Nurick), 1211 (O)
—*Textbook of British Surgery*. Vol. 1: *The Abdomen* (Editor: Sir Henry Souttar), 347
ABEL, A. L.: Surgery of cancer, 150; 303 (C)
—and BROCK, Sir Russell: Royal College of Surgeons, annual general meeting, 1178 (C)
Aberdeen University. See Universities, Aberdeen
Abnormalities which cure themselves, 164
Abortion, threatened, and morbidity of foetus, 721
—and vaginal examination, 112
Abraham Colles Lecture, 1316
ABRAMSON, A. W.: Calomel in teething powders, 660 (C)
Accidents: Campaign among child cyclists, 665
—in children; round-table conference, 163
—in Northern Ireland, 1464
—*Road Accidents, 1955: General Summary and Statistical Tables* (vital statistics), 609, 611
Acetarsol, acute systemic reaction to (A. White), 1528 (O)
N-Acetyl-para-aminophenol as analgesic; controlled clinical trial using method of sequential analysis (D. R. L. Newton and J. M. Tanner), 1096 (O); 1430 (C)
ACKROYD, S.: Preparation for marriage, 419 (C)
Acne, aetiology and treatment, 1317
Acrodynia. See Pink disease
A.C.T.H. See Corticotrophin
ADAMS, E. B.: Treatment of megaloblastic anaemia of pregnancy and the puerperium with vitamin B₁₂, 398 (O)
ADAMSON, Robert Oswald, obituary of, 945
ADDERLEY, D. J.: Apathy in blood transfusions, 357 (C)
Addison's disease, cerebral disturbances in, 681
—heredity, 1132
—treatment (R. N. Beck and D. A. D. Montgomery), 921 (O)
Adenoviruses, 611
Adolescence: *Youth: The Years from Ten to Sixteen* (A. Gesell, Frances L. Ilg, and Louise B. Ames), 1103
Adrenaline: *Noradrenaline: Chemistry, Physiology, Pharmacology, and Clinical Aspects* (U. S. von Euler), 984
—potency and effectiveness, 1190
—urinary sympathin, in normal infants and infants with pink disease (J. W. Farquhar, T. B. B. Crawford, and W. Law), 276 (O)
ADRENALS:
Adrenalectomy, bilateral; anterior approach, 45 (C)
—for intracranial metastases from carcinoma of breast (A. Clain and A. H. Hunt), 627 (O); 651 (A); 825 (C), 881 (C)
Cortex; chemical and clinical problems (F. T. G. Prunty), 615 (O), 673 (O); 824 (C), 1300 (C)
—function in Graves's disease, 738
—hormones, 5, 615
—hyperfunction, 7
—virilism and hirsutism, 676
Hypertrophy causing virilism with mental symptoms, 478 (C), 604 (C), 767 (C), 1488 (C)
Inhibition; diagnostic use in Cushing's syndrome (C. L. Cope), 193 (O)
Virilism treated with steroids (A. W. Spence, J. S. Jenkins, and Alice M. Robinson), 1348 (O)
Adrenocorticotrophic hormone. See Corticotrophin
Adrenogenital syndrome, 8
—chemical and clinical aspects, 676
ADRIANI, J.: *Techniques and Procedures of Anaesthesia*, 2nd ed., 1289
Advertisements, pharmaceutical, 552 (C), 1116 (C), 1238 (C), 1298 (C), 1431 (C), 1488 (C)
Advertising, exploitation of fear in, 46 (C)
—methods, 941 (C), 1058 (C), 1176 (C), 1238 (C), 1367 (C)
Agammaglobulinaemia, familial (R. H. Elphinstone, I. G. Wickes, and A. B. Anderson), 336 (O)
Age, old. See Old age
Agranulocytosis caused by BZ 55, 607 (C)
—genetic, infantile, 871 (A)
Air cysts, benign multilocular intraperitoneal, simulating carcinoma of colon (D. E. Sturdy), 212
—pollution. See Atmospheric pollution
AIRD, I.: *Techniques and methods of medical education*, 500 (O)
—Artificial materials used now and in the past in surgery, 1171
—Visit to Warsaw, 1426 (C)
—See MARTIN, P., 215
—See STEINER, R. E., 400

ANAESTHESIA AND ANALGESIA:

- N-Acetyl-para-aminophenol as analgesic; controlled clinical trial using method of sequential analysis (D. R. L. Newton and J. M. Tanner), 1096 (O); 1430 (C)
Anaesthetic explosions; report of Working Party, 1225 (L)
Analgesic drugs, 156
—supplements to nitrous oxide anaesthesia; review (E. S. Siker), 1326 (O)
Anaesthesia for Obstetrics: Labor—Delivery—Infant Care (R. A. Hingson and L. M. Hellman), 1289
Aortic graft, 163
Asphyxia due to faulty apparatus, 658 (C), 766 (C)
Benzocaine and urethane solution, preparation of, 951, (correction, 1070)
Complications of Regional Anaesthesia: Etiology, Signs and Symptoms, Treatment (D. C. Moore), 464
Deaths due to anaesthesia; report of Association of Anaesthetists of Gt. Britain and Ireland, 868 (L); 995 (C), 1057 (C), 1173 (C), 1485 (C)
Dental; collapse in the dental chair, method of resuscitation, 1381
—innovation in technique, 482 (C)
Dipipanone hydrochloride in the treatment of severe pain; report of 200 cases (R. O. Gillhespy, E. Cope, and P. O. Jones), 1094 (O)
Fenestration operation, 163
First-plane, respiratory sign, 548 (C), 658 (C), 767 (C)
"Fluothane," non-explosive volatile anaesthetic agent (R. Bryce-Smith and H. D. O'Brien), 969 (O); 987 (A)
"Hibernation," value in severely shocked patients (Sheila Kenny), 211 (O); 419 (C), 999 (C)
Management of Pain in Cancer (Editor: M. J. Schiffrin), 1103
Manual of Anaesthetic Techniques (W. J. Pryor), 31
Methypyrrolone, piperidine hypnotic; clinical trial (J. S. Stewart), 1465 (O)
Molecular shape related to analgesia, 34 (A)
Neostigmine-resistant curarization (A. R. Hunter), 919 (O); 1054 (C), 1113 (C), 1174 (C), 1240 (C), 1303 (C), 1365 (C), 1429 (C), 1485 (C), 1544 (C)
New aspects of action of morphine-like analgesics (O. Schaumann), 1091 (O)
Paediatric anaesthesia, 45 (C), 180 (C), 241 (C), 360 (C), (correction, 430), 606 (C), 769 (C)
Pudendal block for low forceps, 1559
—obstetric indications for (I. Rocker), 78 (O)
Recovery rooms, 163
Registrar's Prize, 611
Scottish Society of Anaesthetists, 186
Steroid anaesthetics, 594 (A); 766 (C)
Techniques and Procedures of Anaesthesia, 2nd ed. (J. Adriani), 1289
"Viadril," new steroid anaesthetic; preliminary communication (L. H. Lerman), 129 (O); 300 (C)

- Analgesia. See Anaesthesia and Analgesia
Anastomosis; liquorice-all-sorts in treatment, 999 (C), 1175 (C)
—occlusion clamp for intrathoracic intestinal anastomoses (K. S. Mullard), 1054
Anatomia e Chirurgia, 983
Anatomy: Supply of bodies for dissection, 1357 (A)
—*Textbook of Human Anatomy* (J. D. Boyd and others), 1162
ANDERSON, A. B. See ELPHINSTONE, R. H., 336
—See FERRIMAN, D. G., 402
ANDERSON, Charles, obituary of, 1375
ANDERSSON, B.: Role of the hypothalamus in control of water intake, 415
André Mayer Fellowships for research in food and agriculture, 865
ANDREW, J.: Tracheostomy, and management of the unconscious patient, 328 (O)
Androgens: *Androgens: Biochemistry, Physiology, and Clinical Significance* (R. I. Dorfman and R. A. Shipley), 1416
Aneurysm, dissecting, of aorta, presenting as cerebral catastrophe (C. Giles), 700; 1237 (C)
—intracranial, as cause of subarachnoid haemorrhage; results of treatment of 249 verified cases (W. McKissock and L. Walsh), 559 (O), (correction, 668); 590 (L)
—new method of surgical treatment (J. E. M. Dutton), 585 (O); 711 (C), 825 (C)
Angina pectoris in a young man; diagnosis and treatment, 187
—nocturnal; cause and treatment, 894; 1070 (C)
Angiocardiography causing pulmonary oedema; treatment with intravenous hydrocortisone (E. M. M. Besterman, J. C. Leonard, and P. Wood), 695 (O)

Angiography, cerebral, in a neurosurgical service (S. Dimant, C. P. Moxon, and N. A. Lewtas), 10 (O)
Anglo-Saxon medical manuscript bought by Wellcome Trust, 1462
Animal experiments; Home Office return, 611
Annals of General Practice, 1259
ANNAMUNTHODO, H.: See ARNEAUD, J. D., 792
ANNAN, Gertrude L., appointed librarian, New York Academy of Medicine, 84
ANNING, S. T.: Aetiology and treatment of varicose veins, 159
— See INGRAM, J. T., 256

ANNOTATIONS:

Agranulocytosis, genetic, infantile, 871
Alcohol-induced pain in Hodgkin's disease, 652
Antibiotic hazards, 1477
Antibiotics as food preservatives, 870
Arsenic poisoning, chronic, 351
Atmospheric pollution; season of mists, 931
Atomic hazards, 293
Babinski response, 91
Bacillary dysentery, spread of, 410
Ballistocardiography, 761
Blindness in England, 146; 362 (C)
Brain tissue, ectopic tumours of, 1228
B.M.A. Council: S. Wand elected Chairman, 92
— Scientific exhibition, 1957, 990
British Medical Students' Association, 523; 712 (C)
C-reactive protein, 145; 418 (C)
Cancer, regional statistics, 1535
Caries, study of, 35
Cauda equina, compression of, 1166
Chlorpromazine jaundice, 1048
Chromosome number of man, 353
College of General Practitioners; new building, 147
Colonic motility, 870; 1300 (C)
Constipation, treatment, 36; 374 (C)
Cryoglobulinaemia and macroglobulinaemia, 409
Defibrillator, external, 468
Diabetes and ischaemic heart disease, 36
Diabetic foot, 1047
Diarrhoea in young children, 350
Dissection material, 1357
Experiment in medical education, 522
Fertility in Scotland, 595
Fluorohydrocortisone, 872; 940 (C)
"Fluothane" and "fluoromar," 987
Gilliat, Sir William, Memorial Fund, 1109
Gowers Memorial Lecture, 1168
Growth and illness, 221
Heart, arrest; aetiology and treatment, 1165; 1482 (C)
— disease; new lease of life, 869
— infarction, painless, 705; 826 (C)
Heparin in myocardial infarction, 989
Heparin-like action of dextran sulphate, 1167
Histoplasmosis in Britain, 816
Hodgkin's disease, thymic origin, 35
Hospitals; cost of an in-patient, 1419
Hydroxytryptamine in nettles, 595
Hypodermic needles, sharpening methods, 1535
Hypophysectomy for advanced cancer, 651
Insects, attack on, 706
Intestinal intoxication and hepatic coma, 930
Jelly-fish stings, 352; 1484 (C)
King's Fund, 872
Leucotomy, response to, 760; 885 (C)
Lumbar sympathectomy for arteriosclerosis, 1108
Making champions, 1229; 1489 (C)
Malaria diagnosis, 1533
Mast cells, 219
Maternity, deaths associated with, 932
Measles, treatment, 90
Medical education in the United States, 522
Mental health services, contrasts, 1479
Meprobamate, toxic effects, 1227; 1489 (C)
Molecular shape and analgesia, 34
Mortuaries, new, 292
Muscles; stiff-man syndromes, 1478
Muscular dystrophy, 650
National Health Service priorities, 816
Nobel Prizes, 990, 1109
Nose, neglected; study of sense of smell, 1356
Nuffield Foundation, 817
Nursing degrees, 1228; 1304 (C), 1429 (C), 1546 (C)
Oestrogens and salt retention, 220; 361 (C)
Opium addiction in India, 469
Ozone poisoning, 988
Penicillin V, 1355
Pills on the carpet, 290
Pipes, frozen, 1358
Platelet agglutinins and thrombocytopenic purpura, 1357; 1543 (C)
Pneumoperitoneum, therapeutic, 1534
Polymyositis, paralytic, and physical activity, 871
Pregnancy, early diagnosis, 987; 1118 (C)
Pressure suits in medicine, 1293
Prostatitis, chronic, 146
Pseudohaemophilia, 353; 998 (C)
Psychiatry in Africa, 1420
Psychosis, post-partum, 89
Public health in 1955, 1478
Puerperal sepsis, unsuspected source, 594
Pyloric stenosis, aetiology, 593
Radiation dosage units, 986
Radiological protection, 411
Rehabilitation in the R.A.F., 1294
Relaxin, 707; 1171 (C)
Safety and health in industry, 1421

ANNOTATIONS (continued):

Sarcoidosis, 931; 1237 (C)
Scurf, remedies for, 92
Sex of human nuclei, 815
Sjögren's syndrome, 470
Social workers, general-purpose or specialized, 1293
Steroid anaesthetics, 594; 766 (C)
Surgery; code of surgical operations, 932
Thermometers, electrical, 220
Thrombosis; temporary thrombotic state, 1292; 1547 (C)
Thrush napkin rash, 37
Tobacco-smoking and the cardiovascular system, 90; 659 (C)
Tuberculosis, primary, of mouth, 147
Union Internationale de la Presse Médicale, 1229
Urolithiasis, recurrent; treatment with aspirin, 650; 997 (C)
Vaginal examination in labour, 1168
Water pollution research, 1536
World health, 91
— population, 1047
Wound dressings, 988
Zoxazolamine, 293
Anonychia, rare type, 714 (C)
Anthrax, human, cutaneous, 1300 (C)
— prevention and treatment, 777
ANTIBIOTICS:
Abuse, 551 (C), 712 (C), 767 (C), 883 (C), 997 (C), 1057 (C), 1116 (C), 1241 (C)
Antistaphylococcal; behaviour *in vitro* (L. P. Garrod and Pamela M. Waterworth), 61 (O); 217 (L); 1362 (C)
As food preservatives, 870 (A); 879
Cross-sensitivity to, 373
Fourth annual symposium, 1112
Hazards of use, 1477 (A)
Polymyxin, Neomycin, Bacitracin (E. Jawetz), 589
Sensitivity; medical evidence on appeal in murder case (medico-legal notes), 556; 716 (committee of inquiry), 888
Versus staphylococci, 217 (L); 1115 (C)
Antibodies against cancer, 290 (L); 479 (C), 660 (C)
Anticoagulants: Arteriosclerosis, thrombosing; result of long-term anticoagulant therapy (J. Dedichen), 1038 (O)
— dextran sulphate, urinary excretion related to duration of anticoagulant effect (S. M. Jeavons, K. W. Walton, and C. R. Ricketts), 1016 (O); 1167 (A)
— use as anticoagulant and action in lowering serum cholesterol (H. Cohen and G. R. Tudhope), 1023 (O); 1167 (A)
Antiseptics in midwifery (R. M. Calman and J. Murray), 200 (O)
AORTA:
Aortography, translumbar; dissection of aorta as complication (H. Gaylis and J. W. Laws), 1141 (O); 1368 (C)
Coarctation (W. P. Cleland, T. B. Counihan, J. F. Goodwin, and R. E. Steiner), 379 (O)
— in children; surgical treatment (A. L. d'Abreu and C. Parsons), 390 (O)
Dissecting aneurysm presenting as cerebral catastrophe (C. Giles), 700; 1237 (C)
Dissection, as complication of translumbar aortography (H. Gaylis and J. W. Laws), 1141 (O); 1368 (C)
Grafts, anaesthesia for, 163
Apartheid in blood transfusion, 1487 (C)
Apomorphine treatment; cardiovascular collapse during (D. Parr), 860 (O); 996 (C), 1056 (C), 1238 (C)
Appendicectomy; ileo-colic intussusception after (J. E. Bridger), 755
— incidence among R.A.F. recruits (S. Carne), 19 (O)
Appendicitis, acute, conservative treatment (E. Coldrey), 1458 (O)
Appendix: Rovsing's sign (W. W. Davey), 28 (O); 180 (C), 243 (C), 303 (C)
Apple skin, virtues of, 1252
Appointments, 314, 372, 428, 612, 666, 1008, 1250, 1440
APPLETON, A. B.: See BOYD, J. D., 1162
"Apresoline." See Hydralazine
ARBUTHNOT, J., appointed Parliamentary Private Secretary to Minister of Health (parliamentary note), 1065
ARCHER, G. T. L.: Accidents with injections, 177 (C)
Archives Italiennes de Biologie, 983
ARDIS, J. A.: Pharmaceutical advertisements, 1238 (C)
ARDRA, G. M.: Shoe-fitting, 826 (C)
— and KEMP, F. H.: Leakage radiation from diagnostic tubes, 41 (C)
Argentaffinoma and 5-hydroxytryptamine, 232
Argentina: British medical help, 1067
ARMED FORCES:
Appointments and retirements, 367, 485, 543, 831, 1185, 1378, 1551
Awards and decorations, 367, 831, 1378, 1439
Egyptian casualty list, 1185
Honours, 663
Lee Potter, P. B., appointed Director-General, R.A.F. Medical Services, 470
Medical examinations (parliamentary note), 50
Mentions in dispatches, 1551

ARMED FORCES (continued):

R.A.F.: Medical branch, 444
— rehabilitation, 1294 (A)
— Richard Fox Linton Memorial Prize, 1317
Royal Navy: Naval Medical Service, 542
Woodruff, A. W., appointed honorary consultant in tropical diseases to the Army at Home, 1498
ARMSTRONG, Samuel Richard, obituary of, 1122
ARNEAUD, J. D., ANNAMUNTHODO, H., PINKERTON, J. H. M., and COLE, W. R.: A case of true hermaphroditism, 792 (O); 815 (A); 995 (C)
Arris and Gale Lectureships, 369
Arsenic poisoning, chronic, 351 (A)
"Artane." See Benzhexol hydrochloride
ARTERIES: see also Aneurysm; Embolism; Thrombosis
Arteriography, parathyroid, operative, for location of parathyroid tumour (R. E. Steiner, R. Fraser, and I. Aird), 400 (O)
Arteriosclerosis and the McNaughton Rules (medico-legal note), 947; 1059 (C)
— symposium on, 475
— thrombosing; result of long-term anticoagulant therapy (J. Dedichen), 1038 (O)
— use of lumbar sympathectomy in treatment, 1108 (A)
Carotid, internal, stenosed; relief of neurological symptoms by reconstruction (C. Edwards and C. Rob), 1265 (O)
Disease, obliterative, direct surgery in treatment (C. Rob), 1027 (O)
Femoral artery disease; technique for by-pass operations (K. Owen and C. G. Rob), 273 (O)
Occlusion, acute; anterior tibial syndrome treated by decompression (R. Harrison and P. E. Jackson), 403
Pulmonary, aneurysm resulting from chronic pulmonary embolus (R. Franklin and A. C. P. Ritchie), 983
— embolism by amniotic fluid, 408 (L)
Renal, thrombosis (D. G. Chambers), 1472
Arteriosclerosis. See Arteries
ARTHRITIS:
Enteritis and polyarthritis following partial gastrectomy (J. H. Shoesmith and H. S. Shucksmith), 404
Periarthritis, cause, 1009
Rheumatoid; cortisone and aspirin in treatment, 42 (C), 239 (C)
— employment of the rheumatoid arthritis (F. S. Cooksey and D. A. Brewerton), 1169; 1369 (C)
— long-term treatment, 1110
— management, 232
— present therapeutic status of cortisone and its derivatives (H. F. Polley), 1253 (O)
— rehabilitation, 232
ASHER, R.: Illness as a hobby, 157
ASHTON, N., awarded Proctor Medal, 1128
Asphyxia, aspiration; maternal death from (R. B. Parker), 16 (O); 245 (C), 300 (C), 551 (C)
— due to faulty anaesthetic apparatus, 658 (C), 766 (C)
— neonatorum, treatment with intragastric oxygen, 55; 374 (C)
Aspirin and cortisone in treatment of rheumatoid arthritis, 42 (C), 239 (C)
— in treatment of recurrent urolithiasis, 650 (A); 997 (C)
Association of Clinical Biochemists, annual general meeting, 1067
— of Industrial Medical Officers: 21st anniversary of foundation, 775; dinner, 833
— of Medical Records Officers, 666
See also
American Goiter Association
American Medical Association
British Association for the Advancement of Science
British Association of Forensic Medicine
British Association of Paediatric Surgeons
British Association of Plastic Surgeons
British Association of Urological Surgeons
British Medical Association
British Medical Students' Association
British Paediatric Association
British Tuberculosis Association
Family Planning Association
Irish Medical Association
Medical Association for the Prevention of War
Medical Missionary Association
National Association for Mental Health
National Association for the Prevention of Tuberculosis
Royal Medico-Psychological Association
ASTLEY, R.: *Radiology of the Alimentary Tract in Infancy*, 1289
Ataxia, Friedreich's, inheritance of, 490
Ataxia's foot, 100 (C), 243 (C), 360 (C), 420 (C)
— management in school, 490
Athletics: Making champions, 1229 (A); 1489 (C)
— medical arrangements at Olympic Games, 1234

ATKIN, I.: Schizophrenia in uniovular twins; recovery, 1041
ATKINSON, H.: Worrying reports, 102 (C)
ATMOSPHERIC POLLUTION:
And lung cancer, 248 (parliamentary note), 416 (C)
Clear Air Act, 599
Complaints against registered works, 371
Diesel fumes, toxicity, 914
— smoke in a London diesel bus garage; interim report (B. T. Commins, R. E. Waller, and P. J. Lawther), 753 (O); 939 (C), 1058 (C), 1235 (C), 1487 (C)
— oil, relation to lung cancer, 44 (C), 357 (C), 416 (C), 605 (C)
Fog precautions, 835
In U.S.A., 933
Preventive measures (parliamentary note), 1124
Season of mists, 931 (A)
Smoke control, 890
Toxicity of some atmospheric pollutants (R. E. Pattle and H. Cullumbine), 913 (O); 1058 (C)
Atomic energy: Films, 1297
— international co-operation, 427
— radiation: *Biological Effects of Atomic Radiation*, 293 (A)
— effects (parliamentary note), 106
— Second Annual Report, United Kingdom Atomic Energy Authority, 293 (A)
Automation in medicine, 44 (C)
Auxiliaries, medical, registers of, 186, 542
D'AVIGNON, M., and BERGLUND, G.: B.C.G. vaccination after replacement blood transfusion, 1363 (C)

B

BACHARACH, A. L.: Cigarette smoking, 553 (C)
Bacitracin: Polymyxin, Neomycin, Bacitracin (E. Jawetz), 589
BAGO, Z. M.: Radiation sickness and the adaptation syndrome, 39
Bacteria: *Bacterial Anatomy*. Sixth Symposium of the Society for General Microbiology (Editors: E. T. C. Spooner and B. A. D. Stocker), 926
— luminescence in food, 1251
BAGGOT, M. G.: Neostigmine-resistant curarization, 1363 (C)
BAILEY, J. S.: Future of diagnostic procedures, 1119 (C)
BAILEY, K. V.: Retroversion of uterus, 162
BAIRD, D.: Use of statistics in clinical obstetrics, 823
BAIRD, Joyce D.: See DUNCAN, L. J. P., 433
BAKER, Henry Searle, obituary of, 1063
BAKER, Lily Anita, obituary of, 48
Baldness. See Alopecia
BALINT, M.: Psychotherapy and the general practitioner, 235
BALL, Doreen S.: Pregnancy sickness, 1487 (C)
Ballistocardiography, 761
BANKROFT-LIVINGSTON, G. H.: Oxygen level and post-maturity, 161
BANNER, E. R.: Unconscious mental activity, 7, 103 (C)
BARBER, G. O.: Undergraduate and postgraduate education in general practice, 93
BARBER, Mary: Troublesome staphylococci, 1235 (C)
Barbiturate poisoning treated with amphenazole and bemegride (A. Worlock), 1099 (O); 1107 (L); 1365 (C)
BARR, D. P.: Herpes zoster, 864; 1115 (C), 1366 (C)
BARLOW, A. J. E.: See HOLGATE, M. C., 417
BARNARD, W. G., elected Dean, Faculty of Medicine, London University, 313
— death of, 1536
BARNES, Alfred Edward, obituary of, 1060
BARNES, D. W. H., CORP, M. J., LOUITT, J. F., and NEAL, F. E.: Treatment of murine leukaemia with x rays and homologous bone marrow; preliminary communication, 626 (O)
BARNETT, A. J., and FRASER, J. R. E.: *Peripheral Vascular Disease*, 518
BARON, J. H.: The Brown Dog of University College (Nova et Vetera), 547; 661 (C), 827 (C), 942 (C)
BARR, D. P.: Alpha and beta lipoproteins, 476
BARRATT, John Ogilvie, obituary of, 1433
Barrier cream, silicone, 99 (C)
BARRITT, D. W.: Alimentary lipaemia in men with coronary artery disease and in controls, 640 (O)
BARTER, A. P.: Generalized vaccinia, 1239 (C)
BARTLETT, Hedley Coward, obituary of, 484
BASU, A. K., and DAS, A.: Splenoportal venography for evaluating abnormalities of portal circulation, 916 (O)
BATEMAN, D. V.: Trendelenburg tilt, 479 (C)
BATESON, P. R.: Medical advertising, 552 (C)
Bathroom aid for disabled, 480 (C)
BATTEN, L. W.: The catarrhal child, 166
BAUER, F.: Chorda tympani syndrome, 1176 (C)
BAUER, W.: Reflections on some current trends in medical education in America, 1443 (O)
BAXTER, J. S.: Review of *Textbook of Human Anatomy*, by J. P. Boyd and others, 1162
BAXTER, V. T.: Respiratory sign of first-plane anaesthesia, 658 (C)

BAYLISS, R. I. S.: Cushing's syndrome and hypertension, 231
B.C.G.:
And vole bacillus vaccines, 826 (C), 938 (C), 1114 (C)
Vaccination (parliamentary note), 105
— after replacement blood transfusion (A. S. Hutchison and P. Macpherson), 863 (O); 1115 (C), 1363 (C)
— and local authorities, 371
— complications, 303 (C)
— in childhood, 174 (C), 356 (C)
— of immigrants (parliamentary note), 51
— present policy, 225
— protective value, 227
Vaccine: Dried B.C.G. Vaccine (Y. Obayashi), 756
— freeze-dried; methods adopted in preparation of a standard product (J. Ungar, Pauline Farmer, and P. W. Muggleton), 568 (O)
— vaccination of newborn infants with a British vaccine (Margaret I. Griffiths and W. Gaisford), 565 (O), (correction, 722)

BEARDSWORTH, B. S.: Neostigmine-resistant curarization, 1055 (C)
BEARE, R. L. B., and KNUDSEN, E. T.: Atypical multiple myelomatosis, 1526 (O)
BEATTIE, N.: Divine healing, 177 (C)
BEAUMONT, G. E.: Diagnosis and treatment of jaundice, 155
BECK, R. N., and MONTGOMERY, D. A. D.: Treatment of Addison's disease, 921 (O)
BECK, William Distin, obituary of, 608
BECKETT, A. G., and STEVENSON, C. J.: Unusual neurological complications after sudden withdrawal of cortisone, 27 (O)
Bed rest, therapeutic value, 1531 (L)
BEGGS, S. T.: Preventive medicine and the medical student, 712 (C)
Begley Prize awarded, 311
BEHRMAN, S.: Denervation for carotid sinus syncope, 228
— and KNIGHT, G.: Carotid sinus epilepsy and its treatment by denervation, 1522 (O)
BELCHER, J. R.: Surgical hazards in chronic bronchitis, 1540
Belfast University. See Universities, Belfast
BELL, A. D., MOLD, J. W., OLIVER, R. A. M., and SHAW, S.: Study of transfused platelets in case of congenital hypoplastic thrombocytopenia, 692 (O); 828 (C)
BELL, Ann. See DIGGS, L. W., 589
BELL, G. H., and OLIVER, Jean: Strength of bone in various pathological conditions, 709
Bemegride and amphenazole in treatment of barbiturate poisoning (A. Worlock), 1099 (O); 1107 (L); 1365 (C)
Benactyzine hydrochloride in psychoneurosis; controlled clinical trial in hospital patients (C. P. Seager and A. Leitch), 1407 (O)
Benger prizes for research in general practice, 1315
BENNET, E. A.: Virilism with mental symptoms, 478 (C)
— review of *Community Programs for Mental Health*, edited by Ruth Kotinsky and Helen L. Witmer, 405
— review of *Mental Hygiene in Public Health*, 2nd ed., by P. V. Lemkau, 405
BENNETT, Ruth: Speech therapy, 1000 (C)
BENNETT, R. J.: Disturbed sleep in children, 56 (C)
Benzhexol hydrochloride therapy in Parkinsonism; mental side-effects (H. B. Porteous and D. N. Ross), 138 (O); 361 (C), 478 (C), 550 (C)
— in treatment of depression, 361 (C), 657 (C)
— mental side-effects, 43 (C)
— in treatment of depression, 361 (C), 657 (C)
Benzocaine and urethane solution, preparation of, 951, (correction, 1070)
Bequests of bodies and eyes, 1067
BERGER, F. M.: Toxic effects of meprobamate, 1489 (C)
BERGIN, J. T.: See MORRIS, J. V., 1529
BERGLUND, G.: See D'AVIGNON, M., 1363
BERRY, H., appointed professor emeritus, University of London, 253
BERTRAM, D. S., appointed to chair of medical entomology, University of London, 1185
BESSER, F. S.: Soya flour in infantile eczema, 715 (C)
BESSIS, M.: *Cytology of the Blood and Blood-forming Organs*, 589
BESTERMAN, E. M. M., LEONARD, J. C., and WOOD, P.: Pulmonary oedema due to angiocardiopathy: treatment with intravenous hydrocortisone, 695 (O)
BETTLEY, F. R.: Glycyrrhetic acid, 882 (C)
BEVAN, Charles Edward, obituary of, 1181, 1494
BEVAN, P. G., BROOKE, B. N., and SLANEY, G.: Vagotomy for duodenal ulceration, 1366 (C)
BEVAN, D. C. A.: Rhesus factor and management of haemolytic disease of the newborn, 161
BICKERSTAFF, E. R.: Benign encephalitis of brain stem, 228
BILBEY, D. L. J.: Radioactive iron studies, 103 (C)
— See NICOL, T., 800
Bile ducts: Intravenous cholangiocholangiography with "biligradin": value compared with oral contrast method (R. W. W. Hardie and M. Israelski), 779 (O)
Biliary Tract: With Special Reference to the Common Bile Duct (J. A. Sterling), 405

"Biligradin" in intravenous cholangiocholangiography; value compared with oral contrast method (R. W. W. Hardie and M. Israelski), 779 (O)
BINNING, R. A.: Anaesthesia for the fenestration operation, 163
BINYSH, H.: Increase in lung cancer deaths, 358 (C)
Biochemistry: Association of Clinical Biochemists, annual general meeting, 1067
— *Chemistry of Living Cells* (Helen R. Downes), 1416
Birmingham University. See Universities, Birmingham
BIRSE, E. Leslie: Intestinal obstruction as a late complication of fibrocystic disease of pancreas, 286
Birth control: Contraception during amenorrhoea, 255
— France and Italy, 665
Bisset Hawkins Medal presented to G. S. Wilson, 1006
BLACK, J.: Perinatal mortality, 1543 (C)
BLACKLOCK, J. W. S.: Review of *Cancer Cells*, by E. V. Cowdry, 646
Bladder: Cancer; jig for inserting radon seeds, 102 (C), 244 (C), 303 (C)
— Hunner's ulcer; local hydrocortisone in treatment; preliminary report (J. H. Johnston), 698 (O)
— leukoplakia (L. M. Zinck and H. S. Trafford), 346
BLAKE, H. E.: Surgery of congenital defects, 171
BLATCHLEY, D.: Paediatric anaesthesia, 180 (C)
BLINDNESS: see also Eye; Ophthalmology; Vision
Blindness in England, 1951-1954, 146 (A); 362 (C)
British Empire Society for the Blind; annual report, 401
In children, 222
In young children; claims for cure (parliamentary note), 249
BLOOD:
Agammaglobulinaemia, familial (R. H. Elphinstone, I. G. Wickes, and A. B. Anderson), 356 (O)
Calcium; hypercalcaemia in infants; relation to vitamin D intake, 149
Circulation in the hands in hypertension (R. S. Duff), 974 (O)
Coagulability; reassessment of effect of fatty meals (G. H. Hall), 207 (O); 356 (C), 478 (C)
Coagulation; dextran sulphate, duration of anticoagulant effect in relation to urinary excretion (S. M. Jeavons, K. W. Walton, and C. R. Ricketts), 1016 (O); 1167 (A)
— use as anticoagulant, and action in lowering serum cholesterol (H. Cohen and G. R. Tudhope), 1023 (O); 1167 (A)
— effect of neodymium 3-sulpho-isonicotinate (R. B. Hunter and W. Walker), 1214 (O)
— time after dicoumarol, 778
Cytology of the Blood and Blood-forming Organs (M. Bessis), 589
Diseases; pseudohaemophilia, 353 (A); 998 (C)
Donation; restoration of normal volume and blood count, 613
Erythrocyte sedimentation rate, micromethods for estimation, 952
Group A; association with pernicious anaemia; collective series from a number of centres, 723 (O); 757 (L); 1235 (C)
Groups; ABO blood groups and secretor character in duodenal ulcer; population and sibship studies (C. A. Clarke and others), 725 (O); 757 (L)
— and antibodies, 763
— and evolution, 602
— experience with ABO and Rh blood-grouping cards (Eldon cards) (K. Eldon), 1218 (O)
— in peptic ulceration (D. A. P. Brown, A. G. Melrose, and J. Wallace), 135 (O)
— relation to age at menarche (Jean Grant, Dagmar C. Wilson, and I. Sutherland), 140
— to incidence of disease, 413
Haemoglobin, biosynthesis (C. Rimington), 189 (O)
— D. in Persian girl; presumably the first case of haemoglobin-D-thalassaemia (M. Hynes and H. Lehmann), 923
International Society of Haematology; sixth congress in Boston, 655
Iron, radioactive, studies on, 103 (C)
Macroglobulinaemia of Waldenström (D. G. Ferriman and A. B. Anderson), 402 (O); 409 (A)
Morphology of Human Blood Cells (L. W. Diggs, Dorothy Sturm, and Ann Bell), 589
Peripheral circulation; action of "dibenyline" (R. S. Duff), 857 (O)
Plasma electrolyte and total protein levels, variation in the individual (J. K. Fawcett and V. Wynn), 582 (O)
Platelet agglutinins and thrombocytopenic purpura, 1357 (A); 1543 (C)
— production and treatment of thrombocytopenia, 835
Platelets, transfused; study in case of congenital hypoplastic thrombocytopenia (A. D. Bell, J. W. Mold, R. A. M. Oliver, and S. Shaw), 692 (O); 828 (C)
Portal circulation; splenoportal venography for evaluating abnormalities (A. K. Basu and A. Das), 916 (O)
Practical Haematology, 2nd ed. (J. V. Dacie), 866
Pressure; British standards for sphygmomanometers, 343

BLOOD (continued):

- Pressure, high. See Hypertension
—hypotensive action of mecamylamine (A. E. Doyle, E. A. Murphy, and G. H. Neilson), 1209 (O); 1431 (C)
—of newborn, in relation to maturity, mode of delivery, and condition at birth (W. W. Holland and I. Maureen Young), 1331 (O)
—“pressure suit” to counteract hypotension during operation, 1293 (A)
—readings, technique and normal standards, 668
Pyruvate and α -ketoglutarate in normal and diabetic subjects (M. J. H. Smith and K. W. Taylor), 1035 (O)
Quantitative examination of bone marrow in guinea-pigs after gamma irradiation; preliminary note (P. F. Harris), 1032 (O)
Serum cholesterol; effect of dextran sulphate (H. Cohen and G. R. Tudhope), 1023 (O); 1167 (A)
Transfusion: apathetic in S. Africa, 179 (C), 356 (C), 548 (C), 769 (C), 1487 (C)
—B.C.G. vaccination after replacement transfusion (A. S. Hutcheson and P. Macpherson), 863 (O); 1115 (C), 1363 (C)
—exchange transfusion in haemolytic disease of newborn, 161
—intra-arterial, 1190
—medical blood preparations (L. G. Bogomolova), 294
—plastic equipment, 763
—progress in; international congress in Boston, 763
—repeated; danger of haemosiderosis, 836
—substitute solutions (L. G. Bogomolova), 294, 354; 661 (C)
Vessels, anomalous, of forearm; dangers of intra-arterial thiopentone injection (W. W. Richardson), 754
—cholesterol and vascular disease, 1172 (C), 1303 (C)
—peripheral disease; effect of amnion implants (E. Troensegaard-Hansen), 262 (O); 477 (C), 553 (C), 606 (C), 769 (C), 998 (C)
—vascular disease; use of intra-arterial oxygen (R. J. Marshall and R. F. Whelan), 1448 (Q)
—Peripheral Vascular Disease (A. J. Barnett and J. R. E. Fraser), 518
—Peripheral Vascular Disorders (Editors: P. Martin, R. B. Lynn, J. H. Dible, and I. Aird), 215
BLOOM, A. See WOLFF, F. W., 440
Board of Control (parliamentary note), 107
Body fluids: *Body Fluids: Basic Physiology and Practical Therapeutics* (J. R. Elkinton and T. S. Danowski), 1162
—exchange in serous cavities, 1381
Boeck's sarcoid. See Sarcoidosis
BÖHLER, L.: *The Treatment of Fractures*, vol. 1, 1416
BOGOMOLOVA, L. G.: Medical blood preparations, 294
—Blood substitute solutions, 354; 661 (C)
Boils, multiple, in infants, 1317
BOISSARD, Joan M., and ETON, B.: Neonatal umbilicus as a source of streptococcal infections in a maternity unit, 574 (O); 594 (A); 711 (C)
BOLAND, N.: Cerebral abscess and tetralogy of Fallot, 244 (C)
BOLTON, R. H., PARNELL, R. W., and WEINER, W.: Blood groups of controls, 1235 (C)

BONE: see also Fractures; Orthopaedics
Biochemistry and Physiology of Bone (Editor: G. H. Bourne), 464
Breaking stress, 709
Grafts, cancellous, 710
Growth and repair, 709
Normal and abnormal; symposium at Queen's College, Dundee, 709

- Bone marrow: Myelomatosis, multiple, atypical (R. L. B. Beare and E. T. Knudsen), 1526 (O)
—myelosclerosis, 927 (L)
—quantitative examination of bone marrow in guinea-pigs after gamma irradiation; preliminary note (P. F. Harris), 1032 (O)
Böök, J. A.: Study of first-cousin marriages in Northern Sweden, 412
BOOTH, W. G.: Shoe-fitting by x rays, 479 (C)
BOR, I., BRACHFIELD, K., and SVATY, J.: Cerebral abscess and tetralogy of Fallot, 1055 (C)
BOTTRELL, Stanley Henry Reginald, obituary of, 1311
BOULTON, T. B., and KRIGBAUM, E. M.: Neostigmine-resistant curarization, 1430 (C)
BOUND, J. P., BUTLER, N. R., and SPECTOR, W. G.: Classification and causes of perinatal mortality, 1191 (O), 1260 (O); 1542 (C)
BOURNE, A.: Purpose of medical education, 298 (C)
—Medical education, 1057 (C)
BOURNE, G. H. (Editor): *The Biochemistry and Physiology of Bone*, 464
BOURNE, J. G., and SHACKLETON, P.: Neostigmine-resistant curarization, 1485 (C)
Bourneville's disease, 132
BOWEN, W. H.: *Charles Dickens and his Family: A Sympathetic Study*, 1042
BOWIE, J. H.: Gas gangrene risks, 603 (C)
BOYD, J. D., CLARK, Sir Wilfrid E. Le Gros, HAMILTON, W. J., YOFFEY, J. M., ZUCKERMAN, Sir Solly, and APPLETON, A. B.: *Textbook of Human Anatomy*, 1162

- BOYLE, A. C.: Management of rheumatoid arthritis in the home, 232
BRACHFIELD, K. See BOR, I., 1055
Brachial plexus block in the unconscious, 777
BRADLEY, W. H.: Incidence and mortality from tetanus, 224
BRADLOW, B. A., and SEGEL, N.: Acute hyperparathyroidism with electrocardiographic changes, 197 (O)
BRADSHAW, S.: Treatment of iron-deficiency anaemia, 996 (C), 1304 (C)
BRAHAM, David, obituary of, 831
BRAHAM, Harvey Gordon, obituary of, 946
BRAID, James, biography in preparation, 1000 (C)
BRAIN, R. T.: Soap and the skin, 299 (C)
BRAIN, Sir Russell, appointed trustee of Ciba Foundation, 720

- BRAIN: Abscess and tetralogy of Fallot, 1055 (C)
Ammon's horn sclerosis associated with temporal lobe epilepsy; aetiology (J. B. Cavanagh and A. Meyer), 1403 (O)
Aneurysm, intracranial; new method of surgical treatment (J. E. M. Dutton), 585 (O); 711 (C), 825 (C)
Angiography in a neurosurgical service (S. Dimant, C. P. Moxon, and N. A. Lewtas), 10 (O)
Dissecting aortic aneurysm presenting as cerebral catastrophe (C. Giles), 700; 1237 (C)
Haematoma concealed by leakage of cerebrospinal fluid (C. Connolly), 1154 (O)
Leuco-encephalitis, haemorrhagic, acute (H. E. Aldridge), 807
—case (N. E. Rankin and Jean Dance), 808
Leucotomy, prefrontal; views of patients and their relatives (A. Elithorn and E. Slater), 739 (O); 760 (A); 885 (C)
Subarachnoid haemorrhage due to intracranial aneurysms; results of treatment of 249 verified cases (W. McKissock and L. Walsh), 559 (O), (correction, 668); 590 (L)
Subdural effusions, infected (J. Hankinson and L. V. Amador), 122 (O)
—haematoma and effusions in infancy (G. Ormiston), 126 (O)
Tissue, ectopic tumours of, 1228 (A)
Vitamin B₁₂ deficiency, cerebral manifestations of (J. M. Holmes), 1394 (O)

- BRAMWELL, J. C.: Practice, teaching and research (Harveian Oration), 949
BRAND, W.: Exact control in diabetes, 836 (C)
BRASS, W.: Sickness in an African community, 1117 (C)
Bread: *Breads White and Brown: Their Place in Thought and Social History* (R. A. McCance and E. M. Widdowson), 810

- BREAST: Cancer; adrenalectomy for intracranial metastases (A. Clain and A. H. Hunt), 627 (O); 651 (A); 825 (C), 881 (C)
—palliative hormone therapy, 315
—physiological castration syndrome (G. J. Hadfield and J. A. G. Holt), 972 (O); 1300 (C)
Tumours; delayed microscopy, 316

- Breast-feeding. See Infant feeding
Breast-milk: Galactorrhoea, 1132
Breath-holding test, 766 (C), 1177 (C)
BREEN, G. E.: Early management of poliomyelitis, 175 (C), 828 (C)

- BREWERTON, D. A.: Rehabilitation of rheumatoid arthritis, 232
—See COCKSEY, F. S., 1169

- BREWSTER, E. G.: Early management of poliomyelitis, 657 (C), 997 (C)
BRIDE, Thomas Milnes, obituary of, 946
BRIDGER, J. E.: Ileo-colic intussusception after appendicectomy, 755

- BRIDIE, James, memorial unveiled at Glasgow Citizens' Theatre, 720
Bristol University. See Universities. Bristol
Britannica Book of the Year, 1956, 984
British Association for the Advancement of Science; 118th annual meeting, 601

- British Association of Forensic Medicine, annual general meeting, 1439
British Association of Paediatric Surgeons, 296
British Association of Plastic Surgeons, annual summer meeting, 238
British Association of Urological Surgeons, officers elected, 109
British Empire Cancer Campaign, annual report, 95
British Empire Society for the Blind; annual report, 401
British Institute of Radiology, honorary members elected, 109; annual congress, 1361
British Journal Photographic Almanac, 405

- BRITISH MEDICAL ASSOCIATION: Annual Meeting, Brighton, 143 (L)
Film shows, 173
Presidential address, 57; 87 (L)
Scientific Exhibition, 172
awards, 1248
1957, 990 (A)

- Annual Representative Meeting, 142 (L)
Centenary under present name, 218 (L)
Council: S. Wand elected Chairman, 92 (A)
Functions, 545
Visit to U.S.S.R. (J. G. M. Hamilton), 1049

BRITISH MEDICAL ASSOCIATION: ANNUAL MEETING, BRIGHTON: PROCEEDINGS:

- Plenary Sessions:
Recent advances in the knowledge of cancer (G. Hadfield, A. L. Abel, W. M. Levitt, and A. Haddow), 150
Present position of A.C.T.H., cortisone, and derivatives (Sir Charles Dodds, H. Polley, W. S. C. Copeman, A. J. B. Goldsmith, F. D. Hart, and G. B. Mitchell-Heggs), 151
Handicapped children (N. B. Capon, A. W. G. Ewing, C. T. Potter, Mildred Creak, and W. D. Coltart), 222

- Round-Table Conferences:
Physical treatment of mental disorders, 154
Poliomyelitis, 153

- Section of Anaesthetics:
Anaesthesia for aortic graft (H. L. Thornton), 163
Anaesthesia for fenestration (R. A. Binning), 163
Management of respiratory paralysis (E. A. Pask, R. Bryce-Smith, A. C. Smith, and H. B. Wilson), 162
Neurological complications of anaesthesia (G. Bonney), 163
Recovery rooms (R. M. Davies), 163

- Section of Cardiology:
Aetiology of hypertension (G. W. Pickering), 223
Diagnosis of congenital heart disease (J. W. Brown), 224
Diagnosis of heart disease in infancy (J. D. Hay), 224
Film of cine-angiocardiology (shown by R. Astley), 224
Pharmacology of ganglion-blocking drugs (W. D. M. Paton), 224
Treatment of hypertension (A. R. Gilchrist), 223

- Section of Child Health:
Abnormalities which cure themselves (D. Evans and D. MacCarthy), 164
Accidents in children (Round-table conference), 163
Immunizations in childhood (W. H. Bradley, G. S. Wilson, H. J. Parish, N. Butler, E. T. C. Spooner, and W. C. Cockburn), 224
Therapeutics of childhood (P. Swift and N. M. Jacoby), 225

- Section of Dermatology:
Brains Trust, 226
Corticotrophin and cortisone in dermatology (J. T. Ingram and R. P. Warin), 226
Dermatitis from cosmetics (C. D. Calnan), 226
Nickel dermatitis (G. C. Wells), 226

- Section of Diseases of the Chest:
Prevention of tuberculosis—general measures (F. R. G. Hear), 227
Prevention of tuberculosis—mass radiography (V. H. Springett), 227
Prevention of tuberculosis—B.C.G. vaccination (T. M. Pollock), 227
Problems of chronic bronchitis (C. M. Fletcher), 227
Surgical treatment of asthma (G. K. Harrison), 227

- Section of General Practice:
Catarrhal child (L. W. Batten and others), 166
Education of the general practitioner (R. Whitehead, C. P. D. Grant, R. A. Davison, and G. O. Barber), 93
Hypertension in general practice (R. S. Stevens), 166
Infectious diseases in general practice (G. I. Watson, Liselotte Lennhoff, J. E. Jameson, and H. Paul), 165
Neurological diagnosis in general practice (S. L. Kaye), 165
Sleeplessness (C. A. H. Watts), 166

- Section of Medicine:
Analgesic drugs (S. Alstead), 156
Diagnosis of jaundice (G. E. Beaumont), 155
Epidemic at Royal Free Hospital (N. D. Compston), 157
Illness as a hobby (R. Asher), 157
Iron-deficiency anaemia (W. M. Davidson), 155
Management of asthma (R. S. B. Pearson, D. A. Williams, and D. O. Neil), 156
Management of cirrhosis of liver (Sheila Sherlock), 155
Modern concepts of anaemia (L. J. Witts), 155
Modern views on nephritis (M. D. Milne), 154
Placebos (E. J. Wayne), 157
Recent advances in therapeutics (A. H. Douthwaite), 156
Treatment of chronic leukaemia (R. A. Hickling), 155
Treatment of chronic renal oedema (J. B. Rennie), 154
Use of drugs in neurosis (D. Curran), 157

- Section of Neurology and Neurosurgery:
Benign encephalitis of brain stem (E. R. Bickerstaff), 228
Cerebral manifestations of vitamin B₁₂ deficiency (J. M. Holmes), 228
Denervation for carotid sinus syncope (G. C. Knight and S. Zehrman), 228

BRITISH MEDICAL ASSOCIATION: ANNUAL MEETING, Section of Neurology and Neurosurgery (continued): Hypophysectomy in carcinomatosis (E. J. R. Smith), 229

- Neurological manifestations of endogenous hypoglycaemia (Doreen Moorhouse), 228
Radiological findings in spinal angiomatous malformations (H. W. Davies and H. Jackson), 228

- Section of Obstetrics and Gynaecology:
Diagnosis of ectopic pregnancy (Mary K. Lawlor), 162
Importance of retroversion (K. V. Bailey), 162
Management of hypertension in pregnancy (R. J. Kellar and E. W. L. Thompson), 162

- Sections of Obstetrics and Gynaecology and of Child Health:
Post-maturity (T. L. T. Lewis, J. Walker, T. E. Oppé, G. H. Bancroft-Livingston, and O. D. Fisher), 160
Rhesus factor and the management of haemolytic disease of the newborn (D. C. A. Bevis, P. L. Mollison, B. M. Laurance, A. C. Allison, and Beryl D. Corner), 161

- Section of Occupational Health:
Occupational radioactivity and the general practitioner (Sir E. Rock Carling, E. E. Smith, and A. S. McLean), 229

- Section of Ophthalmology:
Adrenocortical hormones in ophthalmology (C. Cook), 167
Complicated obstructive epiphora and lateral adenectomy (B. W. Rycroft), 167
Modern trends in cataract surgery (J. Foster, K. Wybar, and A. H. Osmond), 166
Visual aids for the partially sighted (P. McG. Moffatt), 167

- Section of Orthopaedics:
Foot-form, function, and footwear in the young (W. H. Gervis, W. Sayle-Creer, and T. T. Stamm), 168
Management of common knee injuries (A. T. Fripp and K. H. Priddle), 169
Painful shoulder (F. A. Simmonds and G. B. Jones), 168
Structural effects of stress (J. C. Scott), 168
Surgery in treatment of spastic children and adolescents (E. S. Evans), 167

- Section of Oto-rhino-laryngology:
Hoarseness (W. A. Mill and J. F. Lipscomb), 170
Nasal obstruction (T. G. Wilson, F. C. W. Capps, and E. Millington), 169

- Section of Pathology:
Detection of endocrine tumours causing hypertension or other circulatory disturbances (M. L. Rosenheim, R. L. S. Bayliss, T. M. Chalmers, R. S. Stacey, and Dorothy S. Russell), 230
Fungous diseases in man (R. W. Riddell, W. St. C. Symmers, and L. J. Rubinstein), 170

- Section of Physical Medicine:
Management of hemiplegia (K. Lloyd, G. O. Storey, W. R. Grant, and H. J. Glanville), 233
Management of rheumatoid arthritis (G. D. Kersley, A. C. Boyle, F. S. Cooksey, and D. A. Brewerton), 232
Prediction and correction of degenerative arthritis (Esther Tuttle), 233

- Section of Plastic Surgery:
“Any Questions?” Panel, 171
Plastic surgical treatment of certain congenital deformities (H. E. Blake), 171
Rodent ulcer (Sir Archibald McIndoe), 171
Treatment of common injuries of face and hands (R. Mowlem), 171

- Section of Preventive Medicine:
Ascertainment and management of defective hearing in the very young (N. L. Crabtree and E. B. Berenice Humphreys), 234
Contribution of preventive health services to the efficiency of hospital practice (J. F. Galloway, A. T. Rogers, and R. L. Newell), 233

- Section of Psychiatry:
Psychotherapy and the general practitioner (M. Balint, P. R. Saville, and A. R. May), 235

- Section of Surgery:
Abdomino-thoracic approach in surgery (R. M. Walker and R. H. Franklin), 159
Aetiology and treatment of renal calculi (F. T. G. Prunty, L. N. Pyrah, F. E. Feilden, and H. S. C. Clarke), 158
Aetiology and treatment of varicose veins (F. B. Cockett, S. T. Anning, and R. B. Wright), 159
Burst abdomen (H. Park and S. Taylor), 159
Conservative resection in carcinoma of the rectum (W. R. Forrester-Wood and E. O. Muir), 158

- British Medical Journal: *Refresher Course for General Practitioners. Specially Commissioned Articles from the British Medical Journal*. Third collection, 1473
British Medical Students' Association, functions of, 546; 523 (A); 742 (C)

- British Overseas Airways Corporation: Medical services, 314
British Paediatric Association: *British Paediatric Association*, 1928-1952 (H. C. Cameron), 811
British Postgraduate Medical Federation, courses, 537
British Society for Immunology, inaugural meeting, 1295

- British Tuberculosis Association; annual conference, 94; symposium on mass radiography, 1497
BRITTON, H. G.: Pregnancy test, 419 (C), 1118 (C)
BROAD, C. P.: Refugees from Hungary; diary of a journey, 1359

- BROBECK, J.: Role of the hypothalamus in controlling appetite and satiety, 1053
BROCK, Sir Russell. See ABEL, A. L., 1178
BROCKIS, J. G., and JONES, E. T.: Treatment of acute haemorrhagic pancreatitis, with cortisone, 1524 (O)

- BROMLEY, L. L. See SZUR, L., 1273
Bronchiectasis, haemophilus infection in, 179 (C)
Bronchitis and air pollution, 109
—chronic; N.A.P.T. symposium, 1539
—with emphysema, 227
—loss of work due to (parliamentary note), 105
—respiratory symptoms and pulmonary disability in an industrial town; survey of random sample of population (I. T. T. Higgins, P. D. Oldham, A. L. Cochrane, and J. C. Gilson), 904 (O); 1119 (C), 1241 (C), 1487 (C)

- Bronchus: Carcinoma; obstruction of superior vena cava (L. Szur and L. L. Bromley), 1273 (O)
—treatment with nitrogen mustard (S. G. McAlpine), 1412 (O)
—involvement by metastatic pulmonary tumours, 299 (C)

- BRONTE-STEWART, B.: Smoking and the cardiovascular system, 659 (C)
BROOKE, B. N. See BFVAN, P. G., 1366
—See INGLIS, J. M., 343

- BROWN, D. A. P., MELROSE, A. G., and WALLACE, J.: Blood groups in neptic ulceration, 135 (O)
BROWN, Dame Edith Mary, obituary of, 1490
BROWN, F. R.: Torsion of spermatic cord, 713 (C)
—Painless cardiac infarction, 826 (C)

- BROWN, J. W.: Clinical diagnosis of congenital heart disease, 224
BROWN, Kathleen: Rupture of rectovaginal septum at parturition, 1543 (C)
BRUCE, J., appointed to Regius Chair of Clinical Surgery, Edinburgh University, 371
BRUCE-CHWATT, L. J.: Malaria in African infants, 1486 (C)

- BRUMFITT, W., and O'BRIEN, W.: Renal vein thrombosis with nephrotic syndrome and renal failure, 751 (O)
BRYCE-SMITH, R.: Management of respiratory paralysis, 163

- and O'BRIEN, H. D.: “Fluothane,” a non-explosive volatile anaesthetic agent, 969 (O); 987 (A)
BRYSON, Thomas, obituary of, 1245
BUCKLEY, Gladys Lieba, obituary of, 247
BUCKLEY, William, obituary of, 1374
Buckston Browne Prize awarded to I. McD. G. Stewart, 1439

- Buclizine hydrochloride: clinical trial for vomiting of pregnancy (M. P. Durham), 1276 (O)
Budd-Chiari syndrome in polycythemia vera; diagnosis and treatment (O. FitzGerald, P. FitzGerald, D. Cantwell, and J. A. Mehigan), 1343 (O); 1354 (L)

- Building cuts (parliamentary note), 106
BULL, Douglas William Anderson, obituary of, 887
BULLOUGH, J.: Paediatric anaesthesia, 360 (C), (correction, 430)

- BURCHELL, G. B.: Neostigmine-resistant curarization, 1054 (C)
BURDON, J. F.: Penicillin V and diabetes, 997 (C)
BURGE, H.: Delayed emptying of gastric stump after gastrectomy, 1428 (C)

- Vagotomy for duodenal ulceration, 1548 (C)
BURI, R. See TANDHANAND, S., 281
BURKINSHAW, J.: Is tonsillectomy necessary?, 420 (C), 713 (C)

- BURKITT, R.: Rovsing's sign, 180 (C)
—Torsion of spermatic cord; plea for manipulative reduction, 345; 552 (C), 713 (C)
BURN, G. P., and FIELD, E. O.: A colorimetric method for the diagnosis of phaeochromocytoma, 1152 (O)

- BURN, J. H.: Review of *Noradrenaline: Chemistry, Physiology, Pharmacology, and Clinical Aspects*, by U. S. von Euler, 984

- BURN, M.: *Mr. Lyward's Answer*, 646
BURNLEY, L. E., appointed Surgeon-General, United States Public Health Service, 427

- BURNS and scalds, notification suggested (parliamentary note), 50, 1552
—incidence and causes, 238
—preventive measures, 239 (C)
—treatment with hydrocortisone, 1547 (C)
Bursitis of olecranon, 429
—unusual injury, 304 (C)

- BURTON, Arthur, obituary of, 1123
BUSH, H. D., HORTON, W. G., SMARE, D. L., and NAYLOR, A.: Fluid content of the nucleus pulposus as a factor in the disk syndrome; further observations, 81 (O)

- BUSVINE, J. R.: Insecticide-resistant strains of insects of public health importance, 1541
BUTLER, N. R. See BOUND, J. P., 1191

C

- Butterworth Gold Medal, 1497
BUTTAUX, R.: Bacteriological classification of canned foods, 879
BUXTON, St. J. D.: Review of *Clinical Orthopaedics*—No. 6, edited by A. F. DePalma, 811
—review of *The Treatment of Fractures*, vol. 1, by L. Böhler, 1416
BYWATERS, E. G. L. See HOLBOROW, E. J., 1338
BZ 55. See Carbutamide

- C-reactive protein, 145 (A); 418 (C)
CADE, Sir Stanford: Radiation-induced cancer in man, 1361
Caesarean section, local or spinal analgesia for, 241 (C), 1173 (C)

- CAIGER, H.: St. Luke's day, 942 (C)
Calcaneo-varus deformity in the young, 169
CALLAHAN, A.: *Surgery of the Eye—Diseases*, 926
CALLAHAN, J. G.: Repeated delayed splenic bleeding into the lesser sac, 462

- CALMAN, R. M., and MURRAY, J.: Antiseptics in midwifery, 200 (O)
CALMAN, C. D.: Dermatitis from cosmetics, 226
Calomel in teething powders, 660 (C)
VAN DE CALSEYDE, P. J. J., to be regional director for Europe of W.H.O., 719

- CALWELL, H. G.: B.C.G. and vole bacillus vaccines, 939 (C)

- Cambridge University. See Universities, Cambridge
CAMERON, Dugald, obituary of, 424

- CAMERON, G. R., awarded honorary L.D., Edinburgh University, 109

- CAMERON, H. C.: *The British Paediatric Association*, 1928-1952, 811

- CAMERON, V. C.: Medical education, 712 (C)
CAMPBELL, W. A. B., and PURSER, H. M.: B.C.G. vaccination after replacement blood transfusion, 1115 (C)

- CAMPS, F. E.: Post-mortem table, 656
—Medical evidence at inquests, 886 (C)

- CANCER: Adrenalectomy for intracranial metastases from carcinoma of breast (A. Clain and A. H. Hunt), 627 (O); 651 (A); 825 (C), 881 (C)

- Antibodies against cancer, 290 (L); 479 (C), 660 (C)
Biochemical changes, 95
Breast; adrenalectomy for intracranial metastases (A. Clain and A. H. Hunt), 627 (O); 651 (A); 825 (C), 881 (C)

- palliative hormone therapy, 315
—physiological castration syndrome (G. J. Hadfield and J. A. G. Holt), 972 (O); 1300 (C)

- Bronchus; obstruction of superior vena cava (L. Szur and L. L. Bromley), 1273 (O)
—treatment with nitrogen mustard (S. G. McAlpine), 1412 (O)

- Cancer Cells (E. V. Cowdry), 646
Chemotherapy, 150
Colon and rectum; results of treatment (E. G. Muir), 742 (O)

- Control; prospects of chemotherapy, 935
Effect on personality, 357 (C)
Environmental history, 823

- Experiments on convict volunteers, 762
Institute of Cancer Research facilities, 537
Lung; and other causes of death in relation to smoking; second report on mortality of British doctors (R. Doll and A. B. Hill), 1071 (O); 1104 (L), 1246 (parliamentary note), 1367 (C), 1426 (C), 1427 (C)

- and tobacco-smoking, 43 (C)
—diagnosis (A. McKenzie), 204 (O)
—exfoliative cytology in examination of one laboratory's results (F. Hampson), 1461 (O)

- diesel oil as aetiological factor, 44 (C), 357 (C), 416 (C), 605 (C)
—related to air pollution and tobacco smoking, 416 (C)

- routine radiography, 373
Management of Pain in Cancer (Editor: M. J. Schiffrin), 1103

- Myelomatosis, multiple, atypical (R. L. B. Beare and E. T. Knudsen), 1526 (O)

- Pre-cancerous conditions of alimentary tract, 237
Prostate; a question of diagnosis, 1499

- Radiation-induced, in man, 1361
Radiotherapy, 150

- Recent advances in knowledge, 150; 303 (C)
Registration in Scotland (parliamentary note), 1312

- Research; British Empire Cancer Campaign, annual report, 95
Skin, 171

- Sloan-Kettering Institute for Cancer Research, 933
Statistics, regional, 1535 (A)

- Stomach; diagnosis (A. McKenzie), 204 (O)
Teletherapy in London Clinic, 1379

- Thyroid; value of radical thyroidectomy in treatment (M. Dargent), 1138 (O)
Uterus; family history of uter

- CAPON, N. B.: Child handicapped by cardiac conditions, 222
— review of *Diseases in Infancy and Childhood*, 2nd ed., by R. W. B. Ellis, 1530
- CAPPER-JOHNSON, Olive: Tranquillizers, 1547 (C)
- CARR, F. C. W.: Mouth breathing in children, 169
"Carbogen" in artificial respiration, 176 (C)
- Carbon monoxide poisoning, 1291 (L)
— accidental: dangers of inadequate ventilation (F. S. Fiddes), 697 (O)
— recent statistics; report to Medical Research Council (A. B. Hill), 1220 (O); 1365 (C)
- CARBUTAMIDE:
Clinical trial as hypoglycaemic agent (J. A. Hunt, W. Oakley, and R. D. Lawrence), 445 (O); 465 (L)
— in treatment of diabetes (L. J. P. Duncan, Joyce D. Baird, and D. M. Dunlop), 433 (O); 465 (L)
- In treatment of diabetes (J. M. McKenzie, P. B. Marshall, J. M. Stowers, and R. B. Hunter), 448 (O); 465 (L)
— (G. Walker, W. L. B. Leese, and J. D. N. Nabarro), 451 (O); 465 (L)
— (F. G. Young), 431 (O); 465 (L); 657 (C)
— report of 20 cases, 1178 (C)
- Trial in treatment of diabetes (F. W. Wolff, G. A. Stewart, M. F. Crowley, and A. Bloom), 440 (O); 465 (L)
- Value in control of diabetes (I. Murray and I. Wang), 451 (O); 465 (L)
- Carbutt Memorial Lecture, 1027
- Carcinoma. See Cancer, and under organs and regions
- Caries, dental. See Teeth
- CARLING, Sir Ernest Rock: Somatic and genetic effects of ionizing radiations, 229
— Radiological protection, 416 (C)
- CARNE, S.: Incidence of tonsillectomy, circumcision, and appendectomy among R.A.F. recruits, 19 (O); 302 (C), 420 (C), 603 (C), 713 (C), 827 (C)
— Enzyme tests for glycosuria, 827 (C)
- Carotid sinus epilepsy and its treatment by denervation (S. Behrman and G. Knight), 1522 (O)
— syncope, treatment by denervation, 228, (correction, 316)
- CARPENTER, M. F.: Degrees in nursing, 1546 (C)
- CARROLL, Denis Charles, obituary of, 1310
- Cars. See Motor-cars
- CARSLAW, Robert Buchanan, obituary of, 1432
- CARTER, C. O.: Aetiological and social factors in mongolism, 993
- CARTER, Peggy: Speech therapy, 884 (C)
- Cataract, polar, posterior, 894
— surgery, modern trends, 166
- Catarth in children, 166
- CATTERALL, R. C. F. See OAKLEY, W., 953, 1432
- CAVANAGH, J. B., and MEYER, A.: Aetiological aspects of Ammon's horn sclerosis associated with temporal lobe epilepsy, 1403 (O)
- CAVE, P.: Pitfalls in medicine, 1299 (C)
- CADWADIA, A. P.: History of medicine in medical education, 883 (C)
- CAWTHORNE, T., and HAYNES, D. R.: Facial palsy, 1197 (O); 1488 (C)
- Cecil Jolliffe of Royal College of Surgeons awarded to P. R. Allison, 949
- Central Public Health Laboratory, retirement of director, 949
- Cephalosporin P₁, antistaphylococcal activity, 62
- Cerebro-macular degeneration; aetiology, 255
- Corumen; origin and function, 254
- Corvix uteri. See Uterus, cervix
- Ceylon: *Health Progress in Ceylon: A Survey*, 500
- Chailey Heritage combined note and x-ray trolley (E. P. Quibell), 1111
- CHALMERS, J. A.: Maternal death from aspiration asphyxia, 245 (C)
- Spontaneous cure in diabetes, 1500 (C)
- CHALMERS, T. M.: Conn's syndrome—aldosteronism, 231
- CHAMBERS, D. G.: Torsion of spermatic cord, 552 (C)
— Bilateral thrombosis of renal artery, 1472
- CHAMBERS, J. S. W. See MARLEY, E., 1467
- CHANCE, I.: Pyrimethamine poisoning, 1486 (C)
- Charing Cross Hospital Medical School, facilities for students, 531
— future site, 821
— presentation of prizes and certificates, 821
— W. J. Hamilton appointed Dean, 834
- CHARTER, Ruth E. See THOMAS, Mair E. M., 339
- Chartered Society of Physiotherapy; annual dinner, 890
- CHAVE, S. P. W., COOPER, Jane, SCOTT, A., and TRIMMER, E. J.: Cold weather and general practice, 1543 (C)
- CHAZAN, A. A., and MCSORLEY, J. G. A.: Haemolytic anaemia in sickle-cell trait, 283 (O)
- CHEESE, Frederick William, obituary of, 181
- Cheeses for reducing diets, 1131; 1500 (C)
- Chelsea Clinical Society, 1557
- Chemotherapy and growth inhibition, 95
- Georg Speyer Haus, fiftieth anniversary, 558
- Chest: Institute of Diseases of the Chest, facilities, 538
Chickenpox; three attacks, 1381
- CHILDREN: see also Infants
- Abdominal migraine, 42 (C)
- Accidents: round-table conference, 163
- Admission to hospital; advice to parents, 372
- Age of puberty, 1188
- Allergy in Childhood* (J. Glaser), 1473
- American Academy of Pediatrics; annual meeting in New York, 1053
- British Paediatric Association*, 1928-1952 (H. C. Cameron), 811
- Child guidance clinics; value and staffing, 1188; 1318 (C)
- Coarctation of aorta; surgical treatment (A. L. d'Abreu and C. Parsons), 390 (O)
- Corporal punishment, 1500
- Cruel Parents*, 809
- Cruelty to: work of National Society for the Prevention of Cruelty to Children, 719
- Deaf; national body to co-ordinate work of societies concerned with welfare of deaf children, 1283
- Developmental speech anomalies in apparently normal children (C. H. M. Walker and P. R. Languth), 1455 (O); 1475 (L)
- Diaphoretic in paediatrics, 374
- Diarrhoea, juvenile, aetiology; laboratory investigation of specimens from general practices in north-east London (Mair E. M. Thomas and Ruth E. Charter), 339 (O); 350 (A)
- Discussions on Child Development*, vol. 1 (Editors: J. M. Tanner and B. Inhelder), 1473
- Diseases in Infancy and Childhood*, 2nd ed. (R. W. B. Ellis), 1530
- Failure to settle at night, 430
- Fluoroscopy, 363 (C)
- Growth, effect of illness on, 221 (A)
- Handicapped, 222
— Advisory Committee on, 1379
— by maternal rubella; group to assist with upbringing and education, 1059 (C)
— *Education of the Handicapped Pupil*, 1039
— functional assessment of physical disability as aid to planning (E. P. Quibell), 991
— grammar school education of, 245 (C)
— *The Hand of the Potter* (Nel Motte and P. Motte), 1223
— *Mentally Handicapped Children: A Handbook for Parents*, 1223
— Rudolf Steiner method of care and education, 1560
- Head-banging, 111
- In hospital, educational provision, 697
- Infectious diseases among schoolchildren, headmaster's powers, 894
- Institute of Child Health, facilities, 537
- Jealousies in childhood, 1441
- Joint meeting of British and American paediatric surgeons, 296
- Maladjusted, 47 (C)
— education of, 303 (C)
— methods of treatment, 179 (C), 478 (C)
- Medical inspection of schoolchildren, legal aspects, 778
- Mentally backward, schools for, 1070; 1190 (C)
- Migraine, abdominal, 359 (C)
- Myopic; food habits (P. A. Gardiner), 699 (O)
- National Society of Children's Nurseries, fiftieth anniversary, 16
- Orthopaedic disabilities, 223
- Paediatric anaesthesia, 45 (C), 180 (C), 241 (C), 360 (C), (correction, 430), 606 (C), 769 (C)
- Problem children, 222
- Prolonged constipation, 374 (C), 490 (C)
- School eyesight tests (parliamentary note), 105
- Sedation, 225
- Therapy in childhood, 225
- CHILDS, B.: Obesity in children, 1053
- Chiropody Associations (parliamentary note), 308; 480 (C)
- CHISHOLM, C.: Living on a pension to-day, 304 (C)
- Chloroquine and bleaching of hair, 300 (C)
- Chlorpromazine as cause of contact dermatitis, 1432 (C)
— as cause of jaundice, 1048 (A)
- Chlortetracycline; comparison with tetracycline in treatment of pneumonia; report from the City General Hospital, Sheffield, 1146 (O)
- CHOKSI, M. V.: Fluoroscopy for children, 363 (O)
- Cholecystitis, medical treatment of, 722
- Cholecystography: Intravenous cholangio-cholecystography with "biligradin"; value compared with oral contrast method (R. W. W. Hardie and M. Israelstam), 779 (O)
- Cholelithiasis; aetiology (G. Horn), 732 (O)
- Cholesterol and atherosclerosis, 476
— and coronary artery disease, 640
— and vascular disease, 1172 (C), 1303 (C)
- Chorda tympani syndrome (A. G. Young), 976 (O); 1176 (C)
- CHRISTENSEN, E.: Torsion of the gall-bladder, 1160; 1369 (C), 1427 (C)
- Christian Medical College request for books, 1060 (C)
- CHRISTIE, A.: Neostigmine-resistant curarization, 1303 (C)
- Christine Murrell Memorial Fellowship, 1439
- CHRISTOPHIS, G. J. See HUSTON, A. F., 629
- Chromosome number of man, 353 (A)
- sex chromatin in oral smears (A. D. Dixon and J. B. D. Torr), 799 (O); 815 (A)
- CHURCHILL-DAVIDSON, H. C.: Cardiac arrest, 1482 (C)
- Ciba Foundation: Award for research on ageing, 313
— Brain, Sir Russell, appointed trustee, 720
— report, 109
- Cigarettes. See Tobacco
- Ciliary spasm, functional, causes and treatment, 254; 490 (C)
- Circulation. See Blood, circulation
- Circumcision: Incidence among R.A.F. recruits (S. Carne), 19 (O)
- Civil defence; care of homeless in war, 54
— economies (parliamentary note), 106
- CLAIN, A., and HUNT, A. H.: Adrenalectomy for intracranial metastases from carcinoma of the breast, 627 (O); 651 (A); 825 (C), 881 (C)
- Claire Wand Fund Prize Essay, 513
- CLARK, D. C.: Neostigmine-resistant curarization, 1544 (C)
- CLARK, Sir Wilfred E. Le Gros. See BOYD, J. D., 1162
- CLARKE, C. A., EDWARDS, J. W., HADDOCK, D. R. W., HOWEL-EVANS, A. W., MCCONNELL, R. B., and SHEPPARD, P. M.: ABO blood groups and secretor character in duodenal ulcer; population and sibship studies, 725 (O); 757 (L)
- CLARKE, E., and MURPHY, E. A.: Neurological manifestations of malignant hypertension, 1319 (O)
- CLARKE, H. S. C.: Aetiology and prevention of renal calculus, 158
- CLARKE, J. C. See SCOTT, W. E. B., 1174
- CLARKE, S. H. C.: Abuse of antibiotics, 883 (C)
— Treatment of recurrent urolithiasis with aspirin, 997 (C)
- Claudication, intermittent; effect of amniot implantation (E. Troensegaard-Hansen), 262 (O); 477 (C), 553 (C), 606 (C), 769 (C), 998 (C)
- CLAUSER, R. J.: Acute respiratory obstruction, 1483 (C)
- CLAYE, A. M.: received honorary doctorate of medicine, Melbourne University, 558
- CLAYTON-JONES, E.: Diarrhoea and vomiting, 175 (C)
- CLELAND, W. P., COUNIHAN, T. B., GOODWIN, J. F., and STEINER, R. E.: Coarctation of the aorta, 379 (O)
- CLEMENT, William, obituary of, 771
- Climatology: International Society of Bioclimatology and Biometeorology, 1249
— Polar physiology, 601
- CLINICA CHIMICA ACTA, 1361
- CLYNE, D. G. W.: Diagnosis of early pregnancy, 1489 (C)
- CLYNE, M. B.: Prefrontal leucotomy, 885 (C)
- Coal-gas poisoning. See Carbon monoxide poisoning
- COATES, J. C., and INNES, I. D.: Medical witnesses, 1000 (C)
- COBURN, A. F., MOORE, Lucile V., WOOD, Judith, and ROBERTS, Mary: *Splenin A in Rheumatic Fever. The Testing of Splenin A as an Anti-inflammatory Agent*, 984
- COCHRANE, A. L.: Eradication of tuberculosis in Britain, 94
- and MIAL, W. E.: Progressive massive fibrosis, 180 (C)
— See HIGGINS, I. T. T., 904
- COCHRANE, E. M.: Severe reaction to penicillin, 1070 (C)
- COCKAYNE, Edward Alfred, obituary of, 1370
- COCKETT, F. B.: Aetiology and treatment of varicose veins, 159
— Diagnosis and surgery of high-pressure venous leaks in the leg; a new overall concept of surgery of varicose veins and venous ulcers, 1399 (O)
— See DODD, H., 1103
- Codeine as supplement to nitrous oxide in anaesthesia, 1328
- Coeliac disease, diet in, 722 (C)
- COGAN, Lee Danby Buxton, obituary of, 484
- COHEN, H., and TUDHOPE, G. R.: Dextran sulphate: Use as an anticoagulant, and action in lowering serum cholesterol, 1023 (O); 1167 (A)
- COHEN, L.: Challenge of mongolism, 1484 (C)
- COHEN OF BIRKENHEAD, Lord, barony gazetted, 186
- Coitus. See Sexual intercourse
- Cold weather and general practice, 1543 (C)
- COLDREY, E.: Treatment of acute appendicitis, 1458 (O)
- COLE, W. R. See ARNEAUD, J. D., 792
- COLEBROOK, L.: Why not prevented?, 239 (C)
— Neonatal umbilicus and puerperal infection, 711 (C)
- COLIN-JONES, E.: Effect of glycyrrhetic acid on eczema, 604 (C), 1305 (C)
- Colitis, mucous, after excess of alcohol, 893; 1318 (C)
— ulcerative, 237
— treatment with local hydrocortisone (S. C. Truelove), 1267 (O); 1486 (C)
- COLLEGES:
College of General Practitioners: Butterworth Gold Medal, 1497
Facilities, 541
Fourth annual meeting, 1232
James Mackenzie Lecture, 1232
New building, 174 (C); 147 (A)
Pfizer Postgraduate Grants, 53
Scottish Council meeting, 1557
College of Pathologists of Australia; inaugural meeting, 1110

- COLLEGES (continued):
See also Royal Australasian College of Physicians
Royal Australasian College of Surgeons
Royal College of Obstetricians and Gynaecologists
Royal College of Physicians of Edinburgh
Royal College of Physicians of Ireland
Royal College of Physicians of London
Royal College of Surgeons of Edinburgh
Royal College of Surgeons of England
Royal College of Surgeons in Ireland
Royal Faculty of Physicians and Surgeons of Glasgow
- Colon, benign multilocular intraperitoneal air cysts simulating carcinoma (D. E. Sturdy), 212
— carcinoma; results of treatment (E. G. Muir), 742 (O)
— motility, 870 (A); 1300 (C)
- COLTART, W. D.: Orthopaedic disabilities in children, 223
- COMFORT, A.: *Biology of Senescence*, 589
— and others: *Medical Relief Appeal*, 1173 (C)
— of disseminated sclerosis, 429
— of disseminated sclerosis after sudden withdrawal (A. G. Beckett and C. J. Stevenson), 27 (O)
- Commonwealth University Interchange Committee, report on work over the last eight years, 1154
- Composting of household waste, 758 (L); 940 (C)
- COMPTON, N. D.: Epidemic at Royal Free Hospital, 157
- CONGRESSES:
Gastroenterology; fifth international congress, 236, (correction, 316); 252
Genetics; first international congress, 412
Haematology; International Society, sixth congress, 635
Harvey Tercentenary Congress, programme of celebrations in London and Folkestone, 1295
History of Medicine; fifteenth international congress, 666
Physiology; twentieth international congress, 414
Union Internationale de la Presse Médicale, 1229 (A)
- Conn's syndrome, 231
- CONNOLLY, C.: Intracranial haematoma concealed by leakage of cerebrospinal fluid, 1154 (O)
- Consanguinity, risks of hereditary defects in grandchildren, 1251
- Constipation, prolonged, in children, 374 (C), 490 (C)
— regular use of laxatives by schoolchildren (J. J. A. Reid), 25 (O); 36 (A); 245 (C)
— treatment, 36 (A); 374 (C)
- Consultants and Specialists: Merit awards (parliamentary note), 249
— referrals in general practice (P. Hopkins), 873
- Contraception. See Birth control
- CONWAY, H.: *Tumors of the Skin*, 464
- COOK, C.: Adrenocortical hormones in ophthalmology, 167
- COOKSEY, F. S.: Rehabilitation of rheumatoid arthritis, 232
— Rehabilitation for chronic bronchitis, 1541
— and BREWERTON, D. A.: The employment of the rheumatoid arthritic, 1169; 1369 (C)
- COOPER, C. J.: Innovation in technique for dental gas, 482 (C)
- COOPER, Jane. See CHAVE, S. P. W., 1543
- COOPER, Lesley D.: Dr. Janet S. Darling Memorial Fund, 245 (C)
- COPE, C. L.: Diagnostic use of adrenal inhibition in Cushing's syndrome, 193 (O)
- COPE, E., GILLIES, R. O., and RICHARDSON, R. W.: Treatment of iron-deficiency anaemia; comparison of methods, 638 (O); 996 (C), 1118 (C), 1239 (C), 1304 (C), 1428 (C)
— See GILLIES, R. O., 1094
- COPEMAN, W. S. C.: Cortisone and A.C.T.H. in rheumatoid arthritis, 151
— elected Warden of Society of Apothecaries of London, 558
- COPLANS, Joseph Moses, obituary of, 48
- COPPARD, Winifred: Medical relief appeal, 1548 (C)
Copyright: Collaboration in authorship (medico-legal note), 1125
- CORBETT, C. H.: Chronic haemopermia, 1132 (C)
- CORBETT, J. T.: Itchy measles, 1488 (C)
— Grafts: eyes offered to save sight not to be used from living persons (medico-legal note), 485
— ulceration in virus diseases, 111
- Coronary artery disease; alimentary lipaemia in men and in controls (D. W. Barritt), 640 (O)
— mortality from, 99 (C)
— sex factor, 98 (C), 551 (C), 768 (C)
- CORP, M. J. See BARNES, D. W. H., 626
- CORTICOTROPHIN:
Clinical uses, 1257
Corticotrophin and cortisone therapy in dermatomyositis (M. McElligott), 1509 (O)
In dermatology, 226
In treatment of disseminated sclerosis, 429
Present therapeutic status, 151
Secretion stimulated by stress, 33 (L)
- CORTISONE:
And aspirin, in treatment of rheumatoid arthritis, 42 (C), 239 (C)
And corticotrophin therapy, in dermatomyositis (M. McElligott), 1509 (O)
- CORTISONE (continued):
Effect on body defence mechanisms (T. Nicol, R. S. Snell, and D. L. J. Bilbey), 800 (O); 1549 (C)
Fluorohydrocortisone, 872 (A); 940 (C)
Hydrocortisone, intravenous, in treatment of pulmonary oedema due to angiocarditis (E. M. M. Besterman, J. C. Leonard, and P. Wood), 695 (O)
— local, for Hunner's ulcer of bladder; preliminary report (J. H. Johnston), 698 (O)
— in treatment of ulcerative colitis (S. C. Truelove), 1267 (O); 1486 (C)
— snuff in treatment of hay-fever, 836
— treatment of burns, 1547 (C)
In dermatology, 226
Present therapeutic status of cortisone and its derivatives, with special reference to rheumatic diseases (H. F. Polley), 151; 1253 (O)
Therapy, failure, 678
Treatment of acute haemorrhagic pancreatitis (J. G. Brockis and E. T. Jones), 1524 (O)
— of Addison's disease (R. N. Beck and D. A. D. Montgomery), 921 (O)
— of disseminated sclerosis, 429
Unusual neurological complications after sudden withdrawal (A. G. Beckett and C. J. Stevenson), 27 (O)
- Cosmetics, dermatitis from, 226
— some hazards of lipstick, 255
- COSTELLO, Thomas Bodkin, obituary of, 588
- COULSON, D. See TUNBRIDGE, R. E., 588
- COUNIHAN, T. B. See CLELAND, W. P., 379
- COURNAND, A. F., awarded Nobel Prize in Medicine, 990 (A)
- COWAN, H. K.: appointed Honorary Physician to H.M. the Queen, 54
- COWDRY, E. V.: *Cancer Cells*, 646
- COWELL, S. J.: *Review of Modern Nutrition in Health and Disease*, edited by M. G. Wohl and R. S. Goodhart, 31
— appointed professor emeritus, University of London, 253
- CRABTREE, N. L.: Ascertainment and management of defective hearing in the very young, 234
- CRADDOCK, D.: The catarrhal child, 166
- CRAIG, W. S., and others: *Nursing Care of the Newly Born Infant*, 287
- CRAIGMILE, D. A.: Child of deaf mutes, 256 (C)
- Crash helmets (parliamentary note), 1129
— revised British Standard, 1129
- CRAWFORD, T. B. B.: The problem child, 222
- CREAK, Mildred: The problem child, 243 (C)
- CREAN, G. P.: *Athlete's foot*, 243 (C)
- CRITCHLEY, M.: *Review of I. P. Pavlov—Selected Works*, edited by Kh. S. Koshtoyants, 1352; 1482 (C)
— elected honorary member, Rumanian Society of Medical Sciences, 776
— elected Master of the Society of Apothecaries of London, 558
- CROMBIE, Thomas Gilmour, obituary of, 307
- CROSSLEY-HOLLAND, Frank William, obituary of, 662
- Crohn's disease in mother and son (G. E. Heard and E. L. John), 85
- CROW, R. S.: Peripheral neuritis in myelomatosis, 802 (O)
- CROWLEY, E. M. See EMERY, J. L., 1518
- CROWLEY, M. P. See WOLFE, F. W., 440
- CRUICKSHANK, John Cecil, obituary of, 1061, 1121
- Cryoglobulinaemia and macroglobulinaemia, 409 (A)
- CSATO, T.: "Staggered dumping" and sugar tolerance, 358 (O)
- CULLIS, Winifred Clara, obituary of, 1242
- CULLUMBINE, H.: Paediatric anaesthesia, 242 (C)
- CUMMING, R. L.: Lung cancer and tobacco, 43 (C)
- CUMMINGS, P. H.: Retirement of, 488
- CUNNINGHAM, Eileen R., retirement of, 488
- Curarization, neostigmine-resistant (A. R. Hunter), 919 (O); 1054 (C), 1113 (C), 1174 (C), 1240 (C), 1303 (C), 1365 (C), 1429 (C), 1485 (C), 1544 (C)
- CURRAN, D.: Use of drugs in neurosis, 157
- CURTIS, Joan M.: Abuse of antibiotics, 767 (C), 997 (C)
- Cushing's syndrome, 8, 683
— and hypertension, 231
— diagnostic use of adrenal inhibition (C. L. Cope), 193 (O)
- CUTHBERTSON, D. P.: *Review of A Symposium on Amino Acid Metabolism*, edited by W. D. McElroy and H. B. Glass, 287
- CUTHBERTSON, William, obituary of, 887
- CUTHBERTSON: Medical relief appeal, 1238 (C)
- CUTLER, R.: See Vitamin B₁₂
- Cyanocobalamin. See Vitamin B₁₂
- Cycle racing, long-distance; food and stimulants, 893
- Cytology, exfoliative, in diagnosis of lung cancer; examination of one laboratory's results (F. Hampson), 1461 (O)
- DALE, Sir Henry, awarded Albert Medal, Royal Society of Arts, 53, 253
- DALE, T. L. C.: Advice from hospital doctors, 1490 (C)
- Dalhousie University. See Universities, Dalhousie
- DALTON, C. H. C.: Facial palsy, 1488 (C)
- DANCE, Jean. See RANKIN, N. E., 808
- Dandruff, 92 (A)
- Dangerous substances, basic list for uniform labelling, 656
- DANON, Mathilde. See SACHS, L., 795
- DANOWSKI, T. S. See ELKINGTON, J. R., 1162
- DANZIGER, A.: 1-Noradrenaline, 46 (C)
- "Daptazole." See Amiphenazole
- "Daraprim." See Pyrimethamine
- DARGENT, M.: Value of radical thyroidectomy in the treatment of thyroid cancer, 1138 (O)
- DARLING, Janet S., memorial fund instituted, 245 (C)
- DAS, Amalananda, obituary of, 1371
— See BASU, A. K., 916
- DAVEY, T. F., ROSS, C. M., and NICHOLSON, B.: Leprosy; changing situation in Eastern Nigeria, 65 (O)
- DAVEY, T. H., and LIGHTBODY, W. P. H.: *The Control of Disease in the Tropics*, 141
- DAVEY, W. W.: Rovsing's sign, 28 (O); 180 (C), 243 (C), 303 (C)
- DAVIDSON, W. M.: Iron-deficiency anaemia, 155
- DAVIDSON, W. P. M.: Doctors in Hungary, 1000 (C)
- DAVIES, A. H. See MCGREGOR, I. A., 686
- DAVIES, D. R., DENT, C. E., and WILLCOX, A.: Hyperparathyroidism and steatorrhoea, 1133 (O); 1363 (C), 1546 (C)
- DAVIES, G. M., and LEWIS, I.: Outbreak of food-poisoning from bread made of chemically contaminated flour, 393 (O)
- DAVIES, G. R.: Maladjusted children, 303 (C)
- DAVIES, H. W.: Spinal angiomatous malformations, 228
- DAVIES, I. G., appointed Honorary Physician to H.M. the Queen, 54
- DAVIES, J. A. L.: Late results of vagotomy combined with gastro-jejunostomy or pyloroplasty in treatment of duodenal ulceration, 1086 (O); 1366 (C), 1548 (C)
- DAVIES, R. M.: Recovery rooms, 163
- DAVIES, Rosemary: Tropical pulmonary eosinophilia, 1470 (O)
- DAVIS, A.: Paediatric anaesthesia, 45 (C)
- DAVIS, N.: Vaccination technique, 1545 (C)
- DAVIS, P. S.: Results of the 17-hydroxycorticosteroid assays compared with clinical response in the same patients, 1110
- DAVISON, M. H. A., and PASK, E. A.: Neostigmine-resistant curarization, 1544 (C)
- DAVISON, R. A.: Education in the U.S.A., 93
- DAWKINS, M.: Anaesthetic deaths, 995 (C)
- DAWSON, I. M. P., appointed reader in pathology, Westminster Medical School, 1315
- DEACON, A. L.: Bleeding from the cord, 1299 (C)
- DEAFNESS: see also Ear; Hearing; Otorhinolaryngology
- Children with impaired hearing, 222
- Deaf-mutism; rearing of child of deaf mutes, 256 (C)
- Defective hearing, ascertainment in the very young, 234
National body to co-ordinate the work of societies concerned with the welfare of deaf children, 1283
- Death, agonal twitching, 1070
- Death, sudden unexpected, in infants; clinical histories of cases reported to coroner (J. L. Emery and E. M. Crowley), 1518 (O)
- DEDICHEN, J.: Thrombotic arteriosclerosis; result of long-term anticoagulant therapy, 1038 (O)
- Delinquency, juvenile: *Mr. Lyward's Answer* (M. Burn), 646
- DENOUAN, A. E. B.: Cigarette smoking, 358 (C)
- DENT, C. E.: Hyperparathyroidism and steatorrhoea, 1546 (C)
— review of *The Biochemistry and Physiology of Bone*, edited by G. H. Bourne, 464
— See DAVIES, D. R., 1133
- Dentistry: Institute of Dental Surgery, facilities, 538
— new dental unit at Sunderland General Hospital, 1505
- Deoxycortone acetate in treatment of Addison's disease (R. N. Beck and D. A. D. Montgomery), 921 (O)
- DEPALMA, A. F. (Editor): *Clinical Orthopaedics—No. 6*, 811
- Department of Scientific and Industrial Research. *Report of the Water Pollution Research Board*, 1955, 1536
- Depilation, 1069
- Dermatitis caused by soap, 299 (C)
— contact, from chlorpromazine, 1432 (C)
Dermatology. See also Skin
— American prizes for essays, 372
— *Clinical Selections in Dermatology and Mycology* (F. R. Schmidt), 1042
— Institute of Dermatology, facilities, 538
- Dermatomyositis: corticotrophin and cortisone therapy (M. McElligott), 1509 (O)
- Desmoid tumour resembling pseudo-pancreatic cyst in a male (E. Wilson), 982
- Detergents, ingested, toxicity of, 316
— synthetic, report on (parliamentary note), 50
- DEUTSCHBERGER, O.: *Fluoroscopy in Diagnostic Roentgenology*, 1162

- Dextran sulphate; heparin-like action, 1167 (A)
— urinary excretion related to duration of anticoagulant effect (S. M. Jeavons, K. W. Walton, and C. R. Rickerts), 1016 (O); 1167 (A)
— use as anticoagulant, and action in lowering serum cholesterol (H. Cohen and G. R. Tudhope), 1023 (O); 1167 (A)
“Dexulate.” See Dextran sulphate
- DIABETES MELLITUS:
Aetiology and management of lesions of the feet (W. Oakley, R. C. F. Catterall, and M. M. Martin), 953 (O); 1047 (A); 1239 (C), 1432 (C)
And ischaemic heart disease, 36 (A)
Blood pyruvate and α -ketoglutarate in normal and diabetic subjects (M. J. H. Smith and K. W. Taylor), 1035 (O)
Convalescent home for male diabetics, 612
Diet before glucose tolerance test, 721
Effect of penicillin V, 997 (C)
Enzyme tests for detection of glucose in urine (J. A. Hunt, C. H. Gray, and D. E. Thorogood), 586 (O); 827 (C), 940 (C), 1058 (C), 1238 (C), 1487 (C)
Enzyme test for glycosuria (R. E. Tunbridge, R. G. Paley, and D. Coulson), 588; 827 (C), 1058 (C), 1238 (C), 1487 (C)
Exact control, 430; 836 (C)
Inherited, 1190
Insulin, abnormal reactions after, 255
— coma, “irreversible,” treatment, 256 (C)
Pregnancy complicated by: review of 119 cases (A. E. M. Stevenson), 1514 (O)
Spontaneous cure, 1131; 1500 (C)
Treatment: clinical trial of BZ 55, new oral hypoglycaemic agent (J. A. Hunt, W. Oakley and R. D. Lawrence), 445 (O); 465 (L)
— trial of oral hypoglycaemic agent (BZ 55) (F. W. Wolf, G. A. Stewart, M. F. Crowley, and A. Bloom), 440 (O); 465 (L)
— with BZ 55 (J. M. McKenzie, P. B. Marshall, J. M. Stowers, and R. B. Hunter), 448 (O); 465 (L)
— with BZ 55; clinical trial (L. J. P. Duncan, Joyce D. Baird, and D. M. Dunlop), 433 (O); 465 (L)
— with BZ 55; report on 20 cases, 1178 (C)
— with hypoglycaemic sulphonamides (BZ 55) (G. Walker, W. L. B. Leese, and J. D. N. Nabarro), 451 (O); 465 (L)
— with hypoglycaemic and antidiabetic sulphonamides (F. G. Young), 431 (O); 465 (L); 657 (C)
Value of BZ 55 in control (I. Murray and I. Wang), 452 (O); 465 (L)
- Diagnosis: Babinski response, 91 (A)
— future of diagnostic procedures, 1119 (C), 1301 (C)
— pitfalls in medicine (A. H. Douthwaite), 895 (O), 958 (O); 1175 (C), 1298 (C), 1489 (C)
Diaphoretic in paediatrics, 374
Diarrhoea, juvenile, aetiology; laboratory investigation of specimens from general practices in North-east London (Mair E. M. Thomas and Ruth E. Charter), 339 (O); 350 (A)
“Dibenyline.” See Phenoxymethylamine hydrochloride
DOBLE, J. H. See MARTIN, P., 215
DICK, James Orford Wallace, obituary of, 308
DICK, William Pointon, obituary of, 305, 365
DICKENS, C.: *Charles Dickens and his Family: A Sympathetic Study* (W. H. Bowen), 1042
DICKINSON, K. S.: Pharmaceutical advertisements, 1298 (C)
DICKSON, Ivan Wanless, obituary of, 662
Dicoumarol, blood-clotting time after ingestion, 778
Dictionaries: *Bellows' German Dictionary*, 3rd ed., 1042
Dieldrin, toxic effects, 397
Diesel fumes, toxicity, 914
— oil; relation to lung cancer, 44 (C), 357 (C), 416 (C), 605 (C)
— smoke in a London diesel bus garage; interim report (B. T. Commins, R. E. Waller, and P. J. Lawther), 753 (O); 939 (C), 1058 (C), 1235 (C), 1487 (C)
- DIET: see also Food; Nutrition
Cheeses for reducing diets, 1131; 1500 (C)
Food habits of myopic children (P. A. Gardiner), 699 (O)
Hutchinson's Food and the Principles of Dietetics, 11th ed. (V. H. Mottram and G. Graham), 810
Ideal weight, 1317
Notes on Diets for Old People in Homes and Institutions, 1040
Relation to structure of teeth, 111
- DIETHELM, O. (Editor): *Etiology of Chronic Alcoholism*, 1352
Digestion: “Staggered dumping” and sugar tolerance, 358 (C)
DIGGS, L. W., STURM, Dorothy, and BELL, Ann: *The Morphology of Human Blood Cells*, 589
DIGNAM, John Francis, obituary of, 49, 181
Dihydroxycholesterol in treatment of renal tubular osteomalacia and management of a subsequent pregnancy (G. A. Rose), 805 (O)
“Dilatil.” See Phenyl-iso-butyl-n-p-hydroxy ephe-drine
DIMANT, S., MOXON, C. P., and LEWTAS, N. A.: Cerebral angiography in a neurosurgical service, 10 (O)
- Diphtheria, graphs (vital statistics), 774, 1065, 1378
— T.A.F. and sensitivity to serum, 56
Dipipanone hydrochloride in treatment of severe pain; report of 200 cases (R. O. Gillhespy, E. Cope, and P. O. Jones), 1094 (O)
Disabled persons, bathroom aid for, 480 (C)
Disinfectants; antidote on the label, 1116 (C)
Disinfection: Protective value of washing the hands, 1070
Dissection; supply of bodies, 1357 (C)
Divine healing, 44 (C), 242 (C)
— distinction from faith healing, 177 (C)
Divorce: Medical evidence of insanity (medico-legal note), 773
DIXON, A. D., and TORR, J. B. D.: Sex chromatin in oral smears, 799 (O); 815 (A)
DIXON, K. C.: Cholesterol and vascular disease, 1304 (C)
DOBBS, Phyllis. See COMFORT, A., 1173
DOBBS, R. H.: Visit to Warsaw, 1230; 1426 (C)
— See COMFORT, A., 1173
DOCK, W.: Effective ways of managing arterio-sclerosis, 475
Doctor. See Consultants; Medical practitioners
Doctor in the House, play at Victoria Palace Theatre, 313
DODD, H., and COCKETT, F. B.: *The Pathology and Surgery of the Veins of the Lower Limb*, 1103
DOBBS, Sir Charles: Present position of A.C.T.H., cortisone, and derivatives, 151
DOLL, R., and HILL, A. B.: Lung cancer and other causes of death in relation to smoking; a second report on the mortality of British doctors, 1071 (O); 1104 (L); 1246 (parliamentary note), 1367 (C), 1426 (C)
— See COMFORT, A., 1173
DON, C.: Review of *Fluoroscopy in Diagnostic Roentgenology*, by O. Deutschberger, 1162
DONALDSON, E. M., and DUTHIE, D. A.: Clinical trial of glycyrrhetic acid ointment, 1161
DONALDSON, M.: Cancer education, 303 (C)
DONOVAN, G. E.: Automation in medicine, 44 (C)
DONOVAN, H.: Medical education, 362 (C)
DORCUS, R. M. (Editor): *Hypnosis and its Therapeutic Applications*, 756
DORFMAN, R. I., and SHIPLEY, R. A.: *Androgens: Biochemistry, Physiology, and Clinical Significance*, 1416
DOUTHWAITE, A. H.: Recent advances in therapeutics, 156 (correction, 316)
— Pitfalls in medicine, 895 (O), 958 (O), 1175 (C), 1298 (C), 1489 (C)
— review of *The Relief of Symptoms*, by W. Modell, 31
DOWDSEWELL, Roland Melville, obituary of, 305
DOWNES, Helen R.: *The Chemistry of Living Cells*, 1416
DOWNIE, D. See WARD, W., 418
DOYLE, A. E., MURPHY, E. A., and NEILSON, G. H.: Hypotensive action of mecamylamine, 1209 (O); 1431 (C)
— and NEILSON, G. H.: Neuromuscular disorders in mecamylamine therapy, 1431 (C)
DRASFA, L. J.: Clinical psychologist in the mental hospital, 826 (C), 1059 (C)
Dressings: Development and evaluation of a porous surgical dressing (J. T. Scales, A. G. Towers, and N. Goodman), 962 (O); 988 (A)
— hernia, umbilical, in infants, clinical trial of adhesive strapping (J. C. Haworth), 1286 (O)
DRINKER, F.: appointed Harben lecturer for 1956, 427
“Dromoran.” See Levorphanol
- DRUGS:
Accidents due to, 290 (A)
Advertising methods, 941 (C), 1058 (C), 1176 (C), 1238 (C), 1367 (C)
Approved names, 602
— supplementary list, correction, 430 (C)
Cost (parliamentary note), 1124
— of prescriptions (parliamentary note), 1552
Eye and ear droppers (parliamentary note), 1552
French ban on pharmaceutical goods (parliamentary note), 308
Life-saving (parliamentary note), 1247
Names; confusion with similar names, 767 (C)
“Pop-gun” containers, 482 (C)
Prescription charge increase (parliamentary notes), 1063, 1124, 1247
— B.M.A. statement, 1063
— complaints (parliamentary note), 1183
— grants for (parliamentary note), 1312
— Minister's defence (parliamentary note), 1375
Sales investigation (parliamentary note), 1064
Statistics of therapeutic trials, 825 (C)
Used in practice eighty years ago (C. Lillingston) (Nova et Vetera), 477
Drunkness tests, 941 (C), 1056 (C), 1173 (C)
DRURY, Godfrey Dru, obituary of, 1063
Dublin University. See Universities, Dublin
DUCKWORTH, A.: Pharmaceutical advertisements, 1238 (C)
Ductus arteriosus, persistent; surgery (R. Nicks and P. J. Molloy), 578 (O)
DUNN, L.: Progressive massive fibrosis, 417 (C)
— Sarcoidosis, 1237 (C)
DUFF, R. S.: Action of “dibenyline” on the peripheral circulation, 857 (O)
— Circulation in the hands in hypertension, 974 (O)
DUGGAN, N.: Twopenny-halfpenny advertising, 1367 (C)
- DUKE-ELDER, Sir Stewart: *Review of Biochemistry of the Eye*, by Antoinette Pirie and Ruth van Heyningen, 405
— review of *Surgery of the Eye—Diseases*, by A. Callahan, 926
— awarded Lister Medal, 990
DUNCAN, James Matthews, obituary of, 555
DUNCAN, L. J. P., BAIRD, Joyce D., and DUNLOP, D. M.: A clinical trial of BZ 55, 433 (O); 465 (L)
DUNLOP, D. M.: Pharmaceutical advertisements, 1298 (C)
— review of *Hutchinson's Food and the Principles of Dietetics*, 11th ed., by V. H. Mottram and G. Graham, 810
— review of *Management of Pain in Cancer*, edited by M. J. Schiffrin, 1103
— See DUNCAN, L. J. P., 433
DUNN, Cuthbert Lindsay, obituary of, 944
Duodenal ulcer. See Peptic ulcer
DURHAM, M. P.: Clinical trial of buclizine hydrochloride for vomiting of pregnancy, 1276 (O)
Durham University. See Universities, Durham
DUTHIE, D. A. See DONALDSON, E. M., 1161
DUTTON, J. E. M.: Intracranial aneurysm; a new method of surgical treatment, 585 (O); 711 (C), 825 (C)
Dysentery, bacillary, blood-stream infection, 668
— spread of, 410 (A)
— graphs (vital statistics), 51, 108, 185, 370, 487, 610, 664, 832, 948, 1127, 1248, 1378, 1556
Dysmenorrhoea, primary, treatment with propantheline bromide (T. G. E. White), 1527 (O)
DYSON, E. D.: Shoe-fitting x-ray fluoroscopes; radiation measurements and hazards, 269 (O); 420 (C), 479 (C), 714 (C), 826 (C)
- E
EADIE, J. W., and THORLAKSON, R. H.: Perforating wound of the portal vein, 285
EAMES, Aetha Josephine, obituary of, 1375
EAR: see also Deafness; Hearing; Otorhinolaryngology
Ear-drum, factors affecting healing after perforation, 613
— rupture of tympanic membrane during syringing, 112 (C)
Fenestration, anaesthesia for, 163
Otitis media due to Gram-negative organisms: treatment, 1441
Removal of foreign bodies in children, 1188
Wax in ears; origin and function, 254
Ear-rings, piercing for, 56 (C)
EARDLEY, William, obituary of, 1373
EASON, E. H.: Zoological nomenclature, 245 (C)
EAST, T.: Review of *Advances in Cardiology*, edited by R. Hegglin, 811
East Africa; medical commission of inquiry (parliamentary note), 309
East Grinstead: visit of B.M.A. Section of Plastic Surgery, 171
Eczema, atopic; vaccination risks, 315
— effect of glycyrrhetic acid on, 480 (C), 604 (C), 882 (C), 1058 (C), 1113 (C), 1239 (C), 1305 (C), 1431 (C), 1483 (C)
— glycyrrhetic acid ointment; clinical trial (E. M. Donaldson and D. A. Duthie), 1161
— infantile: soya flour in treatment, 553 (C), 715 (C)
EDHOLM, O. G.: Polar physiology, 601
Edinburgh Royal Infirmary; new buildings opened, 1249
— University. See Universities, Edinburgh
- EDUCATION, MEDICAL: see also Students
Aims and content of the medical curriculum (A. M. Jones), 494 (O); 519 (L); 712 (C), 824 (C)
Curriculum and the medical schools, 528
Educational number of *British Medical Journal*, 491-548
Experiment in, 522 (A)
In Eire, 535
In Northern Ireland, 535
In United States, 93; 522 (A); 596
— reflections on current trends (W. Bauer), 1433 (O)
London medical schools, 529
Medical schools in England and Wales, 531
— in Scotland, 534
Medicine and university, 519 (L)
Medicine's widening horizons (R. W. Lupton), 510 (O)
Postgraduate courses, 536
Postgraduate; in preparation for entry into general practice (J. K. Paterson), 513 (O); 767 (C), 882 (C)
Preparing for medicine (R. Whitehead), 491 (O)
Purpose (G. W. Pickering), 113 (O); 298 (C), 362 (C), 420 (C), 824 (C), 940 (C), 1116 (C)
Related to general practice, 93
Role of psychiatry (J. A. Ewing), 503 (O)
School versus academy in the medical curriculum (C. McNeil), 507 (O)
Second world conference, 520 (L)
Teaching in the gynaecological out-patient department (J. K. Russell), 506 (O)
— of social and preventive medicine (C. M. Fletcher), 497 (O); 712 (C)
Techniques and methods (I. Aird), 500 (O)
Undergraduate, 529
— and postgraduate in U.S.A., 1050
- EDWARDS, C., and RICE, C.: Relief of neurological symptoms and signs by reconstruction of stenosed internal carotid artery, 1265 (O)
EDWARDS, Dennis Raymond, obituary of, 1062
EDWARDS, J. W.: Unconscious thought?, 605 (C)
EDWARDS, J. W.: See CLARKE, C. A., 725
EICHNER, E.: Relaxin, 1171 (C)
Eire. See Ireland, Republic of
EISER, Arthur, obituary of, 1550
ELAM, J. E.: Anaesthetic deaths, 995 (C)
ELDER, P. D.: Troublesome staphylococci, 1115 (C)
ELDON, K.: Experience with ABO and Rh blood-grouping cards (Eldon cards), 1218 (O)
Eldon cards, experience with use in ABO and Rh blood grouping (K. Eldon), 1218 (O)
Electric convulsion therapy complicated by fractured spine; herpes zoster after (A. I. Roith), 865
Electrocardiogram; changes in acute hyperparathyroidism (B. A. Bradlow and N. Segel), 197 (O)
Electrocardiography: *Clinical Electrocardiography*. Part I (L. N. Katz and A. Pick), 866
Electrolytes: Plasma electrolyte levels, variations in the individual (J. K. Fawcett and V. Wynn), 582 (O)
ELITHORN, A., and SLATER, E.: Prefrontal leucotomy: views of patients and their relatives, 739 (O); 760 (A); 885 (C)
Elizabeth II. Honorary Physicians appointed, 54
ELKIND, J. R., and DANOWSKI, T. S.: *The Body Fluids: Basic Physiology and Practical Therapeutics*, 1162
ELLIOTT, K. A. C., PAGE, I. H., and QUASTEL, J. H. (Editors): *Neurochemistry: The Chemical Dynamics of Brain and Nerve*, 141
ELLIS, R. W. B.: *Diseases in Infancy and Childhood*, 2nd ed., 1530
ELPHINSTONE, R. H., WICKES, I. G., and ANDERSON, A. B.: Familial agammaglobulinaemia, 336 (O)
Embolism, pulmonary, due to amniotic fluid, 408 (L)
Embolus, pulmonary, chronic, aneurysm of pulmonary artery resulting from (R. Franklin and A. C. P. Ritchie), 983
Embryology: *Principles of Embryology* (C. H. Waddington), 1530
EMERY, J. L.: Intestinal obstruction in infants due to impacted meconium, 296
— and CROWLEY, E. M.: Clinical histories of infants reported to coroner as cases of sudden unexpected death, 1518 (O)
Emergency Bed Service. See Hospitals, beds, 1377
Empyema, breathing exercises for, 1560
Empire Medical Advisory Bureau, 541
Empyema, interlobar, aspiration of, 1131
Encephalitis, benign, of brain stem, 228
Encephalomyelitis, myalgic, benign, 157
Endocarditis, bacterial, subacute, and *Streptococcus viridans*; teeth as source of infection (F. G. Hobson and B. E. Juel-Jensen), 1501 (O)
— Subacute Bacterial Endocarditis (A. Kerr), 866
- ENDOCRINOLOGY:
Androgens: *Biochemistry, Physiology, and Clinical Significance* (R. I. Dorfman and R. A. Shipley), 1416
Fifth Annual Report on Stress, 1955-56 (Editors: H. Selye and G. Heuser), 464
Some recent advances (G. I. M. Swyer), 5 (O)
Textbook of *Endocrinology*, 2nd ed. (Editor: R. H. Williams), 347
Tumours causing hypertension, 230
- Endrin: Food-poisoning caused by endrin-contaminated flour (G. M. Davies and I. Lewis), 393 (O)
England and Wales; deaths in 1955 (vital statistics), 251
— medical schools, 531
— Report of the Ministry of Health for 1955, 1478 (A)
— vital statistics, June quarter (vital statistics), 252
Enteramine. See Hydroxytryptamine
Enteric fever. See also Typhoid
— general practice experience, 165
— graphs (vital statistics), 51, 184, 251, 312, 370, 426, 487, 664, 718, 775, 832, 1006, 1248, 1496
Entomology: *Handbook for the Identification of Insects of Medical Importance*, 3rd ed. (J. Smart), 1103
Eosinophilia, pulmonary, tropical (Rosemary Davies), 1470 (O)
Epidemics, early detection of (vital statistics), 1005
Epidemiological notes. See Vital statistics
Epidemiology: Morbidity yesterday and to-day (F. Roberts), 653
Epilepsy: Carotid sinus epilepsy and its treatment by denervation (S. Behrman and G. Knight), 1522 (O)
— malaria prophylactics, antagonism to anticonvulsants, 55
— temporal lobe, associated with Ammon's horn sclerosis; aetiology (J. B. Cavanagh and A. Meyer), 1403 (O)
Epileptics in prison (parliamentary note), 1064
Epimenorrhagia, significance of, 316
Epiphora, surgical treatment, 167
“Equanil.” See Meprobramate
ERKINE, D.: Telephone manners, 1547 (C)
Erythrocyte sedimentation rate, micro-methods for estimation, 952
Erythromycin, anti-staphylococcal activity, 61
ETON, B.: See BOWARD, Joan M., 574
- EULER, U. S. von: *Noradrenaline: Chemistry, Physiology, Pharmacology, and Clinical Aspects*, 984
European Academy of Allergy, 1438
European League for Mental Hygiene, conference, 599
EVANS, C. D. See WARIN, R. P., 480
EVANS, Sir Charles Lovatt (Editor): *Principles of Human Physiology*, 12th ed., by E. H. Starling, 1042
— review of *Textbook of Medical Physiology*, by A. C. Guyton, 646
EVANS, D.: Abnormalities of shape, structure, and function which cure themselves, 164
EVANS, E. O.: Abuse of antibiotics, 712 (C)
— Twopenny-halfpenny advertising, 1058 (C)
EVANS, E. S.: Role of surgery in the treatment of spastics, 167
EVANS, G.: Personality and cancer, 357 (C)
EVANS, I.: Old students of University College London, 715 (C)
EVANS, J. W.: The chart in general practice, 419 (C)
EVANS, P.: German measles, 243 (C)
EVANS, Q.: Effect of glycyrrhetic acid on eczema, 604 (C), 1058 (C), 1239 (C)
EVANS, R. W.: *Histological Appearances of Tumours: With a Consideration of their Histogenesis and Certain Aspects of their Clinical Features and Behaviour*, 926
Evidence, medical, at inquests, 356 (C), 480 (C), 606 (C), 767 (C), 886 (C), 942 (C), 1057 (C)
EWING, A. W. G.: Children with impaired hearing, 222
EWING, J. A.: The role of psychiatry in medical education, 503 (O)
Exhibitions: *A.M.A. Scientific Exhibits, 1955*, Sponsored by the Council on Scientific Assembly, American Medical Association, 756
Experiments on convict volutes, 762
Exposure: Survival at sea, 1044 (L)
- EYE: see also Blindness; Ophthalmology; Vision
Artificial eyes (parliamentary note), 366
Biochemistry of the Eye (Antoinette Pirie and Ruth van Heyningen), 405
Children with minor refractive errors; management, 1441
Damage by over-zealous first aid (medico-legal note), 49
Eyes offered to save sight; not to be used from living persons (medico-legal note), 485
Filamentary keratitis, 1382
Injuries due to fireworks (W. May), 1039 (O)
Neuritis, retrobulbar, bilateral, acute (Doris Rose), 345
Ophthalmic tests (parliamentary note), 309
Posterior polar cataract, 894
School eyesight tests (parliamentary note), 105
Sjögren's syndrome, 470 (A)
Surgery of the Eye—*Diseases* (A. Callahan), 926
Watery eye drops; dangers in use, 884 (C)
- F
Face; injuries, 1481
— plastic surgical treatment, 171
Facial palsy (T. Cawthorne and D. R. Haynes), 1197 (O); 1488 (C)
Faculty of Anaesthetists: Appointments, 1554; fellowship diplomas, 1554
Faculty of Homoeopathy, course in homoeopathy at Royal London Homoeopathic Hospital, 536
Faculty of Radiologists: Fellowship requirements, 536
Facies, occult blood in, 1500
Fallot, tetralogy of, and cerebral abscess, 244 (C)
Family Planning Association: Joan Malleon Memorial Fund, 1438
Fantus test for urinary chlorides, reagents and technique, 1559
FARMER, F. T.: See WARRICK, C. K., 1301
FARMER, Pauline. See UNGAR, J., 568
FARQUHAR, J. W., CRAWFORD, T. B. B., and LAW, W.: Urinary sympathin excretion of normal infants and of infants with pink disease, 276 (O)
FARQUHARSON, John Langwell, obituary of, 1122
FAWCETT, J. K., and WYNN, V.: Variation of plasma electrolyte and total protein levels in the individual, 582 (O)
FAZEKAS, S.: See COMFORT, A., 1173
FEARNLEY, G. R.: Temporary thrombotic state, 1547 (C)
Feet. See Foot
FEILDEN, F. E.: Incidence of renal calculus, 158
FEWELL, M.: See HARRISON, R. J., 852
Fellowship of Postgraduate Medicine, facilities, 541
Fellowship of arterial disease; technique for by-pass operations (K. Owen and C. G. Rob), 273 (O)
Fenestration, anaesthesia for, 163
FENTON-RUSSELL, D.: Suicide, 998 (C)
FERGUSON, J.: Rovsing's sign, 244 (C)
FERKIMAN, D. G., and ANDERSON, A. B.: Macro-globulinaemia of Waldenström, 402 (O); 409 (A)
Fertilization: *Fertilization* (Lord Rothschild), 701
FESSLER, Alfred, obituary of, 1493
Fetishism treated by aversion therapy (M. J. Raymond), 854 (O); 1174 (C), 1301 (C), 1366 (C)
Fever: Pyrexia of unknown origin; study of a series of cases (J. V. O. Reid), 23 (O); 180 (C), 245 (C)
- FFORDE, Sir Arthur: Address at new session of University College Hospital Medical School, 877
Fibrinogen in treatment of haemorrhage, 1318
FIDDES, F. S.: Accidental carbon monoxide poisoning; dangers of inadequate ventilation, 697 (O)
FIELD, E. O.: See BURN, G. P., 1152
FIELDSEND, A. B.: Twopenny-halfpenny advertising, 1238 (C)
FILATOV, Vladimir Petrovich, obituary of, 1120
Films: Atomic energy and related subjects, 1297
— for medical teaching in U.S., 775
FINDLAY, Louis, obituary of, 1243, 1551
FINLAYSON, D. H.: Complete rupture of uterus with subsequent pregnancy, 1415
FINNEY, D. J.: *Experimental Design and its Statistical Basis*, 86
Fireworks, eye injuries due to (W. May), 1039 (O)
FISCHER, E.: See MORRIS, J. V., 1529
FISHER, M.: recipient of Distinguished Service Award, American Medical Writers' Association, 948
FISHER, J. W.: Fetishism treated by aversion therapy, 1301 (C)
FISHER, O. D.: Haemoglobin level in cord blood, 161
FISHER, R.: elected Warden of the Society of Apothecaries of London, 558
FITCH, Arthur Alfred, obituary of, 772
FITZGERALD, B.: Varicose ulcers in ambulant patients, 1484 (C)
FITZGERALD, O., FITZGERALD, P., CANTWELL, D., and MEHIGAN, J. A.: Diagnosis and treatment of the Budd-Chiari syndrome in polycythaemia vera, 1343 (O); 1354 (L)
FITZGERALD, P.: See FITZGERALD, O., 1343
FITZGERALD, R. T. D.: The Motor Show, 1302 (C)
FLETCHER, C. M.: Problems of chronic bronchitis, 227
— The teaching of social and preventive medicine, 497 (O); 712 (C)
— Chronic bronchitis, clinical picture, 1540
Flies: Report on fly control, 573
FLINT, F. J., and RICHARDS, Shelagh M.: Organic basis of confusional states in the elderly, 1537
Flour; controversy revived (parliamentary note), 1312
— present regulations on composition (parliamentary note), 1183
Fluoridation of water supplies (parliamentary notes), 107, 308
— in New Zealand, 1380
— tests on children's teeth (parliamentary note), 249
Fluorine in pregnancy, 667
Fluorohydrocortisone, 872 (A); 940 (C)
“Fluoromax,” new anaesthetic, 987 (A)
Fluoroscopy: *Fluoroscopy in Diagnostic Roentgenology* (O. Deutschberger), 1162
— for children, 363 (C)
“Fluothane,” non-explosive volatile anaesthetic agent (R. Bryce-Smith and H. D. O'Brien), 969 (O); 987 (A)
Foetus: Antenatal sexing and blood grouping, 413
— exsanguination associated with surgical induction of labour (J. K. Russell, D. F. Smith, and R. Yule), 1414 (O)
— malignant disease, 1069
Fog. See Atmospheric pollution
- FOOD: see also Diet; Infants, feeding; Nutrition; Vitamins
Antimicrobial agents in, 1128
Colouring matter (parliamentary note), 1376
Emulsifying and stabilizing agents, 968
Food and Agriculture Organization: André Mayer fellowships for research, 865
Habits of myopic children (P. A. Gardiner), 699 (O)
Hygiene: *Hands Spread Germs*, 463
— Regulations, 53
Preservation with antibiotics, 870 (A); 879
Taboos in East Africa, 700
Taste, appetite, and the selection of food, 601
Third International Congress on Canned Foods, 879
Tinned, bacteriology of, 879
World supplies, 665
Food-poisoning; cases in 1955 (parliamentary note), 1552
— from bread made of chemically contaminated flour (G. M. Davies and I. Lewis), 393 (O)
— from frozen eggs (parliamentary note), 1125
— salmonella food-poisoning problems (Sir William Savage), 317 (O); 481 (C), 603 (C)
- FOOT:
Aetiology and management of lesions in diabetes (W. Oakley, R. C. F. Catterall, and M. M. Martin), 953 (O); 1047 (A); 1239 (C), 1432 (C)
Athlete's foot, 100 (C), 243 (C), 360 (C), 420 (C)
— management in school, 490
— in children; treatment, 1132
Flat feet in children and footwear in the young, 168, Form, function and footwear in the young, 168, (correction, 316)
Gangrenous, management of, 880
Shoe-stretcher for relief of bunions, 769 (C)
FOOTE, R. R.: Varicose ulcer, 188 (C)
— Amnion implantation in peripheral vascular disease, 553 (C)
FORD, R. M.: Tuberculosis and mass radiography, 551 (C)
Foreign bodies, inhaled (C. L. N. Robinson and W. W. Mushin), 324 (O); 714 (C)

- Forensic medicine. See Medico-legal notes
 FORRESTER-WOOD, W. R.: Conservative resection in carcinoma of rectum, 158
 FARRISMAN, W., awarded Nobel Prize in Medicine, 1950 (A)
 FOE, G. L., and SIMPSON, S. L.: Methyltestosterone therapy, 1426 (C)
 FOSTER, J.: Modern trends in cataract surgery, 166
 FOSTER, P. A.: Apartheid in blood transfusion, 548 (C)
 — Neostigmine-resistant curarization, 1485 (C)
 FOUNTAIN, J. R.: Treatment of chronic myeloid leukaemia with mercaptopurine, 1345 (O)
 FOURMAN, P.: Review of *The Body Fluids: Basic Physiology and Practical Therapeutics*, by J. R. Elkinton and T. S. Danowski, 1162
 FOWLER, W. See KNIGHT, G. H., 980
 FOX, P. P.: Early management of poliomyelitis, 304 (C)
 Fractures: *Treatment of Fractures*, vol. 1 (L. Böhler), 1416
 — treatment under hypnosis, 1340
 — see also Bone; Orthopaedics
 FRANCE, Charles Frederic, obituary of, 1551
 FRANKLIN, C. J. G.: Smoking and lung cancer, 1426 (C)
 FRANKLIN, R., and RITCHIE, A. C. P.: Aneurysm of the pulmonary artery resulting from a chronic pulmonary embolus, 983
 FRANKLIN, R. H.: Abdomino-thoracic incision, 159
 FRANKS, C. M.: Case of fetishism treated by aversion therapy, 1174 (C)
 FRASER, H. D. F.: Sore tongue from pipe-smoking, 952 (C)
 FRASER, J. R. E. See BARNETT, A. J., 518
 FRASER, R., and NORDIN, B. E. C.: Hyperparathyroidism and steatorrhea, 1363 (C)
 — See STEINER, R. E., 400
 FREED, L. F.: Elected fellow of the Royal Society of South Africa, 1498
 FRENCH, D. G.: Herpes zoster, 1545 (C)
 FREUD, Sigmund: *Fragments of an Analysis with Freud* (J. Wortis), 1352
 — Nature of genius (E. Jones), 257 (O)
 Freudian concepts and brain physiology, 415 (C), 548 (C), 604 (C), 605 (C), 660 (C)
 Friedreich's ataxia, inheritance of, 490
 FRIEND, Gerald Edward, obituary of, 1123
 FRIPP, A. T.: Treatment of injuries of the knee, 169
 FRY, A.: Abuse of antibiotics, 551 (C)
 FRY, J.: The catarrhal child, 166
 — Is tonsillectomy necessary?, 302 (C)
 — Practical problems raised by acute respiratory infections, 1480
 FULD, H.: Chloroquine and bleaching of hair, 300 (C)
 FULLERTON, H. W.: Effect of fatty meals on blood coagulability, 356 (C)
 Fungus diseases in man, 170
 — of Britain (R. W. Riddell), 783 (O); 816 (A)
 "Furadantin." See Nitrofurantoin

G

- GAISFORD, W.: Review of *The British Paediatric Association, 1929-1952*, by H. C. Cameron, 811
 — review of *Nursing Care of the Newly Born Infant*, by W. S. Craig and others, 287
 — review of *Radiology of the Alimentary Tract in Infancy*, by R. Astley, 1289
 — See GRIFFITHS, Margaret I., 565
 Galactorrhoea, 1132
 GALE, Arthur Harold, obituary of, 1001
 Gall bladder, calculi, aetiology (G. Horn), 732 (O)
 — intravenous cholangio-cholecystography with "biligradin": value compared with oral contrast method (R. W. W. Hardie and M. Israelski), 779 (O)
 — medical treatment of cholecystitis, 722
 — torsion (E. Christensen), 1160; 1369 (C), 1427 (C)
 GALLIVAY, A. H.: Steroid anaesthesia, 300 (C), 766 (C)
 GALLOWAY, J. F.: Contribution of the preventive health services to the efficiency of hospital practice, 233
 GALLOWAY, W. H., and McBEAN, Lena M.: Generalized vaccinia, 1102; 1239 (C)
 GALTON, E. M. G.: Watery eye drops, 884 (C)
 GAMMIE, John Lawrence, obituary of, 716
 Ganglion block in human subjects; a class experiment (W. D. M. Paton and Hannah Steinberg), 622 (O); 769 (C)
 — in treatment of hypertension; two new agents (S. Locket), 116 (O)
 Ganglion-blocking drugs, 224
 GARDNER, A. S.: Hibernation in shocked patients, 419 (C)
 GARDNER, P. A.: Observations on the food habits of myopic children, 699 (O)
 GARDNER-HILL, H., captain of the Royal and Ancient Golf Club, St. Andrews, 776
 GARDNER, E. K.: Shadow in the lung, 998 (C)
 GARDNER, Isabel: Preparation for marriage, 45 (C)
 GARNHAM, P. C.: Review of *Medical Parasitology*, 2nd ed., by W. G. Sawitz, 1416
 GARROD, L. P.: Gas gangrene risks, 415 (C)
 — Albomycin, 1362 (C)
 — review of *Bacterial Anatomy*. Sixth Symposium of the Society for General Microbiology, edited by E. T. C. Spooner and B. A. D. Stocker, 926

- GARROD, L. P.: Review of *Biochemical Mechanisms in Inflammation*, 2nd ed., by V. Menkin, 518
 — review of *Polymyxin, Neomycin, Bacitracin*, by E. Jawetz, 589
 — and WATERWORTH, Pamela M.: Behaviour *in vitro* of some new anti-staphylococcal antibiotics, 61 (O); 217 (L); 1362 (C)
 GARRY, Thomas Gerald, obituary of, 1434
 GASTER, B. S. C.: Amnion implantation in peripheral vascular disease, 606 (C)
 Gastrectomy, partial, followed by enteritis and polyarthritides (J. H. Shoemith and H. S. Shucksmith), 404
 Gastro-enteritis, infantile, aetiology; laboratory investigation of specimens from general practices in north-east London (Mair E. M. Thomas and Ruth E. Charter), 339 (O); 350 (A)
 — outbreaks, management, 175 (C)
 Gastroenterology: fifth international congress, 236, (correction, 316); social events, 252
 Gastro-intestinal tract: Family history of uterine and gastro-intestinal cancer (D. Savage), 341 (O)
 GATELY, G. L.: Debt to the Middle Ages, 301 (C)
 GAUNTLETT, S. L.: Alcoholism, 549 (C)
 GAWEL, Mary L. See PERRY, Helen S., 1223
 GAYLIS, H., and LAWS, J. W.: Dissection of aorta as a complication of translumbar aortography, 1141 (O); 1368 (C)
 GEAR, H. S.: Some principles and methods of international health work, 471
 GEE, Nathan, obituary of, 1551
 GEFFEN, T. J.: Gonadal agenesis with tetany and severe osteoporosis, 282 (O)
 GELLMAN, D. A., and SILBERSTEIN, K.: Perforation of peptic ulcer of the oesophagus into the pericardial cavity; report of a case, 1413 (O)
 GENAUD, P. E. M.: Cases administered in artificial respiration, 176 (C)
 GENERAL PRACTICE:
 Benger prizes for research, 1315
 Cold weather, influence on volume of work, 1543 (C)
 Postgraduate medical education in preparation for entry (J. K. Paterson), 513 (O); 767 (C), 882 (C)
 Practice expenses (parliamentary note), 1065
 Present conditions (A. Hall), 57 (O); 87 (L)
 Statistical review of referrals to specialists (P. Hopkins), 873
 Use of case charts, 419 (C)
 GENERAL PRACTITIONERS: see also Medical practitioners
 Annual earnings under N.H.S. (parliamentary note), 366
 Complaints against (parliamentary note), 49
 Education, 93
 Pay increase (parliamentary note), 1125

- GENETICS:
 Annotated Catalogue of the *Mutant Genes of the House Mouse* (H. Gruneberg), 1379
 Chromosome number in man, 353 (A)
 Effect of cousin marriage, 412
 Human; first international congress, 412
 Research (parliamentary note), 309
 Genius, nature of (E. Jones), 257 (O)
 Georg Speyer Haus, fiftieth anniversary, 558
 Geriatrics. See Old age
 German measles. See Rubella
 GERVIS, W. H.: Foot form, function, and footwear in the young, 168, (correction, 316)
 GESELL, A., ILO, Frances L., and AMES, Louise B.: *Youth: The Years from Ten to Sixteen*, 1103
 GIBBENS, G. H.: Broken probe, 240 (C)
 GIBBS, Sidney Alfred, obituary of, 1433
 GIBSON, J. G.: appointed to chair of mental health, Queen's University, Belfast, 719
 GIBSON, P. C.: Divine healing, 242 (C)
 GIBSON, R.: Peroneal muscular atrophy with mental defect and myopathy in siblings, 1281 (O)
 GILCHRIST, A. R.: Treatment of hypertension, 223; 1011 (O)
 GILDER, S. S. B.: appointed associate editor, *World Medical Journal*, 833
 GILES, C.: Dissecting aortic aneurysm presenting as a cerebral catastrophe, 700; 1237 (C)
 GILLES, H. M. See MCGREGOR, I. A., 686
 GILLESPIE, J. A.: Bone growth and repair, 709
 GILLIESPY, R. O.: Benzhexol hydrochloride in Parkinsonism, 361 (C)
 — COPE, E., and JONES, P. O.: Dipipanone hydrochloride in the treatment of severe pain; a report of 200 cases, 1094 (O)
 — See COPE, E., 638, 1428
 GILLIAT, Sir William, obituary of, 829
 — Memorial Fund, 1109 (A)
 GILLISON, T. H.: Enzyme test for glycosuria, 1487 (C)
 GILSON, J. C. See HIGGINS, I. T. T., 904
 Glandular fever at age of 6 weeks (K. D. Phillips and D. G. H. Stone), 1222
 GLANVILLE, H. J.: Home management of hemiplegia, 233
 GLASER, J.: *Allergy in Childhood*, 1473
 Glasgow Obstetrical and Gynaecological Society: William Hunter Memorial Lecture, 775
 — University. See Universities, Glasgow
 GLASS, H. B. See McELROY, W. D., 287
 GLAUBER, D. T.: Idiopathic cardiac hypertrophy, 302 (C)

- Glaucoma, salivation in, 457
 Glomangioma of nail-bed (W. J. Law), 30
 GLOVER, D.: Antidote on the label, 1116 (C)
 GLOVER, E.: *On the Early Development of Mind*. Vol. I of Selected Papers on Psycho-Analysis, 31
 — review of *Fragments of an Analysis with Freud*, by J. Wortis, 1352
 — review of *Hypnosis and its Therapeutic Applications*, edited by R. M. Dorcus, 756
 Glucagon, 288 (L)
 Glucocorticoids, 5
 Glucose: Enzyme tests for detection in urine (J. A. Hunt, C. H. Gray, and D. E. Thorogood), 586 (O); 827 (C), 940 (C), 1058 (C), 1238 (C), 1487 (C)
 — enzyme test for glycosuria (R. E. Tunbridge, R. G. Paley, and D. Coulson), 588; 827 (C), 1058 (C), 1238 (C), 1487 (C)
 Glycyrhethic acid, effect on eczema, 480 (C), 604 (C), 882 (C), 1058 (C), 1113 (C), 1239 (C), 1305 (C), 1431 (C), 1483 (C)
 — ointment; clinical trial (E. M. Donaldson and D. A. Duthie), 1161
 GODDING, E. W.: Prolonged constipation in children, 490 (C)
 Goitre, exophthalmic, aetiology in relation to recent experimental findings (G. W. Harris and J. W. Woods), 737 (O)
 GOLDBERG, L.: Alcoholic nystagmus, 415
 GOLDBERGER, E.: *Heart Disease: Its Diagnosis and Treatment*, 2nd ed., 518
 GOLDIE, L.: Biography of James Braid, 1000 (C)
 — Hypnosis in the casualty department, 1340 (O); 1549 (C)
 GOLDSMITH, A. J. B.: Cortisone and related steroids, value in ophthalmology, 151
 Gonads, agenesis, with tetany and severe osteoporosis (T. J. Geffen), 282 (O)
 GOODMAN, N. See SCALES, J. T., 962
 GOODWIN, J. F. See CLELAND, W. P., 379
 GORDON, B. See INMAN, P. M., 1202
 GORDON, Doris Clifton, obituary of, 364, 1004
 GORDON, J.: Neostigmine-resistant curarization, 1054 (C)
 GORDON, L.: Riboflavine in migraine, 550 (C)
 GORDON, R. M.: Review of *A Handbook for the Identification of Insects of Medical Importance*, 3rd ed., by J. Smart, 1103
 GORDON, W. W.: Fetishism treated by aversion therapy, 1366 (C)
 Gorleston holiday camp for the physically handicapped, 1060 (C)
 GOSSE, Alfred Hope, tribute to, 246
 GOUGH, J.: Address on 25th anniversary of Welsh National School of Medicine, 937
 GOULD, R. B.: Paediatric anaesthesia, 241 (C)
 GOW, J. G.: Amnion implantation in peripheral vascular disease, 477 (C)
 Gowers Memorial Lecture, 1168 (A)
 — Memorial Medal presented to Sir Francis Walshe, 1185; 1168 (A)
 GRAHAM, G. See MOTTRAM, V. H., 810
 GRAHAM, J. D. P.: Strychnine poisoning, 1302 (C)
 GRANT, C. P. D.: Personal experiences of a young general practitioner, 93
 GRANT, I. D.: Family doctors, their heritage and their future, 1232
 — elected President, College of General Practitioners, 1233
 GRANT, James: Food-poisoning, 603 (C)
 GRANT, Jean, WILSON, Dagmar C., and SUTHERLAND, I.: Blood groups and the age of the menarche, 140
 GRANT, W. R.: Domestic management of hemiplegia, 233
 Granuloma annulare, relationship to warts, 1484 (C)
 — inguinal (venereum) (G. H. Knight and W. Fowler), 980 (O)
 GRAVES, P. R.: BZ 55, 1178 (C)
 Graves's disease; aetiology in relation to recent experimental findings (G. W. Harris and J. W. Woods), 737 (O)
 GRAY, Sir Archibald: Brown Dog of University College, 942 (C)
 GRAY, C. H. See HUNT, J. A., 586
 GRAY, Douglas, obituary of, 1004
 GRAY, P. G.: Sampling from the electoral roll, 1119 (C), 1487 (C)
 GRAY, T. C.: Neostigmine-resistant curarization, 1365 (C)
 GREAVES, R. I. N.: Review of *Dried B.C.G. Vaccine*, by Y. Obayashi, 756
 GREEN, A.: Jig for inserting radon seeds into bladder, 244 (C)
 GREEN, A. M.: Longer holidays, 941 (C)
 GREEN, C. A. See HUTCHISON, J. G. P., 1364
 GREEN, Irene B. M.: Gorleston holiday camp for the physically handicapped, 1060 (C)
 GREENFIELD, J. G., awarded honorary LL.D., Edinburgh University, 109
 GREGG, E. A.: resignation as Chairman of Council, British Medical Association, 92 (A)
 GREGG, Minnie Elizabeth, obituary of, 772
 GREGSON, A. E. W., and GUNNING, A. J.: Management of acute respiratory obstruction; with report of a case, 1150 (O); 1483 (C)
 GRIFFITH, John Richard, obituary of, 1002
 GRIFFITHS, Margaret I., and GAISFORD, W.: Freezedried B.C.G.; vaccination of newborn infants with a British vaccine, 555 (O), (correction, 722)
 Growth, effect of illness on, 221 (A)

- GRÜNEBERG, H.: *An Annotated Catalogue of the Mutant Genes of the House Mouse*, 1379
 GUNNING, A. J. See GREGSON, A. E. W., 1150
 GUNTER, W. See WARD, W., 418
 GUSTAFSON, F. R.: Paediatric anaesthesia, 606 (C)
 Guy, Thomas, ancestors of, 622
 Guy's Hospital Medical School, facilities for students, 529
 GUYTON, A. C.: *Textbook of Medical Physiology*, 646
 Gynaecology: *Integrated Gynecology: Principles and Practice* (I. C. Rubin and J. Novak), 517
 — teaching in the gynaecological out-patient department (J. K. Russell), 506 (O)

H

- HADDOCK, D. R. W. See CLARKE, C. A., 725
 HADDOW, A.: Chemotherapy of cancer, 150
 HADFIELD, G.: Recent advances in knowledge of cancer, 150
 — review of *An Introduction to Pathology*, 2nd ed., by G. P. Wright, 701
 — review of *Pathology*, by P. A. Herbut, 701
 HADFIELD, G. J., and HOLT, J. A. G.: The physiological castration syndrome in breast cancer, 972 (O); 1300 (C)
 Haematology. See Blood
 Haematoma, intracranial, concealed by leakage of cerebrospinal fluid (C. Connolly), 1154 (O)
 — subdural, and effusions in infancy (G. Ormiston), 126 (O)
 Haematomyelia and hyperextension injuries of cervical spine (P. N. Robson), 848 (O)
 Haemoglobin, biosynthesis (C. Rimington), 189 (O)
 — D, in Persian girl; presumably the first case of haemoglobin-D-thalassaemia (M. Hynes and H. Lehmann), 923
 Haemophilia: Ministry of Health booklet, 611
 Haemophilus infection in bronchiectasis, 179 (C)
 Haemorrhage, value of fibrogen in treatment, 1318
 Haemorrhoidectomy, pain and urinary retention, after, 429
 Haemosiderosis, 703 (L); 942 (C)
 Haemosperrmia, chronic, 951; 1132 (C)
 HAGEN, W.: Twentieth-century changes in the German way of life, 600
 Hair, bleaching due to chloroquine, 300 (C)
 — pantothenic acid, action on, 1560
 — superfluous, depilatory methods, 1069
 HAINAL, J.: N-Acetyl-para-aminophenol as an analgesic, 1430 (C)
 HALDANE, J. B. S., awarded honorary LL.D., Edinburgh University, 109
 HALL, A.: The state of general practice to-day (Presidential address to B.M.A.), 57 (O); 87 (L)
 HALL, G. H.: Reassessment of effect of fatty meals on blood coagulability, 207 (O); 356 (C), 478 (C)
 HALL, Marcia: B.C.G. and vole bacillus vaccines, 939 (C)
 HALL, R., and JEFFERSON, J.: Glycyrhethic acid, 1431 (C)
 HALLETT, G., and MCGILL, J.: Medical relief appeal, 1238 (C)
 HALLIDEN, W. G. B.: New preparations, 1178 (C)
 HAMILTON, J. G. M.: The B.M.A. visit to the U.S.S.R., 1049
 HAMILTON, J. J.: Unconscious mental activity?, 301 (C)
 HAMILTON, W. J.: Review of *Principles of Embryology*, by C. H. Waddington, 1530
 — appointed Dean of Charing Cross Hospital Medical School, 834
 — See BOYD, J. D., 1162
 HAMMOND, J., MACKINNON, J., and WHITAKER, W.: Effect of mitral valvotomy on renal function, 71 (O)
 HAMPTON, F.: Exfoliative cytology in the diagnosis of lung cancer; examination of one laboratory's results, 1461 (O)
 HAND: see also Nails
 Circulation in hypertension (R. S. Duff), 974 (O)
 Injuries, plastic surgical treatment, 171
 — Reconstructive surgery, with special reference to skin cover (S. H. Harrison), 746 (O)
 Handicapped persons: Gorleston holiday camp for the physically handicapped, 1060 (C)
 HANDLEY, R. S., and NURICK, A. W.: Peritoneoscopy; an evaluation with report of 136 cases, 1211 (O)
 HANKINSON, J., and AMADOR, L. V.: Infected subdural effusions, 122 (O)
 HARCOURT-WEBSTER, J. N. See KEYNES, W. M., 1463
 HARDIE, R. W. W., and ISRAELSKI, M.: Intravenous cholangio-cholecystography with "biligradin"; its value as compared with the oral contrast method, 779 (O)
 HARDY, J. M.: "Pop-gun" containers, 482 (C)
 HARDY, K.: Neostigmine-resistant curarization, 1241 (C)
 HARE, R. I.: Mortality from coronary disease, 99 (C)
 HARDY, R.: Tuberculosis and mass radiography, 101 (C)
 HARE, R., and THOMAS, C. G. A.: The transmission of *Staphylococcus aureus*, 840 (O); 867 (L); 999 (C), 1056 (C), 1364 (C)

- HARE, T.: Review of *Veterinary Parasitology*, by G. Lapege, 347
 HARGREAVES, E. R.: Vaccination against tuberculosis in childhood, 174 (C)
 HARLOW, R. A.: "Old Elthamians 13; U.C.H. 8," 769 (C)
 HARMER, M.: "P.U.O." 180 (C)
 HARRIS, G. W.: Review of *Fifth Annual Report on Stress*, 1955-56, edited by H. Selye and G. Heuser, 464
 — and WOODS, J. W.: Aetiology of Graves's disease in relation to recent experimental findings, 737 (O)
 HARRIS, P. F.: Quantitative examination of bone marrow in guinea-pigs after gamma irradiation; a preliminary note, 1032 (O)
 HARRIS, William Cecil, obituary of, 1004
 HARRISON, R., and JACKSON, P. E.: Anterior tibial syndrome after acute arterial occlusion, treated by decompression, 403
 HARRISON, R. J., and FEIWEL, M.: Pellagra caused by isoniazid, 852 (O)
 HARRISON, S. H.: Reconstructive surgery of the hand, with special reference to skin cover, 746 (O)
 HARRISON, W. R. E.: Swaphook tenotomy, 715 (C)
 HART, F. D.: A.C.T.H. in treatment of adrenal insufficiency, 151
 — Fluorohydrocortisone, 940 (C)
 HART, P. D. A.: B.C.G. and vole bacillus vaccines, 938 (C)
 HARTILL, S.: Brown Dog of University College, 942 (C)
 HARTLEY, J. B.: Radiation hazards, 41 (C)
 Harveian Oration, 949
 — Society of London: Buckston Browne Prize awarded to I. McD. G. Stewart, 1439
 Harvey Tercentenary Congress, programme of celebrations in London and Folkestone, 1295
 HATCH, L. A. See HAWKINS, G. F. C., 1200
 HAUSMANN, W., and KARLS, A. J.: Staphylococcal pneumonia in adults, 845 (O); 867 (L); 1056 (C)
 HAWKINS, D. F., and LABRUM, A. H.: Function of the prostate, 1256 (C)
 HAWKINS, G. F. C., HATCH, L. A., and McDONALD, J. C.: Influenza vaccination in a residential boys' school; report to the Medical Research Council committee on clinical trials of influenza vaccine, 1200 (C)
 HAWORTH, J. C.: Adhesive strapping for umbilical hernia in infants; clinical trial, 1286 (O)
 HAXTON, H.: Rovsing's sign, 303 (C)
 HAY, J. D.: Diagnosis of heart disease in infancy, 224
 Hay fever, prophylaxis and treatment, 111
 — see also Allergy
 HAYNES, D. R. See CAWTHORNE, T., 1197
 HAYWARD, G.: Review of *Cardiac Anomalies: A Clinicopathologic Correlation*, by V. Moragues and C. P. Lynxwiler, 926
 — review of *Peripheral Vascular Disease*, by A. J. Barnett and J. R. E. Fraser, 518
 — review of *Subacute Bacterial Endocarditis*, by A. Kerr, 866
 HEAF, F. R. G.: Prevention of tuberculosis, 227; 1383 (O)
 Health: Some ideas in regard to meaning of student health and its assessment (A. H. Macklin), 524; 520 (L)
 Health in the United Kingdom Dependencies, 91 (A)
 HEANLEY, C. L.: Principles underlying the repair of facial injuries, 1481
 HEARD, G. E., and JOHN, E. L.: Regional ileitis in mother and son, 85
 Hearing, defective, ascertainment in the very young, 234
 HEART (continued):
 Infarction, painless, 705 (A); 826 (C)
 Institute of Cardiology; facilities, 537
 Mitral valvotomy, effect on renal function (J. Hammond, J. Mackinnon, and W. Whitaker), 71 (O)
 Tachycardia, ventricular, management, 1560
 Tobacco-smoking and the cardiovascular system, 90 (A); 659 (C)
 Heberden Society, 1110; annual dinner, 1557
 HEDGCOCK, W.: Review of *A.M.A. Scientific Exhibits, 1955*. Sponsored by the Council on Scientific Assembly, American Medical Association, 756
 HEERV, P. J.: Staphylococcal infections after pneumonectomy, 241 (C)
 HEGGLIN, R. (Editor): *Advances in Cardiology*, 811
 Height, adult; prediction and control, 1381
 HEISCH, R. B.: Zoonoses as a study in ecology; with special reference to plague, relapsing fever, and leishmaniasis, 669 (O)
 HELLER, M. D. A.: Athlete's foot, 360 (C)
 HELLIER, F. F.: Increase in scabies, 1117 (C)
 HELLMAN, L. M. See HINGSON, R. A., 1289
 Hemiplegia, management of, 233
 HENDERSON, Sir David: Psychiatric evidence in court, 1 (O)
 HENDERSON, T.: Functional ciliary spasm, 490 (C)
 Heparin, action of, 778
 — in myocardial infarction, 989 (A)
 HEPPOLLETTE, John Emmanuel Reid, obituary of, 1373
 Her Majesty's Overseas Civil Service, medical appointments, 536
 HERBUT, P. A.: *Pathology*, 701
 HERDAN, G.: Statistics of therapeutic trials, 825 (C)
 HERDMAN, N. A.: Pharmaceutical advertisements, 1298 (C)
 Heredity in diabetes, 1190
 HERFORD, Ethel Budgett Meakin, obituary of, 1122
 HERMAN, J. B. See JACKSON, W. P. U., 607
 Hermaphroditism, true; case (J. D. Arneaud, H. Annamunthodo, J. H. M. Pinkerton, and W. R. Cole), 792 (O); 815 (A); 995 (C)
 Hernia, inguinal; effect of truss in subsequent herniorrhaphy, 893
 — strangulated, on board ship, 374
 — umbilical, in infants, adhesive strapping for; clinical trial (J. C. Haworth), 1286 (O)
 Herpes zoster (L. J. Barford), 864; 1115 (C), 1366 (C)
 — after fractured spine complicating E.C.T. (A. I. Roith), 865
 — treatment, and post-herpetic pain, 1545 (C)
 Herring roes, luminous, 1251
 HESS, Evelyn V., and MARKHAM, R. L.: C-reactive protein, 418 (C)
 Heterophoria, diagnosis and treatment, 667
 HETHERINGTON, R.: The clinical psychologist in the mental hospital, 708; 826 (C), 885 (C), 1059 (C)
 HEUSER, G. See SELYE, H., 464
 HEWER, C. L.: Asphyxia due to faulty apparatus, 766 (C)
 Hexamethonium, effects on healthy student volunteers (W. D. M. Paton and Hannah Steinberg), 622 (O); 769 (C)
 Hibernation in midwifery, 1368 (C)
 — value in severely shocked patients (Sheila Kenny), 211 (O); 419 (C), 999 (C)
 "Hibitane," antiseptic value in midwifery, 200
 HICKLING, R. A.: Treatment of chronic leukaemia, 135
 HICKS, A.: Hibernation in shocked patients, 999 (C)
 HICKS, C. S.: Purpose of medical education, 824 (C)
 HIGGINS, I. T. T., OLDHAM, P. D., COCHRANE, A. L., and GILSON, J. C.: Respiratory symptoms and pulmonary disability in an industrial town; survey of random sample of population, 904 (O); 1119 (C), 1241 (C), 1487 (C)
 HIGGINS, L. G.: Physiological castration syndrome in breast cancer, 1300 (C)
 HILL, A. B.: Recent statistics of carbon monoxide poisoning; report to Medical Research Council, 1220 (O); 1365 (C)
 — review of *Experimental Design and its Statistical Basis*, by D. J. Finney, 86
 — See DOLL, R., 1071
 HILL, A. G. S. See SCOTT, D. G., 100
 HILL, C., to be in charge of Government's public relations, 1379
 HILL, D. M.: Medical education, 712 (C)
 HILL, R. D.: Mass therapy with piperazine adipate in the control of threadworm infestations, 1156 (O); 1369 (C)
 HILLMAN, S.: Hydrocortisone for buccal ulcers, 1486 (C)
 HILTON, Gwen: Treatment of intracranial metastases, 881 (C)
 HIMSWORTH, Sir Harold, created honorary LL.D., London University, 1315
 HINGSON, R. A., and HELLMAN, L. M.: *Anesthesia for Obstetrics: Labor-Delivery-Infant Care*, 1289
 HINGSTON, S.: Treatment of barbiturate poisoning, 1365 (C)
 HINSHELWOOD, Sir Cyril, awarded Nobel Prize for chemistry, 1109 (A)
 — re-elected President of the Royal Society, 1379
 HIPKINS, G. J.: Directory of medical libraries, 1490 (C), (correction, 1560)
 HIRTEINSTEIN, J.: Pancoast syndrome due to acute osteomyelitis, 645

Histopathology: *Histological Appearances of Tumours: With a Consideration of their Histogenesis and Certain Aspects of their Clinical Features and Behaviour* (R. W. Evans), 926

Histoplasmosis contracted in Britain: case of histoplasmic lymphadenitis following clinical recovery from sarcoidosis (W. St. C. Symmers), 786 (O); 846 (A)

— ch. r. us, localized (W. St. C. Symmers), 790 (O); 816 (A)

History of medicine. See Medicine, history; Nova et Vetera

Hoarseness, 170

HOBSON, F. G., and JUEL-JENSEN, B. E.: Teeth, *Streptococcus viridans*, and subacute bacterial endocarditis, 1501 (O)

HODGES, R. J. H.: Neostigmine-resistant curarization, 1240 (C)

HODGKIN, Dorothy, awarded Royal Medal, 1185

Hodgkin's disease, alcohol-induced pain in, 652 (A)

— thymic origin, 35 (A)

HOFFER, A.: Adrenochrome and adrenolutine, 1488 (C)

HOGG, J. C.: Treatment of nasal polyposis, 170

Hoists: Easy lifting apparatus for helpless and heavy patients (A. B. Stewart), 1111

HOLBOROW, E. J., BYWATERS, E. G. L., and JOHNSON, G. D.: Blood levels after oral penicillin V (free acid) in children, 1338 (O); 1355 (A)

HOLGATE, M. C., and BARLOW, A. J. E.: *Rauwolfia serpentina* in psoriasis, 417 (C)

HOLLAND, W. W., and YOUNG, I. Maureen: Neonatal blood pressure in relation to maturity, mode of delivery, and condition at birth, 1331 (O)

HOLMAN, Alec George, obituary of, 1435

HOLMES, J. M.: Cerebral manifestations of vitamin B₁₂ deficiency, 228; 1394 (O)

HOLMES, R.: Abuse of antibiotics, 1241 (C)

HOLT, J. A. G.: See HADFIELD, G. J., 972

Homicide Bill in Committee (parliamentary note), 1376

HONEY, M.: Sulphonamides in aetiology of lupus erythematosus, 659 (C)

Hong Kong medical staffs (parliamentary note), 1125

HOOKER, D.: Athlete's foot, 100 (C)

HOPKINS, P.: Referrals in general practice, 873

Hormone, melanocyte-stimulating, 719, 776

— therapy, in mongolism, 1009

Hormones of adrenal cortex, 5

— *Recent Progress in Hormone Research*. Proceedings of 1954 Laurentian Hormone Conference, vol. XI (Editor: G. Pincus), 215

HORN, G.: Observations on the aetiology of cholelithiasis, 732 (O)

HORTON, W. G.: See BUSH, H. D., 81

HOSKYN, C. H.: Employment of the rheumatoid arthritis, 1369 (C)

HOSPITALS:

Alcoholic beverages prescribed (parliamentary note), 51

Beds: Emergency Bed Service, annual report, 186; emergency admissions (vital statistics), 1377

Building programme, 775; 1495 (parliamentary note)

Call system for house officers, 833

Children admitted; advice for parents, 372

Consultant establishment (parliamentary note), 107

Consultants, part-time (parliamentary note), 1246

Costing returns, 1419 (A)

Diets for patients, 332

Extensions in Scotland (parliamentary note), 1495

King Edward's Hospital Fund for London, 872 (A)

Medical officers; emoluments (parliamentary note), 1065

— junior (parliamentary note), 1065

— taxation of value of insurance policies given to voluntary staff (medico-legal note), 105

Money for buildings (parliamentary note), 1494

Preventive medicine in hospital practice, 233

Psychiatric out-patient clinics (parliamentary note), 30

St. George-in-the-East Hospital, closing of, 421 (C)

Scotland, 776

United States, hospital services, 598

U.S.S.R., 1050

Housing: Insanitary and sub-standard dwellings, 923

— relation to pulmonary tuberculosis in north Glasgow, 1451

HOUSTON, W.: Hypertension due to hydronephrosis; relief after nephrectomy, 644

HOWEL-EVANS, A. W.: See CLARKE, C. A., 725

HOWELL, H.: Diesel fumes, 1058 (C), 1487 (C)

HOWELLS, D. E.: Nystagmus in alcoholic intoxication, 550 (C)

HOWELLS, J. G.: Maladjusted children, 179 (C)

HUBBLE, D. V.: *Review of Charles Dickens and his Family: A Sympathetic Study*, by W. H. Bowen, 1042

— review of *Fundamentals of Internal Medicine*, 4th ed., by W. M. Yater, 141

— review of *The Hand of the Potter*, by Nel Motte and P. Motte, 1223

— review of *Heaven and Hell*, by A. Huxley, 86

— review of *Mentally Handicapped Children: A Handbook for Parents*, 1223

— review of *Mr. Lyward's Answer*, by M. Burn, 646

— review of *Textbook of Endocrinology*, 2nd ed., edited by R. H. Williams, 347

HUCKER, A. G., and SCHOFIELD, F. D.: Whipworm infections; trial of four piperazine compounds, 1159 (O)

HUDSON, W.: Radiation hazard, 549 (C)

HUEBNER, R.: Adenoviruses as a cause of ill-health in childhood, 1053

HUGGETT, A. St. G.: *Review of Principles of Human Physiology*, 12th ed., by E. H. Starling, edited by Sir Charles Lovatt Evans, 1042

HUGHES, J. H.: Pregnancy test, 660 (C)

HUME, C. W.: awarded Albert Schweizer Medal of the American Animal Welfare Institute, 949

HUMPHREYS, E. B. Berenice: Clinic for ascertainment and assessment of defective hearing in infancy, 234

Hungary: Refugees; danger of spread of tuberculosis (parliamentary note), 1495

— diary of a journey (C. P. Broad), 1359

— Rockefeller aid, 1497

— status of medical practitioners, 611; 886 (C), 1000 (C)

Hunner's ulcer of bladder; local hydrocortisone in treatment; preliminary report (J. H. Johnston), 698 (O)

HUNT, A. H.: See CLAIN, A., 627

HUNT, J. A., GRAY, C. H., and THOROGOOD, D. E.: Enzyme tests for detection of glucose, 586 (O); 827 (C), 940 (C), 1058 (C), 1238 (C), 1487 (C)

— OAKLEY, W., and LAWRENCE, R. D.: Clinical trial of new oral hypoglycaemic agent BZ 55, 445 (O); 465 (L)

HUNTER, A. R.: Neostigmine-resistant curarization, 919 (O); 1054 (C), 1113 (C), 1174 (C), 1240 (C), 1303 (C), 1365 (C), 1429 (C), 1485 (C), 1544 (C)

HUNTER, R. B., and WALKER, W.: Neodymium 3-sulpho-isobutyrate and blood coagulation, 1214 (O)

— See MCKENZIE, J. M., 448

Hunter House Memorial Fund, 487

Hunterian Society: *Transactions of the Hunterian Society*, vol. 14, 1102

Huntington's chorea; management and prognosis, 255

HUSTON, A. F., MORWOOD, J. B., CHRISTOFINIS, G. J., and WOOD, W.: Poliomyelitis in suburban Surrey; clinical and epidemiological observations in the light of virus isolation from faeces, 629 (O)

HUTCHESON, A. S., and MACPHERSON, P.: B.C.G. vaccination after replacement blood transfusion, 863 (O); 1115 (C), 1363 (C)

HUTCHISON, Benjamin, obituary of, 1182

HUTCHISON, J.: Dyschondroplasia and metaphysal acalasia, 710

HUTCHISON, J. G. P., and GREEN, C. A.: Troublesome staphylococci, 1364 (C)

HUTTON, Lillian, obituary of, 483

HUXLEY, A.: *Heaven and Hell*, 86

Hydralazine, comparison with intra-arterial oxygen as vasodilator, 1448

Hydrocephalus, congenital, and spina bifida; hereditary predisposition and prognosis for future offspring, 1010

Hydrocortisone. See under Cortisone

Hydronephrosis, hypertension due to; relief after nephrectomy (W. Houston), 644

Hydroxytryptamine in nettles, 595 (A)

HYMAN, G.: Paediatric anaesthesia, 242 (C)

HYNES, M., and LEHMANN, H.: Haemoglobin D in a Persian girl; presumably the first case of haemoglobin-D-thalassaemia, 923

Hypercalcaemia in infants; relation to vitamin D intake, 149

Hyperparathyroidism, acute, with electrocardiographic changes (B. A. Bradlow and N. Segel), 197 (O)

— and steatorrhoea (D. R. Davies, C. E. Dent, and A. Wilcox), 1133 (O); 1363 (C), 1546 (C)

HYPERTENSION:

Aetiology, 223

Circulation in the hands (R. S. Duff), 974 (O)

Due to endocrine tumours, 230

— to hydronephrosis; relief after nephrectomy (W. Houston), 644

In general practice, 166

In pregnancy; management, 162

Inheritance, 985 (L)

Malignant, irradiation-induced; cured by nephrectomy (W. M. Levitt and S. Oram), 910 (O); 1176 (C), 1236 (C), 1304 (C), 1368 (C)

— neurological manifestations (E. Clarke and E. A. Murphy), 1319 (O)

Symptomless, hypotensive drugs in, 111

— investigation of, 254

Treatment, 223

— (A. R. Gilchrist), 1011 (O)

— two new ganglion-blocking agents (S. Lockett), 116 (O); 418 (C)

Hypnosis: *Hypnosis and its Therapeutic Applications* (Editor: R. M. Dorcus), 756

— in the casualty department (L. Goldie), 1340 (O); 1549 (C)

Hypochondriasis; illness as a hobby, 157

Hypodermic needle, broken in arm or buttock; management, 187

— sharpening methods, 1535 (A)

Hypoglycaemia, endogenous; some neurological manifestations (Doreen Moorhouse), 228; 1512 (O)

Hypophysectomy in carcinomatosis, 229

Hypopituitarism. See Pituitary

Hypospadias, treatment, 240 (C)

Hypotension: Action of mecamylamine (A. E. Doyle, E. A. Murphy, and G. H. Neilson), 1209 (O); 1431 (C)

Hypothalamus: Hypothalamic syndromes (I. S. Wechsler), 375 (O)

Hypothermia in midwifery, 1368 (C)

— value in severely shocked patients (Sheila Kenny), 211 (O); 419 (C), 999 (C)

I

Idiocy, amaurotic, aetiology, 255

Ileitis, regional, in mother and son (G. E. Heard and E. L. John), 85

Ileostomy, advice for patients, 441

— national organization for welfare of patients with permanent ileostomies, 665

ILES, Alfred John Hopkinson, obituary of, 307

Ileum: Simple ulcers, perforation as cause of peritonitis (J. H. Wrigley), 924

ILG, Frances L.: See GSELL, A., 1103

ILLINGWORTH, R. S.: *Review of Youth: The Years from Ten to Sixteen*, by A. Gesell, Frances L. Ilg, and Louise B. Ames, 1103

— review of *Discussions on Child Development*, vol. 1, edited by J. M. Tanner and B. Inhelder, 1473

Immunization: Abbreviated titles for serological products (W. L. M. Perry and H. J. Parish), 38

— delayed complications (P. W. Robertson and B. J. Leonard), 1029 (O)

— for pregnant European going to Tropics, 721

Immunizations in childhood, 224

Immunology: British Society for Immunology, inaugural meeting, 1295

Imperial Cancer Research Fund Lecture, 935

IMPEY, R. L.: German measles and abortion, 1299 (C)

Impotence: Nullity decree refused in spite of impotence (medico-legal note), 105

INCE, F. G.: Tests for drunkenness, 1056 (C)

Income-tax: Taxation of value of insurance policies given to voluntary hospital staff (medico-legal note), 105

Incontinence in wheel-chair patient; management, 668

INDUSTRY AND OCCUPATIONS: see also Pneumoconiosis

Accidents and diseases, notifications (vital statistics), 312, 832, 1065, 1378

Annual Report of Chief Inspector of Factories for 1955, 1421 (A)

Assessing the health of the industrial worker (Mackenzie Industrial Health Lecture), 764

Industrial Health Service (parliamentary note), 1125

Industrial Injuries Advisory Council, 1438, (correction, 1560)

Mackenzie Industrial Health Lecture, 764

Occupational health institute advocated, 833

— radioactivity, 229

Prescribed diseases; review for purpose of the National Insurance (Industrial Injuries) Acts, 611

Public health laundry service, 1177 (C)

Selenium poisoning, cause and treatment, 1499

INFANTS: see also Children

Agranulocytosis, genetic, infantile, 871 (A)

Cardiac surgery, 296

Diseases in Infancy and Childhood, 2nd ed. (R. W. B. Ellis), 1530

Feeding; preparation of cow's milk, 187

Infant Nutrition in the Subtropics and Tropics (D. B. Jelliffe), 86

Multiple boils, 1317

Newborn; blood pressure in relation to maturity, mode of delivery, and condition at birth (W. W. Holland and I. Maureen Young), 1331 (O)

— haemolytic disease, 161

— *Nursing Care of the Newly Born Infant* (W. S. Craig and others), 287

— perinatal mortality; classification and causes (J. P. Bound, N. R. Butler, and W. G. Spector), 1191 (O), 1260 (O); 1542 (C)

— treatment of umbilical cord, 104 (C)

— vaccination with freeze-dried B.C.G. vaccine (Margaret I. Griffiths and W. Gaisford), 565 (O), (correction, 722)

Physiology and Pathology of Infant Nutrition (L. F. Meyer and E. Nassau), 1223

Post-maturity, 160

Prematurity and intelligence, 1353 (L), (correction, 1442)

Sudden unexpected death; clinical histories of cases reported to coroner (J. L. Emery and E. M. Crowley), 1518 (O)

Suffocation, accidental (parliamentary note), 250

Tension emphysema, 296

Umbilical hernia; clinical trial of adhesive strapping (J. C. Haworth), 1286 (O)

Infection in the laundry, 1177 (C)

Infectious disease contacts, period of exclusion from school, 613

— headmaster's powers, 894

— in general practice, 165

— notifications (vital statistics), 52, 108, 184, 251, 312, 369, 427, 486, 537, 610, 664, 717, 774, 833, 889, 948, 1006, 1066; 127, 1184, 1248, 1314, 1377, 1438, 1496, 1556

Infectious diseases weekly tables (vital statistics), 52, 107, 184, 250, 314, 370, 426, (correction, 490), 486, 556, 610 (correction, 668), 663, 718, 774, 832, 890, 947, 1005, 1066, 1128, 1184, 1247, 1314, 1377, 1437, 1495, 1555

Inflammation: *Biochemical Mechanisms in Inflammation*, 2nd ed. (V. Menkin), 518

Influenza vaccination in a residential boys' school; report to the Medical Research Council committee on clinical trials of influenza vaccine (G. F. C. Hawkins, L. A. Hatch, and J. C. McDonald), 1200 (O)

— vaccines, British, 315

INGLIS, J. M., and BROOKE, B. N.: Trendelenburg tilt; an obsolete position, 343 (O); 479 (C)

INGRAM, J. T.: Use of corticotrophin and cortisone in dermatology, 226

— review of *Clinical Selections in Dermatology and Mycology*, by F. R. Schmidt, 1042

— review of *Tumors of the Skin*, by H. Conway, 464

— and ANNING, S. T.: Varicose ulcer, 256 (C)

INGRAM, V. M.: Sickle-cell anaemia and haemoglobin, 601

INHEDER, B.: See TANNER, J. M., 1473

Injection accidents, 177 (C)

— intra-arterial, of thiopentone, in patient with anomalous forearm vessels (W. W. Richardson), 754

INMAN, P. M., GORDON, B., and TRINDER, P.: Mercury absorption and psoriasis, 1202 (O); 1428 (C)

INNES, I. D.: See COATES, J. C., 1000

Inoculation; delayed complications (P. W. Robertson and B. J. Leonard), 1029 (O)

Inquests; medical evidence, 356 (C), 480 (C), 606 (C), 767 (C), 886 (C), 942 (C), 1057 (C)

Insanity, certifiable; clinical criteria and procedure for certification, 668

— McNaughton Rules applied in case of assault by arteriosclerotic (medico-legal note), 947; 1059 (C)

— medical evidence in divorce on grounds of insanity (medico-legal note), 773

— questions to prospective employees (parliamentary note), 249

Insecticides: Endrin; food-poisoning caused by endrin-contaminated flour (G. M. Davies and I. Lewis), 393 (O)

— resistance to, 706, 1541

Insects: *Handbook for the Identification of Insects of Medical Importance*, 3rd ed. (J. Smart), 1103

— severe reactions from bites, 777

Insomnia, 166

Institute of Basic Medical Sciences, facilities, 537

— of Cancer Research; appointments, 253; facilities, 537

— of Cardiology, facilities, 537

— of Child Health, facilities, 537

— of Dental Surgery, facilities, 538

— of Dermatology, facilities, 538

— of Diseases of the Chest, facilities, 538

— of Laryngology and Otolaryngology, facilities, 538

— of Medical Laboratory Technology, 253

— of Neurology, facilities, 538

— of Obstetrics and Gynaecology, facilities, 538

— of Ophthalmology, facilities, 538

— of Orthopaedics, facilities, 538

— of Pathology, Newcastle; opening by Sir Harold Himsforth, 297

— of Psychiatry, facilities, 538

— of Psycho-Analysis, facilities, 536

— of Urology, facilities, 538

Instrument design, grants for, 1498

Insulin, abnormal reactions after, 255

— coma, "irreversible," treatment, 256 (C)

Intelligence in relation to prematurity, 1353 (L), (correction, 1442)

Interim, 719, 776

International Abstracts of Biological Sciences, 314

International Academy of Proctology, annual prize, 1498

International Journal of Applied Radiation and Isotopes, 576

International Medical Visitors Bureau, 541

International Society of Bioclimatology and Biometeorology, 1249

International Society of Haematology; sixth congress in Boston, 655

Intervertebral disks. See Spine

INTESTINES:

B. coli infection causing urethro-trigonitis and frequency in female (J. E. Semple), 696 (O)

Ileo-colic intussusception after appendicectomy (J. E. Bridger), 755

Intestinal intoxication and hepatic coma, 930 (A)

Obstruction, as late complication of fibrocystic disease of pancreas (E. Leslie Birse), 286

— due to meconium, 296

Occlusion clamps for intrathoracic intestinal anastomoses (K. S. Mullard), 1054

"Strawberry lesion" of rectosigmoid (G. K. Thomas), 209 (O); 421 (C)

Intussusception, ileo-colic, after appendicectomy (J. E. Bridger), 755

"Invenol." See Carbutamide

"Inversine." See Mecamylamine

Iodine, intravenous, allergy to, 1178 (C)

Ipswich and East Suffolk Hospital, new x-ray department, 597

IRELAND, REPUBLIC OF: see also Northern Ireland

Medical Research Council grant, 665

Medical schools, 535

Population in second quarter (vital statistics), 889

Registrar-General's quarterly returns (vital statistics), 252, 1556

Irish Medical Association: J. C. McFeeley elected president, 109

Iron, radioactive, studies on, 103 (C)

— therapy, intramuscular, in anaemia of pregnancy; two-year survey (Jean M. Scott), 635 (O); 1239 (C)

ISAACS, B.: Cardiovascular collapse during apomorphine treatment, 996 (C)

ISMAY, D. G.: Mortality and smoking, 1427 (C)

Isoniazid as cause of pellagra (R. J. Harrison and M. Feiwel), 852 (O)

ISRAELSKI, M.: See HARDIE, R. W. W., 779

ISSERLIN, B.: Soya flour in infantile eczema, 553 (C)

J

JACKSON, W. P. U., and HERMAN, J. B.: Agranulocytosis caused by BZ 55, 607 (C)

JACOBY, M. G.: Medical and associated services in the United States, 596

JACOBY, N. M.: Sedation for children, 225

JAMES, D. G.: Diagnosis and treatment of sarcoidosis, 900 (O); 931 (A); 1237 (C)

JAMES, E. F.: B.C.G. and vole bacillus vaccines, 826 (C), 1118 (C)

JAMES, J. R. E.: See KWANTES, W., 576

JAMES, N. R.: Artificial respiration, 362 (C)

James Mackenzie Lecture, 1232

JAMESON, J. E.: Enteric infections in general practice, 165

JAMESON, Edward Bald, obituary of, 554, 607, 661, 771

Janet S. Darling Memorial Fund, 245 (C)

Jaundice caused by chlorpromazine, 1048 (A)

— diagnosis and treatment, 155

JAWETZ, E.: *Polymyxin, Neomycin, Bacitracin*, 589

JEAVONS, S. M., WALTON, K. W., and RICKETTS, C. R.: Duration of anticoagulant effect in relation to urinary excretion of dextran sulphate, 1016 (O); 1167 (A)

JEFFCOATE, T. N. A.: *Review of Integrated Gynecology: Principles and Practice*, by I. C. Rubin and J. Novak, 517

JEFFERISS, D., and SMITH, G. S.: An unusual cause of obstructed labour, 1040

JEFFERSON, J.: See HALL, R., 1431

JELLIFFE, D. B.: *Infant Nutrition in the Subtropics and Tropics*, 86

— appointed visiting professor of tropical medicine, Tulane University, New Orleans, 372

JELLY, O.: Alternative approach to the prostate, 1488 (C)

Jelly-fish stings, 352 (A); 1484 (C)

Jenner Medal awarded to P. Stocks, 1129

JENKINS, J. S.: See SPENCE, A. W., 1348

JENKINS, J. S.: Facial palsy, 1488 (C)

JEWESBURY, E. C. O.: Battersby, obituary of, 424

JOHNSON, Thomas Battersby, obituary of, 85

JOHN, E. L.: See HEARD, G. E., 85

JOHNSON, D. J. N.: Olympic silver medal gained by, 1315

JOHNSON, G. D.: See HOLBOROW, E. J., 1338

JOHNSON, J. H.: Local hydrocortisone for Hunner's ulcer of the bladder; preliminary report, 698 (O)

JOHNSON, L.: Cigarette smoking, 605 (C)

JOHNSON, Munro Kennedy, obituary of, 365

JONES, A. M.: Aims and content of the medical curriculum, 494 (O); 519 (L); 712 (C), 824 (C)

JONES, C. H.: Cardiovascular abnormalities with oesophageal atresia, 1366 (C)

JONES, E.: Nature of genius, 257 (O)

JONES, E. R.: Antibodies against cancer, 479 (C)

JONES, E. T.: See BROCKIS, J. G., 1524

JONES, G. B.: Painful shoulder, 168

JONES, P. O.: See GILLHEP, R. O., 1094

JONES, R. G. G.: Neostigmine-resistant curarization, 1240 (C)

JORDAN, R. C.: Cardiac diagnosis, 1176 (C)

JORDAN, W. M.: Familial tuberous sclerosis, 132 (O)

Joseph Rogers Prize, 253

Journalism: Public Bodies (Admission of the Press to Meetings) Bill, 371

— worrying reports of diseases, 102 (C)

JOURNALS:

Anatomia e Chirurgia, 983

Annals of General Practice, 1259

Archives Italiennes de Biologie, 983

Il Bassini, 983

Clinica Chimica Acta, 1361

International Abstracts of Biological Sciences, 314

International Journal of Applied Radiation and Isotopes, 576

Medical History, 891

Minerva Fisioterapica, 983

New Scientist, 1447

Physics in Medicine and Biology, 1067

West London Medical Journal discontinued, 1272

JOYCE, Henry Cyril Conwy, obituary of, 609

JUEL-JENSEN, B. E.: See HOBSON, F. G., 1501

JULER, F. A.: Christmas Gifts Fund, 1305 (C)

JURISPRUDENCE, medical. See Medico-legal

K

KAHN, J. H.: Freudian concepts and brain physiology, 604 (C)

KARLISH, A. J.: See HAUSMANN, W., 845

KARSNER, H. T.: *Human Pathology*, 8th ed., 31

KATZ, L. N., and PICK, A.: *Clinical Electrocardiography*. Part I, 866

KAY, J.: Herpes zoster, 1366 (C)

KAY, W. W.: "Irreversible" insulin coma, 256 (C)

— Alcoholic excess and mucous colitis, 1318 (C)

KAYE, S. L.: Neurological diagnosis in general practice, 165

KEATING, V.: Coronary artery disease, 768 (C)

KELLAR, R. J.: Management of hypertension in pregnancy, 162

KELLY, G. C.: appointed Honorary Physician to H.M. the Queen, 54

KELLY, M.: History of adrenal virilism, 1300 (C)

KELLY, W. J.: Tests for drunkenness, 1173 (C)

KEMP, F. H.: See ARDRA, G. M., 41

KEMPTON, J. J., and MARTIN, T. D. M.: Neonatal umbilicus and puerperal infection, 711 (C)

KENNAWAY, Sir Ernest: Eighteen days in the U.S.A.; some random notes, 933

KENNEDY, A.: *Review of Conceptions of Modern Psychiatry*. First William Alanson White Memorial Lectures, by H. S. Sullivan, 1223

— review of *The Interpersonal Theory of Psychiatry*, by H. S. Sullivan, edited by Helen S. Perry and Mary L. Gawel, 1223

KENNEDY, C. O.: Vaccination complications, 303 (C)

KENNEDY, M. C. S.: Breath-holding test, 1177 (C)

KENNY, Sheila: Value of "hibernation" in severely shocked patients, 211 (O); 419 (C), 999 (C)

— Neostigmine-resistant curarization, 1113 (C)

Kernicterus of prematurity, 161

KERR, A.: *Subacute Bacterial Endocarditis*, 866

KERR, D.: See COMFORT, A., 1173

KERR, J. M. W.: William Hunter Memorial Lecture, 775

KERR, Roy Russell, obituary of, 104

KERSHAW, J. D.: presidential address to Society of Medical Officers of Health, 764

KERSLEY, G. D.: Management of rheumatoid arthritis, 232

a-Ketoglutarate and blood pyruvate in normal and diabetic subjects (M. J. H. Smith and K. W. Taylor), 1035 (O)

KEYNES, W. M., and HARCOULT-WEBSTER, J. N.: Recovery from peritonitis four years after bilateral transplantation of ureters, 1463 (O)

KEYS, A.: Sex factor in coronary artery disease, 98 (C)

Khartum University. See Universities, Khartum

KIDNEY:

Artificial, modifications, 1129

Calculus, 158

— associated with chronic urinary infection; treatment with nitrofurantoin (Mary G. McGeown), 274 (O)

Danger from prolonged dosage with magnesium hydroxide, 1069

Function; effect of mitral valvotomy (J. Hammond, J. Mackinnon, and W. Whitaker), 71 (O)

Hydronephrosis, hypertension due to; relief after nephrectomy (W. Houston), 644

Polycystic, inheritance of, 188

Renal oedema, chronic; treatment (J. B. Rennie), 1506 (O)

Renal vein thrombosis with nephrotic syndrome and renal failure (W. Brumfit and W. O'Brien), 751 (O)

Thrombosis of renal arteries (D. G. Chambers), 1472

KILLPACK, W. S.: Iron-deficiency anaemia, 1239 (C)

King's College Hospital Medical School, facilities for students, 531; address at opening of new session, 821

King Edward's Hospital Fund for London, 872 (A); annual meeting, 53; council meeting, 1557

KINMONTH, J. B.: *Review of Peripheral Vascular Disorders*, edited by P. Martin, R. B. Lynn, J. H. Dible, and I. Aird, 215

KINSELLA, V. J.: Bad gastroscopies, 1277 (O); 1428 (C)

KINSEY, Alfred Charles, obituary of, 555

KINSEY, E. W.: The discipline of learning, 824 (C)

KIRKLAND, I. S.: appointed assistant director, Postgraduate Board for Medicine, Edinburgh, 1498

KITCHING, R. L.: Public health laundry service, 1177 (C)

KITTEL, F. W. B.: Anaesthetic emergencies, 240 (C)

KJELLBERG, S. R., and others: *Diagnosis of Congenital Heart Disease*, 215

KLEMPMAN, Bertha: Treatment of iron-deficiency anaemia, 997 (C)

Knee injuries; management, 169

KNIGHT, G.: See BEHRMAN, S., 1522

KNIGHT, G. C.: Denervation for carotid sinus syncope, 228

KNIGHT, G. H., and FOWLER, W.: Granuloma inguinale (venereum), 980 (O)

KNIGHT, R. J.: Purpose of medical education, 940 (C)

KNOX, A. C. W.: presentation of portrait, 1129

KNUDSEN, E. T.: See BEARE, R. L. B.

KOSHTOYANTS, Kh. S. (Editor): *I. P. Pavlov—Selected Works*, 1352; 1482 (C)
KOTINSKY, Ruth, and WITMER, Helen L. (Editors): *Community Programs for Mental Health*, 405
KRAFT, T.: Painless cardiac infarction, 826 (C)
KRAMER, I. R. H.: Intracranial aneurysm, 711 (C)
KRAUS, E. M.: See BOULTON, T. B., 1430
KUBA, V.: Purkinje's letters, 421 (C)
KUNK, P. B.: Irradiation-induced malignant hypertension, 1368 (C)
KWANTES, W., and JAMES, J. R. E.: Haemolytic streptococci on the neonatal umbilicus, 576 (O); 594 (A); 711 (C)
KYDD, James Lowdon, obituary of, 887

L

LABOUR: see also Abortion; Caesarean section; Infants, newborn; Obstetrics; Pregnancy; Puerperium
Factors influencing perinatal mortality, 1260
In diabetic mother, 1517
Induction, domiciliary, in post-maturity, 187
—surgical associated with foetal exsanguination (J. K. Russell, D. F. Smith, and R. Yule), 1414 (O)
Maternal death from aspiration asphyxia (R. B. Parker), 16 (O); 245 (C), 300 (C), 551 (C)
Natural childbirth, 1545 (C)
Obstetric indications for use of pudendal nerve block (I. Rocker), 78 (O)
Obstructed, unusual cause (D. Jefferiss and G. S. Smith), 1040
Post-maturity, 160
Rupture of rectovaginal septum (M. R. Neely), 1288; 1543 (C)
Vaginal examination, 1168 (A)

LABRUM, A. H.: See HAWKINS, D. F., 1236
LACROIX, P.: Bone growth and repair, 709
LADE, Leonard Cyril, obituary of, 1435
LADELL, R. M.: Speech therapy, 884 (C), 1118 (C)
LAIRD, S. M.: Eradication of congenital syphilis, 1369 (C)
Lambarene: *More from the Primeval Forest* (A. Schweizer), 1289
LAMBERT, T. D.: Diagnosis of early pregnancy, 1118 (C)
LAMBO, T. A.: Neuropsychiatric observations in the western region of Nigeria, 1388 (O); 1420 (A)
LAMPARD, M. E.: Treatment of iron-deficiency anaemia, 1119 (C)
LAMPÉRIÈRE, Thérèse: Mental hygiene and the cinema, 599
— Leisure activities involving speed, 600
LAMPITT, L. H.: Diets for coeliac disease and steatorrhoea, 722 (C)
LANE, K. E.: Divine healing, 44 (C)
LANE-PETTER, W.: Infirmary mice, 1318 (C)
LANGHORNE, Douglas Alfred, obituary of, 1003
LANGUTH, P. R.: See WALKER, C. H. M., 1455
LAPAGE, G.: *Veterinary Parasitology*, 347
— *Largactil*. See Chlorpromazine
Laundries, hygiene and protection against infection, 1177 (C)
LAURANCE, B. M.: Kernicterus of prematurity, 161
— Inhaled foreign bodies, 714 (C)
LAVERY, Samuel John, obituary of, 608
LAW, F. W.: Re-elected Master of the Spectacle Makers' Company, 1129
LAW, W.: See FARQUHAR, J. W., 276
LAW, W. B.: Example of painful subcutaneous tubercle, 30
LAWLER, Sylvia D., and RENWICK, J. H.: Rare type of anonychia, 714 (C)
LAWLOR, Mary K.: Diagnosis of ectopic pregnancy, 162
LAWRENCE, R. A. A. R.: Apartheid in blood transfusions, 356 (C)
LAWRENCE, R. D.: Enzyme test for glycosuria, 1058 (C)
— See HUNT, J. A., 445
LAWS, J. W.: See GAYLIS, H., 1141
LAWSON, D.: Early management of poliomyelitis, 417 (C)
LAWSON, J. I. M.: Neostigmine-resistant curarization, 1544 (C)
LAWTHER, P. J.: Aetiology of chronic bronchitis, — See COMBINS, B. T., 753, 1235
Laxatives; regular use by schoolchildren (J. J. A. Reid), 25 (O); 36 (A); 245 (C)
Lead: Tests for lead in urine, 614

LEADING ARTICLES:

Antibiotic deaths, 868; 995 (C), 1057 (C), 1173 (C), 1485 (C)
— explosions; report of Working Party, 1225
Antibiotics versus staphylococci, 217; 1115 (C)
Antibodies against cancer, 290; 479 (C), 660 (C)
Artful dodger, 216
Barbiturate poisoning, treatment, 1107
Bed: No rest for the feverish, 1531
Blood groups and diseases, 757
B.M.A.: Annual Representative Meeting, 142
— Brighton Meeting, 143
— Centenary, 218
— Presidential address, 87
Coal-gas poisoning, 1291
Composting of household waste, 758; 940 (C)
Co-operative research in the Commonwealth, 349

LEADING ARTICLES (continued):

General practice under the N.H.S., 87
Glucagon, 288
Homicide, responsibility for, 1164
Hypertension, inheritance of, 985
Hypoglycaemic sulphonamides, 465
Hypometabolism, 702
Keeping up with the times, 406
Leukaemia and exposure to x rays, 704
Lung, brown induration, 703; 942 (C)
Medicine and university, 519
Metabolic upsets and migraine, 812
Ministers' Nol, 144
Mortality and smoking, 1104; 1427 (C)
Myeloclerosis, 927
N.H.S.: Unity of purpose, 1417
Ordeal by Spens, 350
Pancreas, fibrocystic disease, 648
Poliomyelitis and segregation, 32
— cheap propaganda on vaccination, 929
— viruses, attenuated, 407
Polycythaemia vera, 1354
Postgraduate Medical School of London, 1045
Prematurity and intelligence, 1353, (correction, 1442)
Professional cohesion, 1165
Pulmonary embolism by amniotic fluid, 408
— oedema, treatment of, 1531
— Q fever, 1226
Radiation, chemical protection against, 647
Radiotherapy, megavoltage, 88
Rehabilitation, 1105
Remuneration; claim for increase, 216
— crisis of confidence, 1290
— suspense continued, 291
Respiratory tract viruses, 1474
Second World Conference on Medical Education, 520
Sensory deprivation, 1224
Speech problems in children, 1475
Spens and present discontents, 1043
Staphylococci, troublesome, 867; 999 (C), 1056 (C), 1115 (C)
Stress and corticotrophin secretion, 33
— as cause of disease, 592
Student health services, 520
Subarachnoid haemorrhage, spontaneous, 590
Suicide and attempted suicide, 813
Survival at sea, 1044
Syphilis, congenital, eradication, 1163; 1369 (C)
Tetanus, prevention, 348; 481 (C)
Trypanosomiasis in Africa, 1418
Whooping-cough immunization, 467
LEAK, W. N.: Herpes zoster, 1115 (C)
— Hypothemia in midwifery, 1368 (C)
LEARMONTH, Sir James, retirement from Regius Chair of Clinical Surgery and Chair of Surgery, Edinburgh University, 371
— appointed professor emeritus, Edinburgh University, 253
Learning during sleep, 315
LEATHES, John Beresford, obituary of, 770, 1436
LEDGER, R.: Doctors in Hungary, 886 (C)
LEDINGHAM, J. M.: See WILSON, C., 1236
LEE, K. T.: See THOMAS, W. A., 99
LEE, M.: Delayed emptying of gastric stump, 1364 (C)
LEE POTTER, P. B., appointed Director-General, R.A.F. Medical Services, 470
LEES, W. L. B.: See WALKER, G., 451
Leg: Anterior tibial syndrome after acute arterial occlusion, treated by decompression (R. Harrison and P. E. Jackson), 403
— diagnosis and surgery of high-pressure venous leaks in the leg; new overall concept of surgery of varicose veins and venous ulcers (F. B. Cockett), 1399 (O)
— exercises for thin legs, 373
LEGGATE, J. M.: Torsion of the gall-bladder, 1369 (C)
LEHMANN, H., and RAPER, A. B.: Maintenance of high sickling rate in an African community, 333 (O); 481 (C), 882 (C), 1117 (C)
— See HYNES, M., 923
LEIGH, A. D.: Influence of television, 599
LEIGH, R. E. D.: Prophylaxis for recurrent upper respiratory tract infections, 44 (C)
Leishmaniasis, transmission, 669
LEITCH, A.: See SEAGER, C. P., 1407
LEITNER, Z. A.: Cholesterol and vascular disease, 1303 (C)
LELEAN, Percy Samuel, obituary of, 1243, 1494
LEMKAU, P. V.: *Mental Hygiene in Public Health*, 2nd ed., 405
LENNHOFF, Liselotte: Infectious diseases in hospital practice, 165
LEONARD, B. J.: See ROBERTSON, P. W., 1029
LEONARD, J. C.: See BESTERMAN, E. M. M., 695
Leprosy diagnosed as syringomyelia (C. J. Lucas), 214
Leptospirosis; atypical Weil's disease, 100 (C), 359 (C)
LERMAN, L. H.: Viadril, new steroid anaesthetic; preliminary communication, 129 (O); 300 (C)
LESTER, J. P.: Pharmaceutical advertisements, 1431 (C)
Letterer-Siwe syndrome in adults; report of two cases (A. W. Taylor), 68 (O)
Leuco-encephalitis, haemorrhagic, acute (H. E. Aldridge), 807
— — — case (N. E. Rankin and Jean Dance), 808

Leucotomy, prefrontal; views of patients and their relatives (A. Ellithorpe and E. Slater), 739 (O); 760 (A); 885 (C)

LEUKAEMIA:

And exposure to x rays, 704 (L)
Chronic, treatment, 155
Deaths (parliamentary note), 1376
Murine, treatment with x rays and homologous bone marrow; preliminary communication (D. W. H. Barnes, M. J. Corp, J. F. Loutit, and F. E. Neal), 626 (O)
Myeloid, chronic; treatment with mercaptopurine (J. R. Fountain), 1345 (O)
Nature and treatment; round-table conference, 152
Robert Roesler de Villiers award to M.R.C. Radiobiological Research Unit, 1128

Leukoplakia of bladder (L. M. Zinck and H. S. Trafford), 346
Levallorphan as supplement to nitrous oxide in anaesthesia, 1328
Leverhulme Research Awards, 949

LEVIN, J.: Neostigmine-resistant curarization, 1429 (C)
LEVITT, W. M.: Radiotherapy of cancer, 150
— and ORAM, S.: Irradiation-induced malignant hypertension: cured by nephrectomy, 910 (O); 1176 (C), 1236 (C), 1304 (C), 1368 (C)
Levorphanol as supplement to nitrous oxide in anaesthesia, 1328

LEWIS, Gwenda M.: Divine healing, 242 (C)
— Anaesthesia and apnoea neonatorum after caesarean section, 1173 (C)
LEWIS, I.: See DAVIES, G. M., 393
LEWIS, T. L. T.: Post-maturity, 160
LEWTAS, N. A.: See DIMANT, S., 10
LEYS, D.: Haemophilus infection in bronchiectasis, 179 (C)
— Medical relief appeal, 1369 (C)
— See COMFORT, A., 1173

LEYTON, G. B.: Abuse of antibiotics, 883 (C)
LIBRACH, I. M.: Is tonsillectomy necessary?, 549 (C), 827 (C)
Libraries: Directory of medical libraries, 1490 (C), (correction, 1560)

Library Association: Medical Section; week-end conference in Manchester, 820
Life expectancy in Britain, 316
— of doctors, 489
LIGHTBODY, W. P. H.: See DAVEY, T. H., 141
LIGHTBOWN, J. W.: Albomycin, 1362 (C)
LILLINGTON, C.: Only eighty years ago (Nova et Vetera), 477

LINDGREN, F. T.: Relationship of the blood lipids and lipoproteins and coronary disease, 476
LINDSAY, David Kenneth Llewellyn, obituary of, 1001
Lipaemia, alimentary, in men with coronary artery disease and in controls (D. W. Barritt), 640 (O)
LIPMAN, Reuben, obituary of, 307
LIPSCOMB, J. F.: Non-malignant conditions of the larynx causing hoarseness, 170
Lipstick, hazards of, 255
Liquorice-all-sorts as anastomotic aid, 999 (C), 1175 (C)

Lister Institute, annual report, 186
Lister Medal awarded to Sir Stewart Duke-Elder, 990

LIVER:
Budd-Chiari syndrome in polycythaemia vera: diagnosis and treatment (O. FitzGerald, P. FitzGerald, D. Cantwell, and J. A. Mehigan), 1343 (O); 1354 (L)
Cirrhosis; advances in treatment, 55
— management, 155
Intestinal intoxication and hepatic coma, 930 (A)

Liverpool School of Tropical Medicine, postgraduate facilities, 544
— University. See Universities, Liverpool

LIVINGSTONE, D.: Radioactive key-light, 1302 (C)
LLOYD, K.: Management of hemiplegia, 233
LLOYD, S. J.: No doctor at sea, 363 (C)
LOCKET, S.: Two new ganglion-blocking agents in treatment of hypertension, 116 (O); 418 (C)

LOGAN, Barbara Marshall, obituary of, 1373
LOGAN, David Dale, obituary of, 1370
LONBAY, E. L.: Burns and hydrocortisone, 1547 (C)
London County Council: Medical service, 536, (correction, 722)

London Hospital Medical College, facilities for students, 530
London Medical Exhibition, 1171
London School of Hygiene and Tropical Medicine, postgraduate facilities, 544

London University. See Universities, London
LONGLAND, C. J.: Review of *Pathology and Surgery of the Veins of the Lower Limb*, by H. Dodd and F. B. Cockett, 1103

LOUIS, F.: Gas gangrene risks, 713 (C)
LOURIE, Emanuel Mannie, obituary of, 482
LOUTIT, J. F.: Protection from effects of radiation by haemopoietic tissue, 39
— See BARNES, D. W. H., 626

LOVE, William, obituary of, 555
Lowe, C. R.: An association between smoking and respiratory tuberculosis, 1081 (O); 1104 (L); 1367 (C)

LOXTON, G. E.: Cortisone and aspirin in rheumatoid arthritis, 240 (C)
LUBEL, M.: Cigarette swallow, 102 (C)
LUCAS, C. J.: Leprosy diagnosed as syringomyelia, 214

LUNG: see also Bronchus; Pneumoconiosis
Apicalysis with fascial fixation (J. D. Thomson and N. McSwan), 1409 (O)
Cancer, and air pollution, 95
— and other causes of death in relation to smoking; second report on mortality of British doctors (R. Doll and A. B. Hill), 1071 (O); 1104 (L); 1246 (parliamentary note), 1367 (C), 1426 (C), 1427 (C)
— and tobacco-smoking, 43 (C), 95, 416 (C)
— diagnosis (A. McKenzie), 204 (O)
— exfoliative cytology in; examination of one laboratory's results (F. Hampson), 1461 (O)
— diesel oil as aetiological factor, 44 (C), 357 (C), 416 (C), 605
— increase in mortality, 358 (C)
— relation to atmospheric pollution (parliamentary note), 248
— research; co-operation of tobacco manufacturing industry, 338
— routine radiography, 373
Farmer's lung in Radnor and North Breconshire; report of ten cases (D. I. Williams and P. P. Mulhall), 1216 (O)
Fibrosis, massive, progressive, 180 (C)
Haemosterosiderosis, 703 (L); 942 (C)
Involvement of bronchi by metastatic pulmonary tumours, 299 (C)
Oedema, treatment, 1531 (L)
Shadow shown in mass x ray, 998 (C), 1483 (C)
Staphylococcal infections after pneumonectomy, 241 (C)
Tropical eosinophilia (Rosemary Davies), 1470 (O)

LUNN, G. M.: Adrenalectomy for intracranial metastases, 825 (C)
LUNN, H. F.: Hypnosis in the casualty department, 1549 (C)

Lupus erythematosus caused by sulphonamide hypersensitivity, 418 (C), 659 (C)
Lutembacher's syndrome in woman of 81 (L. Rosenthal), 1351

LUXTON, R. W.: Medicine's widening horizons, 510 (O)
— Irradiation-induced malignant hypertension, 1176 (C)

Lymph nodes: Letterer-Siwe syndrome in adults; report of two cases (A. W. Taylor), 68 (O)
LYNN, C. R.: Treatment of measles, 359 (C)
LYNN, R. B.: See MARTIN, P., 215
LYNNWILER, C. P.: See MORAGUES, V., 926
LYON, David Murray, obituary of, 1309

LYTLE, G. G.: Apomorphine treatment for alcoholism, 1056 (C)

M

MCALPINE, S. G.: Nitrogen mustard in treatment of bronchial carcinoma, 1412 (O)
MCBEAN, Lena M.: See GALLOWAY, W. H., 1102
MCALLUM, D. I.: Glycylthrethine acid, 1239 (C)
MCCANCE, R. A., and WIDDOWSON, E. M.: *Breads White and Brown: Their Place in Thought and Social History*, 810

MACCARTHY, D.: Abnormalities which cure themselves, 165
MCCLURE, D.: See COMFORT, A., 1173
MCCLURE, William, obituary of, 246

MCCONNELL, R. B.: See CLARKE, C. A., 725
MCCONNELL, Robert John, obituary of, 1427 (C)
MCURDY, R.: Mortality and smoking, 1427 (C)
MCDERMOTT, W.: The problem of staphylococcal infection, 837 (O); 867 (L); 999 (C), 1056 (C), 1115 (C), 1235 (C), 1364 (C)

MCDONAGH, O.: Twopenny-halfpenny advertising, 1176 (C)
MCDONALD, J. C.: See HAWKINS, G. F. C., 1200
MCELLIGOTT, M.: Corticotrophin and cortisone therapy in dermatomyositis, 1509 (O)

MCILROY, W. D., and GLASS, H. B. (Editors): *A Symposium on Amino Acid Metabolism*, 287
MCFEELEY, J. C.: elected president, Irish Medical Association, 109

MCGEOCH, A.: See WARD, W., 418
MCGEOWN, Mary G.: Nitrofurantoin in chronic urinary infection associated with renal calculi, 274 (O)

MCGILL, J.: See HALLETT, G., 1238
MCGILL, R. J.: See MENDEL, D., 83
MCGRATH, G. D.: Neostigmine-resistant curarization, 1485 (C)

MCGRATH, M.: Neostigmine-resistant curarization, 1114 (C)
MCGREGOR, I. A., GILLES, H. M., WALTERS, J. H., DAVIES, A. H., and PEARSON, F. A.: Effects of heavy and repeated malarial infections on heavy and repeated malarial infections; effects of Gambian infants and children; effects of erythrocytic parasitization, 686 (O); 1486 (C)
MCGREGOR, Margaret S. M.: Increase in scabies, 1427 (C)

MCILROY, J. H.: Cigarette smoking, 358 (C)
MCILWAIN, H.: Review of *Neurochemistry: The Chemical Dynamics of Brain and Nerve*, edited by K. A. C. Elliott, I. H. Page, and J. H. Quastel, 141

MCINDOE, Sir Archibald: Skin cancer, 171
MCKAY, N.: Jig for inserting radon seeds into bladder, 303 (C)
MCKEAN, C. W. F.: Treatment of measles, 660 (C)
MCKENZIE, A.: Diagnosis of cancer of lung and stomach, 204 (O)

MCKENZIE, J. M., MARSHALL, P. B., STOWERS, J. M., and HUNTER, R. B.: BZ 55 in diabetes, 448 (O); 465 (L)
MACKENZIE, M.: Clinical psychologist in the mental hospital, 885 (C)

MACKENZIE Industrial Health Lecture, 764
MACKINNON, J.: See HAMMOND, J., 71
MACKINTOSH, James M., appointed professor emeritus, University of London, 253
MACKINTOSH, Jean M., to be president, Section on Health and Welfare of the Family, Royal Society of Health annual congress, 1498
MCKISOCK, W., and WALSH, L.: Subarachnoid haemorrhage due to intracranial aneurysms; results of treatment of 249 verified cases, 559 (O), (correction, 668), 590 (L)

MACKLIN, A. H.: Some ideas in regard to the meaning of student health and its assessment, 524; 520 (L)
— Student mental health, 1175 (C)
MCLEAN, A. S.: Radiation protection, 229
MCLELLAN, Malcolm, obituary of, 1123
MCLEOD, Harold Hay Brodie, obituary of, 1372
MCLEOD, K. I. E.: Sex factor in coronary artery disease, 551 (C)

MACLURE, Alfred Fay, obituary of, 1121
MCMAHON, J. E.: Shoe-stretcher for bunions, 769 (C)
MCMULLEN, H. L.: Radiation hazard, 362 (C)
MCNEE, Sir John: Cholesterol and vascular disease, 1172 (C)
MCNEIL, C.: School versus academy in the medical curriculum, 507 (O)

MCPARTLIN, G. A.: Making champions, 1489 (C)
MACPHEE, I. W.: Bad gastritis, 1428 (C)
MACPHERSON, C.: Nyctagmus in alcoholic intoxication, 418 (C)
MACPHERSON, P.: See HUTCHESON, A. S., 863
MCQUEEN, A.: "Meratran," 43 (C)
MACROGLOBULINEMIA of Waldenström (D. G. Ferri-man and J. B. Anderson), 402 (O), 409 (A)
man and A. G.: See CHAZAN, A. A., 283
MCSORLEY, J. G.: See THOMSON, J. D., 1409
MC SWAN, N.: See THOMSON, J. D., 1409
MAGEE, C. G.: appointed Honorary Physician to H.M. the Queen, 54
H.M. the Queen, 54
MAGEE, J. A.: True hermaphrodites and the prostate, 995 (C)
— Function of the prostate, 1427 (C)
Magnesium sulphate flavouring, 668
MAGNUS, F. F.: appointed Honorary Physician to H.M. the Queen, 54
MATTIAND, A. I. L., and YOUNG, T. M.: Jig for inserting radon seeds into bladder, 102 (C)
MAIZEL, J.: Laxatives in schoolchildren, 245 (C)

MALARIA:
Diagnosis, 1533 (A)
Effects of heavy and repeated infections on Gambian infants and children; effects of erythrocytic parasitization (I. A. McGregor, H. M. Gilles, J. H. Walters, A. H. Davies, and F. A. Pearson), 686 (O); 1486 (C)
Incidence in S. Europe, 272
Maintenance of high sickling rate in an African community (H. Lehmann and A. B. Raper), 333 (O); 481 (C), 882 (C), 1117 (C)
Prophylactics and anticonvulsants, 55
Species diagnosis, 1171 (C)

MALLESSE, Joan: Climacteric stress; its empirical management, 1422
— death of, 248
— memorial fund, 1438
MALONE, L. D.: Medical education, 1116 (C)
Malta: Commission on medical matters (parliamentary note), 1125
MALVERN, Viscount, retirement of, 1128
Manchester Medical Society: Presidential address, 1186
— Northern Hospital; illustrated booklet published, 891
— University. See Universities, Manchester
MANSBRIDGE, H. St. J.: Amnion implantation in peripheral vascular disease, 606 (C)
Mantoux testing, multiple-puncture method, 1381
MARKHAM, R. L.: See HESS, Evelyn V., 418
MARKLEY, E., and CHAMBERS, J. S. W.: Toxic effects and side-effects of methylpentynol, 1467 (O)
MARMION, D. E.: Abdominal migraine in children, 42 (C)

MARQUARDT, Martha, obituary of, 181, 307
Marriage guidance: *Getting Married*, 54
— problems, and preparation for marriage, 45 (C), 244 (C), 419 (C)

MARSH, F.: Non-specific ulcers, 768 (C)
— Troublesome staphylococci, 999 (C), 1364 (C)
MARSH, K.: Vaccination against tuberculosis in childhood, 174 (C)

MARSHALL, P. B.: See MCKENZIE, J. M., 448
MARSHALL, R. J., and WHELAN, R. F.: Intra-arterial oxygen in peripheral vascular disease, 1448 (O)
MARTIN, J. D., and MILLS, I. H.: Aldosterone excretion in normal and toxæmic pregnancies, 571 (O)

MARTIN, M. M.: See OAKLEY, W., 953, 1432
MARTIN, Marjorie F. M.: The Brown Dog of University College, 661 (C)
MARTIN, P.: Liquorice-all-sorts as anastomotic aid, 999 (C)

— LYNN, R. B., DIBLE, J. H., and AIRD, I. (Editors): *Peripheral Vascular Disorders*, 215
MARTIN, T. D. M.: See KEMPTON, J. J., 711
MARTIN, Thomas Young, obituary of, 1434

MARTINE, William Robert, obituary of, 773
MASON, A.: Prefrontal leucotomy, 885 (C)
MASON, S. A.: Breath-holding test, 766 (C)
Mast cells, 219 (A)
Maternal mortality in 1953, 932 (A)
Maternity benefit; false claim (medico-legal note), 1126

MATTHEW, G. D.: Simple clinical test for the diagnosis of early pregnancy, 979 (O); 1118 (C), 1489 (C)
Maudsley Bequest lecture, 1
MAVOR, G. E.: Pathological anatomy of gangrene, and some aspects of by-pass operations, 880
MAVOR, O. H.: memorial plaque, 720
MAY, A. R.: Psychotherapy and the general practitioner, 235

MAY, J. R.: Laboratory aid in investigation of respiratory infections, 1480
— Aetiology of chronic bronchitis, 1540
MAY, W.: Eye injuries due to fireworks, 1039 (O)
MAYER, A. C.: Abuse of antibiotics, 883 (C)
MAYFIELD, R. B.: Vaccination against tuberculosis, 356 (C)

MAYMAN, D. W.: Tests for drunkenness, 1056 (C)
— Twopenny-halfpenny advertising, 1367 (C)
MAYNE, F. S.: Invalid aid, 480 (C)
Measles, graphs (vital statistics), 557, 774, 1005, 1185, 1314, 1437, 1556
— itchy rash, 1299 (C), 1488 (C)
— treatment, 90 (A); 359 (C), 660 (C)
Mecamylamine; hypotensive action (A. E. Doyle, E. A. Murphy, and G. H. Neilson), 1209 (O); 1431 (C)

Medical Association for the Prevention of War, relief appeal, 1173 (C), 1238 (C), 1304 (C), 1369 (C), 1548 (C)
Medical Defence Union, 544; annual meeting, 765
Medical and Dental Defence Union of Scotland, 544
Medical education. See Education, medical
Medical Golfing Society, 891
Medical History, 891
Medical Insurance Agency, 546; annual meeting, 297
Medical Missionary Association, 536
Medical Officers of Health, deputy (parliamentary note), 1436

Medical practice eighty years ago (C. Lillingston) (Nova et Vetera), 477
Medical Practices Advisory Bureau, 546
Medical practitioners: see also Consultants and Specialists; General practitioners
— life expectancy, 489
— living on a pension to-day, 304 (C)
Medical profession: Unity of purpose, 1417 (L)
Medical Protection Society, 544; annual meeting, 878
Medical Register; statistics of medical practitioners, 528
Medical research. See Research, medical

MEDICAL RESEARCH COUNCIL:
Annual report, 96
Carbon monoxide poisoning; recent statistics (A. B. Hill), 1220 (O); 1365 (C)
Fellowships in Clinical Research, 53
Members appointed, 891
Virus production laboratory, 1315
Whooping-cough Immunization Committee: Report on vaccination against whooping-cough; relation between protection in children and results of laboratory tests, 454; 467 (L)

Medical Women's Federation, 546
— Christine Murrell Memorial Fellowship, 1439
Medical Women's International Association, 1297

MEDICINE:
Debt to the Middle Ages, 301 (C)
Fundamentals of Internal Medicine, 4th ed. (W. M. Yater), 141
History, importance in medical education, 883 (C), 1059 (C)
— see also Nova et Vetera
Institute of Basic Medical Sciences, facilities, 537
Pitfalls in diagnosis and treatment (A. H. Douthwaite), 895 (O), 958 (O), 1175 (C), 1298 (C), 1489 (C)
Research. See Research, medical
Tropical. See Tropical medicine
Widening horizons (R. W. Luxton), 510 (O)

MEDICO-LEGAL:
Action against orthopaedic surgeon dismissed, 1313
Arteriosclerosis and the McNaughton Rules, 947; 1059 (C)
Collaboration in authorship, 1125
Eyes offered to save sight; not to be used from living persons, 485
Libel action against *Daily Sketch*, 309
Maternity benefit; false claim, 1126
Medical evidence in divorce on grounds of insanity, 773
— received on criminal appeal, 556; findings of committee of inquiry, 716, 888
Naturopath gaoled for two years, 366
Over-zealous first aid damaging eye, 49
Psychiatric evidence in court (Sir David Henderson), 1 (O)
Sexual Offences Act 1956, 888
Stress and coronary thrombosis, 1126
Taxation of value of insurance policies given to voluntary hospital staff, 105
Tuberculosis; alleged delay in treatment, 1182

- "Megimide." See Bemegride
- MEHIGAN, J. A. See FITZGERALD, O., 1343
- Melbourne University. See Universities, Melbourne
- MELLOTTE, J. H.: Abdominal migraine, 359 (C)
- MELROSE, A. G.: See BROWN, D. A. P., 135
- MENAKER, W.: Air pollution, smoking, and lung cancer, 416 (C)
- MENDEL, D., and MCGILL, R. J.: Nephrosis treated by intravenous T.A.B., 83 (O)
- Meningococcal infection, graphs (vital statistics), 108, 312, 486, 609, 832, 889, 948, 1185, 1314, 1496
- MENKIN, V.: *Biochemical Mechanisms in Inflammation*, 2nd ed., 518
- Menopause: Climacteric stress; its empirical management (Joan Malleson), 1422
- obesity at, 1251
- MENSTRUATION:
- Blood groups and age at menarche (Jean Grant, Dagmar C. Wilson, and I. Sutherland), 140
- Disorders; value of "Mist. menses," 1188
- Epimenorrhagia, significance of, 316
- Oedema of thighs, 1382
- Treatment of premenstrual tension; progesterone-withdrawal bleeding, 256 (C)
- MENTAL DEFICIENCY:
- Associated with peroneal muscular atrophy in siblings (R. Gibson), 1281 (O)
- *The Hand of the Potter* (Nel Motte and P. Motte), 1223
- High-grade mental defectives, detention of, 176 (C)
- Legal and clinical definitions, 777
- Mental deficiency (parliamentary note), 366
- *Mentally Handicapped Children: A Handbook for Parents*, 1223
- Review of mental defectives (parliamentary note), 107
- MENTAL DISEASE:
- Annual Report of General Board of Control for Scotland, 1955, 724
- Clinical psychologist in the mental hospital (R. Hetherington), 708; 826 (C), 885 (C), 1059 (C)
- Confusional states in the elderly, organic basis of (F. J. Flint and Shelagh M. Richards), 1537
- Mental hospitals; admissions of involuntary patients (parliamentary note), 182
- — Board of Control's report, 1185
- — increase in nursing staffs, 61
- — shortage of beds, 341
- — patients (parliamentary note), 366
- — voluntary, subsequently certified (parliamentary note), 1312
- Observation of mental cases in general wards (parliamentary note), 50
- Physical treatment; round-table conference, 154
- Research (parliamentary note), 1312
- MENTAL HEALTH:
- *Community Programs for Mental Health* (Editors: Ruth Kotinsky and Helen L. Witmer), 405
- European League for Mental Hygiene, conference, 599
- *Family Mental Health and the State*; proceedings of the eighth annual meeting, World Federation for Mental Health, 1285
- Maladjusted children, 47 (C)
- Mental health services, contrasts, 1479 (A)
- *Mental Hygiene in Public Health*, 2nd ed. (P. V. Lemkau), 405
- National Association for Mental Health, post-graduate courses, 541
- Research Fund awards, 488
- Student Mental Health; first international conference, 936; 1175 (C)
- World Federation for Mental Health, conference, 599
- Menthol cigarettes, 1189
- "Mepavlon." See Meproamate
- Mephensin in treatment of strychnine poisoning, 1302 (C)
- Meproamate; controlled trial (E. D. West and A. F. da Fonseca), 1206 (O); 1227 (A); 1489 (C)
- "Meratran." See Benzhydrol hydrochloride
- Mercaptopurine in treatment of chronic myeloid leukaemia (J. R. Fountain), 1345 (O)
- Mercury absorption and psoriasis (P. M. Inman, B. Gordon, and P. Trinder), 1202 (O); 1428 (C)
- in teething powders; Pharmaceutical Society statement, 1067
- Mescaline: *Heaven and Hell* (A. Huxley), 86
- therapeutic value, 1189
- Metabolism: Effects of metabolic upsets on migraine, 812 (L)
- hypometabolism, 702 (L)
- response to operation in childhood, 296
- Methonium compounds: Effects of hexamethonium on healthy student volunteers (W. D. M. Paton and Hannah Steinberg), 622 (O); 769 (C)
- L-Methorphan. See Levorphanol
- Methylpentynol, toxic effects and side-effects (E. Marley and J. S. W. Chambers), 1407 (O)
- Methyltestosterone therapy, 1426 (C)
- Methypyrilone, piperidine hypnotic; clinical trial (J. S. Stewart), 1465 (O)
- MEYER, A. See CAVANAGH, J. B., 1403
- appointed professor emeritus, University of London, 253
- MEYER, L. F., and NASSAU, E.: *Physiology and Pathology of Infant Nutrition*, 1223
- MIALL, W. E. See COCHRANE, A. L., 180
- Mice: *Annotated Catalogue of the Mutant Genes of the House Mouse* (H. Grüneberg), 1379
- migratory habits, 1190, 1318 (C), 1442 (C)
- Microbiology: *Bacterial Anatomy*. Sixth Symposium of the Society for General Microbiology (Editors: E. T. C. Spooner and B. A. D. Stocker), 926
- *Perspective and Horizons in Microbiology* (Editor: S. A. Waksman), 141
- Micrococci P. antistaphylococcal activity, 62
- Micturition. See Urination
- Middlesex Hospital Medical School, facilities for students, 531; annual dinner, 822
- Midge bites, treatment of severe reactions, 777
- Midwifery. See Obstetrics
- Migraine, abdominal, 359 (C)
- in children, 42 (C)
- effects of metabolic upsets, 812 (L)
- treatment with riboflavin, 550 (C)
- MILES, A. A.: Resistance to infection; the experimental approach (Stephen Paget Memorial Lecture), 1379
- MILES, H. N.: Neostigmine-resistant curarization, 1429 (C)
- Milk tablets in schools (parliamentary note), 50
- MILL, W. A.: Hoarseness, 170
- MILLARD, M.: Twopenny-halfpenny advertising, 1488 (C)
- MILLEN, J. H.: Twopenny-halfpenny advertising, 1238 (C)
- MILLER, B. R.: Diesel oil and lung cancer, 357 (C)
- MILLER, H. R.: Atypical Weil's disease, 100 (C)
- MILLER, J. S.: Allergy to intravenous iodine, 1178 (C)
- MILLINGTON, E.: Treatment of nasal polyposis, 170
- MILLMAN, C. G.: High-grade defectives, 176 (C)
- MILLS, I. H. See MARTIN, J. D., 571
- MILNE, John Irvine, obituary of, 1492
- MILNE, M. D.: Modern views on nephritis, 154
- MILNER, F. H.: Abuse of antibiotics, 1116 (C)
- "Miltown." See Meproamate
- Mineralocorticoids, 6
- Minerva Fisioterapia, 983
- Ministry of Health: Deputy Chief Medical Officer, 186
- — *Report for Year Ended December 31, 1955*, 816 (A)
- MITCHELL, J. S.: Chemical radiosensitizers, 40
- MITCHELL, Lachlan Martin Victor, obituary of, 887, 1436
- MITCHELL-HEGGS, G. B.: Hormone therapy in dermatology, 152, (correction, 430)
- Mitral valvotomy; effect on renal function (J. Hammond, J. Mackinnon, and W. Whitaker), 71 (O)
- MITTWOCH, Ursula: Polymorphonuclear leucocytes in mongolism, 994
- MODELL, W.: *The Relief of Symptoms*, 31
- MOFFATT, P. McG.: Visual aids for partially sighted children, 167
- MOHUN, A. F. See COMFORT, A., 1173
- MOLD, J. W. See BELL, A. D., 692
- MOLLISON, P. L.: Treatment of haemolytic disease by exchange transfusion, 161
- MOLLOY, P. J. See NICKS, R., 578
- Mongolism, current research, 993; 1484 (C)
- *The Hand of the Potter* (Nel Motte and P. Motte), 1223
- value of hormone therapy, 1009
- Mononucleosis, infectious. See Glandular fever
- MONSARRAT, K. W.: Freudian concepts and brain physiology, 660 (C)
- Monster, dicephalic, as cause of obstructed labour (D. Jefferies and G. S. Smith), 1040
- MONTGOMERY, D. A. D. See BECK, R. N., 921
- MONTGOMERY, J. B.: Neostigmine-resistant curarization, 1113 (C)
- MOORE, A.: Neostigmine-resistant curarization, 1365 (C)
- MOORE, A. M. A.: Chiropody associations, 480 (C)
- MOORE, D. C.: *Complications of Regional Anesthesia: Etiology, Signs and Symptoms, Treatment*, 464
- MOORE, H. S.: Medical education, 940 (C)
- MOORE, L. H. G.: Blindness, 362 (C)
- MOORE, Lucile V. See COBURN, A. F., 984
- MOORE, T.: Review of *Breads White and Brown: Their Place in Thought and Social History*, by R. A. McCance and E. M. Widdowson, 810
- MOORHEAD, T. G.: elected honorary fellow of Trinity College, Dublin, 1379
- MOORHOUSE, Doreen: Some neurological manifestations of endogenous hypoglycaemia, 228; 1512 (O)
- MORAGUES, V., and LYNXWILER, C. P.: *Cardiac Anomalies: A Clinico-pathologic Correlation*, 926
- Morbidity yesterday and to-day (F. Roberts), 653
- MORLEY, A. H.: Maternal death from aspiration asphyxia, 300 (C)
- Anaesthetic deaths, 1057 (C)
- Morphine: Molecular shape related to analgesia, 34 (A)
- MORRIS, D.: Intragastric oxygen for asphyxia neonatorum, 374 (C)
- MORRIS, J. V., FISCHER, E., and BERGIN, J. T.: Rare complication of phenytoin sodium treatment, 1529 (O)
- MORRIS, W. R.: Selwyn College list, 942 (C)
- MORRISON, W.: *Diseases of the Ear, Nose, and Throat*, 2nd ed., 701
- MORSON, C.: The Brown Dog of University College, 827 (C)
- Mortuaries: *Planning of Mortuaries and Post-mortem Accommodation*, 292 (A)
- MORWOOD, J. B. See EUSKON, A. F., 629
- MOSSER, D. A. A.: Bacteriological examination of canned foods, 879
- Motor Show of 1956, 938; 1302 (C)
- Motor-car parking by doctors (parliamentary note), 182
- charges for doctors' cars (parliamentary note), 106
- MOTTE, Nel, and MOTTE, P.: *The Hand of the Potter*, 1223
- MOTTE, P. See MOTTE, Nel, 1223
- MOTTRAM, V. H., and GRAHAM, G.: *Hutchinson's Food and the Principles of Dietetics*, 11th ed., 810
- MOURANT, A. E.: Blood groups and evolution, 602
- Mouth: Hydrocortisone for buccal ulcers, 1486 (C)
- tuberculosis, primary, 147 (A)
- MOWLEM, R.: Treatment of common injuries of the face and hands, 171
- MOXON, C. P. See DIMANT, S., 10
- MOYNAHAN, E. J.: Purpose of medical education, 298 (C)
- MOYNIHAN, N. H.: Prevention of tetanus, 481 (C)
- Mucolytic agents, value of inhalation therapy, 489
- MÜLLER, A.: Haemodynamics of the coronary system, 476
- MUGGLETON, P. W. See UNGAR, J., 568
- MUIR, E. G.: Conservative resection in carcinoma of rectum, 158
- Results of treatment in carcinoma of colon and rectum, 742 (O)
- MULHALL, P. P. See WILLIAMS, D. I., 1216
- MULKERN, P. D.: Troublesome staphylococci, 1056 (C)
- MULLARD, K. S.: Occlusion clamp for intrathoracic intestinal anastomoses, 1054
- MULLER, H. J.: Effect of radiation on mutation rate, 412
- Mumps and its complications, 1252
- Munchausen's syndrome, 157
- Murder and responsibility, 1164 (L)
- medical evidence received on criminal appeal (medico-legal notes), 556; 716 (committee of inquiry), 888
- MURLEY, R. S.: Anaesthetic deaths, 1173 (C)
- MURPHY, E. A. See CLARKE, E., 1319
- See DOYLE, A. E., 1209
- MURRAY, I., and WANG, I.: The value of BZ 55 in control of diabetes, 452 (O); 465 (L)
- MURRAY, J. See CALMAN, R. M., 200
- MURRAY, Moira, and OSMOND-CLARKE, Freda: Post-menopausal oestrogen production, 179 (C)
- Muscles, dystrophy, 650 (A)
- rare type (G. Sandler), 981
- peroneal atrophy with mental defect and myopathy in siblings (R. Gibson), 1281 (O)
- relaxants; zoxazolamine, 293 (A)
- see also Hexamethonium
- stiff-man syndromes, 1478 (A)
- MUSHIN, W. W.: Review of *Anesthesia for Obstetrics: Labor—Delivery—Infant Care*, by R. A. Hingson and L. M. Hellman, 1289
- review of *Complications of Regional Anesthesia: Etiology, Signs and Symptoms, Treatment*, by D. C. Moore, 464
- See ROBINSON, C. L. N., 324
- MUTCH, Margaret Helen, obituary of, 1551
- "Myanesin." See Mephensin
- MYCOSES:
- *Clinical Selections in Dermatology and Mycology* (F. R. Schmidt), 1042
- Fungus diseases of Britain (R. W. Riddell), 783 (O); 816 (A)
- Histoplasmosis contracted in Britain; case of histoplasmic lymphadenitis following clinical recovery from sarcoidosis (W. St. C. Symmers), 786 (O); 816 (A)
- cutaneous, localized (W. St. C. Symmers), 790 (O); 816 (A)
- In man, 170
- Myelomatosis, multiple, atypical (R. L. B. Beare and E. T. Knudsen), 1526 (O)
- peripheral neuritis in (R. S. Crow), 802 (O)
- Myeloclerosis, 927 (L)
- Myocardial infarction, use of heparin in treatment, 989 (A)
- Myopathy associated with peroneal muscular atrophy in siblings (R. Gibson), 1281 (O)
- Myopia: Food habits of myopic children (P. A. Gardiner), 699 (O)
- N
- NABARRO, J. D. N. See WALKER, G., 451
- "Nadisan." See Carbutamide
- Nails: Painful subcutaneous tubercle (W. B. Law), 30
- rare type of onychia, 714 (C)
- NAISH, F. Charlotte: Review of *Physiology and Pathology of Infant Nutrition*, by L. F. Meyer and E. Nassau, 1223
- N.A.P.A.P. See N-Acetyl-para-aminophenol
- Napkin rash due to *C. albicans*, 37 (A)
- Narcotics: British Report to United Nations, 313
- NASH, D. F. E.: Congenital spinal palsy, 1333 (O)
- Nasolacrimal duct obstruction, 316
- NASSAU, E. See MEYER, L. F., 1223
- National Association for Mental Health, post-graduate courses, 541
- National Association for the Prevention of Tuberculosis: Symposium on chronic bronchitis, 1539; Canadian scholarship, 775
- NATIONAL HEALTH SERVICE:
- Convalescent treatment, 949
- *Costing Returns, Year Ended March 31st, 1956*, 1419
- Disciplinary cases since 1948 (parliamentary note), 49
- Drugs, cost of (parliamentary note), 1124
- General practice; present conditions (A. Hall), 57 (O); 87 (L)
- General practitioners; annual earnings (parliamentary note), 366
- Hospitals; building programme, 775
- Prescription charges (parliamentary notes), 1124, 1247
- — complaints (parliamentary note), 1183
- — grants for (parliamentary note), 1312
- — Minister's defence (parliamentary note), 1375
- Priorities, 816 (A)
- Reform, remuneration, and unity of purpose, 1417 (L)
- Remuneration claim, 106, 216 (L), 309
- — crisis of confidence, 1290 (L)
- — leading article in *The Times*, 406 (L)
- — Minister's rejection, 144 (L); 182 (parliamentary note), 350 (L)
- — Minister's view, 290 (L)
- — contractual obligations of Spens Report, 1043 (L)
- — professional cohesion, 1165 (L)
- National Library of Medicine: Classification scheme, 2nd ed., 1156
- National Old People's Welfare Council: *Progress Report for 1955-56*, 1214
- Naturopath gaoled for two years (medico-legal note), 366
- NAYLOR, A. See BUSH, H. D., 81
- NEAL, F. E. See BARNES, D. W. H., 626
- NEAME, H., and WILLIAMSON-NOBLE, F. A.: *A Handbook of Ophthalmology*, 8th ed., 811
- NEEDLES, hypodermic, sharpening methods, 1535 (A)
- NEEL, J. V.: Apparent alteration in sex ratio of children born to irradiated mothers, 412
- Work of the Heredity Clinic at Ann Arbor, 1054
- NEELY, M. R.: Rupture of rectovaginal septum at parturition, 1288; 1543 (C)
- Negligence: Action against orthopaedic surgeon dismissed (medico-legal note), 1313
- tuberculosis; alleged delay in treatment (medico-legal note), 1182
- NEGRIN Y LOPEZ, Juan, obituary of, 1246
- NEIL, D. O.: Psychological approach to asthma, 156
- NEIL, E.: Hypothermia, 415
- NELSON, G. H. See DOYLE, A. E., 1209, 1431
- NELSON, T. Y.: Tension emphysema in infants, 296
- Neodymium 3-sulpho-isonicotinate and blood coagulation (R. B. Hunter and W. Walker), 1214 (O)
- Neomycin: *Polymyxin, Neomycin, Bacitracin* (E. Jawetz), 589
- Neostigmine-resistant curarization (A. R. Hunter), 919 (O); 1054 (C), 1113 (C), 1174 (C), 1240 (C), 1303 (C), 1365 (C), 1429 (C), 1485 (C), 1544 (C)
- Nephrectomy, irradiation-induced malignant hypertension cured by (W. M. Levitt and S. Oram), 910 (O); 1176 (C), 1236 (C), 1304 (C), 1368 (C)
- Nephritis, modern views, 154
- Nephrosis treated with intravenous T.A.B. (D. Mendel and R. J. McGill), 83 (O)
- Nephrotic syndrome and renal failure in renal vein thrombosis (W. Brumfit and W. O'Brien), 751 (O)
- Nerve block: Neostigmine-resistant curarization (A. R. Hunter), 919 (O); 1054 (C), 1113 (C), 1174 (C), 1240 (C), 1303 (C), 1365 (C), 1429 (C), 1485 (C), 1544 (C)
- Neuritis, peripheral, in myelomatosis (R. S. Crow), 802 (O)
- retrobulbar, bilateral, acute (Doris Rose), 345
- NEUROLOGY:
- Abstracts on demyelinating diseases, 109
- *Clinical Studies in Neurology* (H. L. Parker), 518
- Hypoglycaemia, endogenous, neurological manifestations (Doreen Moorhouse), 1512 (O)
- Institute of Neurology, facilities, 538
- *Neurochemistry: The Chemical Dynamics of Brain and Nerve* (Editors: K. A. C. Elliott, I. H. Page, and J. H. Quastel), 141
- Neurological diagnosis in general practice, 165
- — manifestations of malignant hypertension (E. Clarke and E. A. Murphy), 1319 (O)
- Neuropsychiatric observations in the western region of Nigeria (T. A. Lambo), 1388 (O); 1420 (A)
- Relief of neurological symptoms and signs by reconstruction of stenosed internal carotid artery (C. Edwards and C. Rob), 1265 (O)
- Neurophysiology: I. P. Pavlov—*Selected Works* (Editor: Kh. S. Koshtoyants), 1352; 1482 (C)
- Neurosis; treatment with drugs, 157
- New Science, 1447
- NEWBOLD, G., and AMBROSE, G.: Hypnosis in the casualty department, 1549 (C)
- Newborn. See Infants, newborn
- Newcastle General Hospital: Department of Psychological Medicine opened, 1249, 1379
- NEWELL, R. L.: Problems of the elderly surgical patient, 234
- NEWTH, D. R.: Review of *The Biology of Senescence*, by A. Comford, 589
- NEWTON, D. R. L., and TANNER, J. M.: N-acetyl-para-aminophenol as an analgesic; a controlled clinical trial using the method of sequential analysis, 1096 (O); 1430 (C)
- NEWTON, Sir Wilberforce Stephen, obituary of, 1061
- NICHOLLS, G. G.: Twopenny-halfpenny advertising, 1368 (C)
- Nicholls Fellowship, 1439
- NICHOLSON, B. See DAVEY, T. F., 65
- Nickel dermatitis, 226
- NICKS, R., and MOLLOY, P. J.: Surgery of persistent ductus arteriosus, 578 (O)
- NICKSON, J.: Cholesterol and vascular disease, 1303 (C)
- NICOL, T., SNELL, R. S., and BILBEY, D. L. J.: Effect of cortisone on the defence mechanisms of the body, 800 (O); 1549 (C)
- Nigeria: Neuropsychiatric observations in the western region of Nigeria (T. A. Lambo), 1388 (O); 1420 (A)
- "Nisental." See Alphaprodine
- Nitrofurantoin in chronic urinary infection associated with renal calculi (Mary G. McGeown), 274 (O)
- Nitrogen mustard in treatment of bronchial carcinoma (S. G. McAlpine), 1412 (O)
- Nitrous oxide anaesthesia, analgesic supplements (E. S. Siker), 1326 (O)
- Nobel Prize, 990 (A); 1109 (A)
- "Noludar." See Methypyrilone
- Nomenclature: Abbreviated titles for serological products (W. L. M. Perry and H. J. Parish), 38
- terminology in medical writing, 940 (C), 1057 (C), 1116 (C), 1175 (C)
- Noradrenaline: *Noradrenaline: Chemistry, Physiology, Pharmacology, and Clinical Aspects* (U. S. von Euler), 984
- L-Noradrenaline, 46 (C)
- NORDIN, B. E. C. See FRASER, R., 1363
- North-east Clinical Society, 1558
- Northern Ireland: Medical schools, 535
- vital statistics in 1955 (vital statistics), 1314
- Nose, neglected; study of sense of smell, 1356 (A)
- obstruction, 169
- polyposis, treatment, 170
- Noses, broken, 1481
- NOVA ET VETERA:
- Brown Dog of University College (J. H. Baron) (Nova et Vetera), 547; 661 (C), 827 (C), 942 (C)
- Medicine eighty years ago (C. Lillicington), 477
- West London Hospital, centenary, 41
- NOVAK, J. See RUBIN, I. C., 517
- Novobiocin, antistaphylococcal activity, 62
- Nucleus pulposus: fluid content as factor in the disk syndrome; further observations (H. D. Bush, W. G. Horton, D. L. Smare, and A. Naylor), 81 (O)
- Nuffield, Viscount, gift to Faculty of Dental Surgery, 949
- Nuffield College of Surgical Sciences, 1497
- Nuffield Foundation: Commonwealth bursaries, 110
- Nuffield Report for the Year Ended March 31, 1956, 817 (A)
- NURICK, A. W. See HANDLEY, R. S., 1211
- NURSING:
- Easy lifting apparatus for helpless and heavy patients (A. B. Stewart), 1111
- Home nursing services in 1955, 994
- Nursing degrees, 1228 (A); 1304 (C), 1429 (C), 1546 (C)
- NUTRITION: see also Food; Vitamins
- *Breads White and Brown: Their Place in Thought and Social History* (R. A. McCance and E. M. Widdowson), 810
- Experiments on convict volunteers, 762
- Flour; controversy revived (parliamentary note), 1312
- *General Hospital Diets*, 332
- *Hutchinson's Food and the Principles of Dietetics*, 11th ed. (V. H. Mottram and G. Graham), 810
- In British families (parliamentary note), 249
- *Infant Nutrition in the Subtropics and Tropics* (D. B. Jelliffe), 86
- *Modern Nutrition in Health and Disease* (Editors: M. G. Wohl and R. S. Goodhart), 31
- *Physiology and Pathology of Infant Nutrition* (L. F. Meyer and E. Nassau), 1223
- Nystagmus in alcoholic intoxication, 418 (C), 550 (C)
- O
- OAKLEY, W. G.: Diabetic gangrene, 880
- CATTERALL, R. C. F., and MARTIN, M. M.: Aetiology and management of lesions of the feet in diabetes, 953 (O); 1047 (A); 1239 (C), 1432 (C)
- See HUNT, J. A., 445
- OBAYASHI, Y.: Dried B.C.G. vaccine, 756
- Obesity and reduction to ideal weight, 1317
- exclusion of sugar from diets, 722
- OBITUARY:
- Adamson, Robert Oswald, 945
- Alton, Francis Cooke, 1374
- Anderson, Charles, 1375
- Armstrong, Samuel Richard, 1122
- Baker, Henry Searle, 1063
- Baker, Lily Anita, 48
- Barnes, Alfred Edward, 1060
- Barratt, John Oglethorpe Wakelin, 1433
- Bartlett, Hedley Coward, 484
- Beck, William Dismin, 608
- Bevan, Charles Edward, 1181, 1494
- Bottrell, Stanley Henry Reginald, 1311
- Braham, David, 831
- Braham, Harvey Gordon, 946
- Bride, Thomas Milnes, 946
- Brown, Dame Edith Mary, 1490
- Bryson, Thomas, 1245
- Buckley, Gladys Lieba, 247
- Buckley, William, 1374
- Bull, Douglas William Anderson, 887
- Burton, Arthur, 1123
- Cameron, Dugald, 424
- Carroll, Denis Charles, 1310
- Carslaw, Robert Buchanan, 1432
- Cheese, Frederick, William, 181
- Clement, William, 771
- Cockayne, Edward Alfred, 1370
- Cogan, Lee Danby Buxton, 484
- Coplans, Joseph Moses, 48
- Costello, Thomas Bodkin, 365
- Crombie, Thomas Gilmour, 307
- Crossley-Holland, Frank William, 662
- Cruickshank, John Cecil, 1061, 1121
- Cullis, Winifred Clara, 1242
- Cuthbertson, William, 887
- Das, Amalananda, 1371
- Dick, James Orford Wallace, 308
- Dick, William Pointon, 305, 365
- Dickson, Ivan Wanless, 662
- Dignan, John Francis, 49, 181
- Dowdeswell, Roland Melville, 305
- Drury, Godfrey Dru, 1063
- Duncan, James Matthews, 555
- Dunn, Cuthbert Lindsay, 944
- Eames, Alethea Josephine, 1375
- Eardley, William, 1373
- Edwards, Dennis Raymond, 1062
- Eiser, Arthur, 1550
- Farquharson, John Langwell, 1122
- Fessler, Alfred, 1493
- Filatov, Vladimir Petrovich, 1120
- Findlay, Louis, 1243, 1551
- Fitch, Arthur Alfred, 772
- France, Charles Frederic, 1551
- Friend, Gerald Edward, 1123
- Gale, Arthur Harold, 1001
- Gammie, John Lawrence, 716
- Garry, Thomas Gerald, 1434
- Gee, Nathan, 1551
- Gibbs, Sidney Alfred, 1433
- Gilliat, Sir William, 829
- Gordon, Doris Clifton, 364, 1004
- Gray, Douglas, 1004
- Gray, Minnie Elizabeth, 772
- Griffith, John Richard, 1002
- Harris, William Cecil, 1004
- Heppoleite, John Emmanuel Reid, 1373
- Herford, Ethel Budgett Meakin, 1122
- Holman, Alec George, 1435
- Hutchison, Benjamin, 1182
- Hutton, Lilian, 483
- Iles, Alfred John Hopkinson, 307
- Jamieson, Edward Bald, 554, 607, 661, 771
- Jobson, Thomas Battersby, 424
- Johnston, Munro Kennedy, 365
- Joyce, Henry Cyril Conwy, 609
- Kerr, Roy Russell, 104
- Kinsey, Alfred Charles, 555
- Kydd, James Lowdon, 887
- Lade, Leonard Cyril, 1435
- Langhorne, Douglas Alfred, 1003
- Lavery, Samuel John, 608
- Leathes, John Beresford, 770, 1436
- Lelean, Percy Samuel, 1243, 1494
- Lindsay, David Kenneth Llewellyn, 1001
- Lipman, Reuben, 307
- Logan, Barbara Marshall, 1373
- Logan, David Dale, 1370
- Lourie, Emanuel Mannie, 482
- Love, William, 555
- Lyon, David Murray, 1309
- McClure, William, 246
- McConnell, Robert John, 364
- McEldan, Malcolm, 1123
- MacLeod, Harold Hay Brodie, 1372
- MacLure, Alfred Fay, 1121
- Marquardt, Martha, 181, 307
- Martin, Thomas Young, 1434
- Martine, William Robert, 773
- Milne, John Irvine, 1492
- Mitchell, Lachlan Martin Victor, 887, 1436
- Mutch, Margaret Helen, 1551
- Negrin y Lopez, Juan, 1246
- Newton, Sir Wilberforce Stephen, 1061
- Osgood, Robert Bayley, 1120
- O'Sullivan, Christopher Francis Xavier, 831
- Patterson, Joseph Hume, 1551
- Pickerill, Henry Percy, 483
- Pollard, Harold James Alexander, 1063
- Poole, William Joseph, 608
- Rhind, Sydney Devenish, 715
- Scott, Alexander, 1244
- Scott, Sir Henry Harold, 422
- Silverstone, Maurice, 771
- Simpson, Robert Gordon, 1374
- Singer, Karl, 246
- Skirving, Robert Scot, 306, 423

OBITUARY (continued):

- Slessor, James Runciman, 715
Sloane, John Stretton, 247
Smith, Harold Edgar, 47
Smith, Stuart Laurie, 663
Soothill, Victor Farrar, 772
Stallard, Philip Lechmere, 1181
"war", Matthew John, 1179, 1311
Sydney, Deryck Ralph, 887
Thomson, Ian Fream, 1493
Thornley, Robert Lewis, 608
Titcombe, Roland Hereward, 1062
Tomlin, Edgar Ernest Dexter, 1372
Trevan, John William, 943
Waddy, Sidney Hill, 1550
Wainwright, William Longworth, 662
Wartenberg, Robert, 1550
Watson, George William, 1491
Wells, Arthur Quinton, 944
Wells, Joseph Douglas, 1434
Whitaker, Donald Faraday, 365, 484
Whitby, Sir Lionel Ernest Howard, 1306, 1434, 1493
Whittaker, Hermon, 306
Wightman, Arthur Robertson, 48
Wigoder, Simon, 773
Wilkinson, George, 1492
Williams, Morgan Watkin, 1493
Willoughby, Dorothy, 1003
Wilson, Gordon Charles Edwyn, 831
Wilson, Richard Arderne, 247
Wilson, William Muirhead, 1004
Wright, Henry Cecil, 716
Yavagal, Shivalingappa Shivappa, 1003

"Oblivion." See Methylpentynol
O'BRIEN, H. D.: See BYRCE-SMITH, R., 969
O'BRIEN, J. R.: Pseudo-haemophilia, 998 (C)
O'BRIEN, W.: See BRUMFITT, W., 751

OBSTETRICS

- See also Abortion; Caesarean section; Labour; Pregnancy; Puerperium
Anesthesia for Obstetrics: Labor-Delivery—Infant Care (R. A. Hingson and L. M. Hellman), 1289
Antiseptics in midwifery (R. M. Calman and J. Murray), 200 (O)
Domestic midwifery; use of gas-and-air, 952
Institute of Obstetrics and Gynaecology, facilities, 538
Maternal mortality in 1953, 932 (A)
Post-maturity, 160
Fudendal block for low forceps, 1559
Statistical usages, 823
Uses of hypothermia in, 1368 (C)
Work of department of obstetrics, Adeyo Hospital, Nigeria, 439

Occupational medicine. See Industry and Occupations
O'DRISCOLL, D. T.: Indications for operation in pelvic tuberculosis, 1252 (C)
Oedema, menstrual, of thighs, 1382
— renal, chronic; treatment (J. B. Rennie), 1506 (O)
— subclinical; diagnostic sign, 242 (C)
Oesophagus: Combined congenital malformations of oesophagus and heart (Ana Aladjem-Tajhner and M. Orijan), 1160; 1366 (C)
— function, 236, (correction, 316)
— stricture, treatment, 237
— ulcer, perforation into pericardial cavity; report of case (D. D. Gellman and K. Silberstein), 1413 (O)
Oestrogen, post-menopausal production, 179 (C)
— relation to salt and water retention, 220 (A); 361 (C)
O'KANE, Patricia, appointed deputy commissioner, General Board of Control for Scotland, 1067

OLD AGE

- Biology of Senescence* (A. Comfort), 589
Ciba Foundation awards for research on ageing, 313
Elderly surgical patient; problems for the consultant, 234
National Old People's Welfare Council: Progress Report for 1955-56, 1214
Notes on Diets for Old People in Homes and Institutions, 1040
Organic basis of confusional states in the elderly (F. J. Flint and Shelagh M. Richards), 1537
Residential homes, 667
OLDFIELD, K. H.: Neostigmine-resistant curarization, 1544 (C)
OLDHAM, P. D.: Sampling from the electoral roll, 1241 (C)
— See HIGGINS, I. T., 904
Olecranon bursitis, 429
OLIVER, Jean. See BELL, G. H., 709
OLIVER, R. A. M.: See BELL, A. D., 692
Olympic Games: Making champions, 1229 (A); 1489 (C)
— medical arrangements at, 1234
Onchocerciasis; research and plans for control, 401
ONUGBO, W. I. B.: Antibodies against cancer, 660 (C)
Onychomadesis; prognosis and treatment, 1499
Oophorectomy, unilateral, radiography as career after, 489
Operating theatre, infection in (parliamentary note), 309; 415 (C), 603 (C), 713 (C)

Ophthalmia neonatorum, graphs (vital statistics), 108, 184, 312, 426, 610, 889, 1127, 1438
OPHTHALMOLOGY: see also Blindness; Eye; Vision
Handbook of Ophthalmology, 8th ed. (H. Neame and F. A. Williams-Noble), 811
Institute of Ophthalmology, facilities, 538
Ophthalmic tests (parliamentary note), 309
Use of adrenocortical hormones, 167

Opium addiction in India, 469 (A)
OPPE, T. E.: Post-mature infants, 160
OPRIAN, M.: See ALADJEM-TAJHNER, Ana, 1160
Opticians Bill (parliamentary note), 1376
ORAM, S.: See LEVITT, W. M., 910, 1304
"Orasecron," use in test for early diagnosis of pregnancy, 979
ORMISTON, G.: Subdural haematoma and effusions in infancy, 126 (O)
Orthopaedics: *Clinical Orthopaedics—No. 6* (Editor: A. F. DePalma), 811
— Institute of Orthopaedics, facilities, 538
OSBORN, S. B.: Future of diagnostic procedures, 1301 (C)
OSGOOD, Robert Bayley, obituary of, 1120
OSMOND, A. H.: Modern trends in cataract surgery, 167
OSMOND-CLARKE, Freda. See MURRAY, Moira, 179
Osteoarthritis, handbook published by Empire Rheumatism Council, 253
— prediction and correction, 233
Osteomalacia, renal tubular; treatment of case with dihydrotachysterol and management of a subsequent pregnancy (G. A. Rose), 805 (O)
Osteomyelitis, acute, Pantoast syndrome due to (J. Hirstenstein), 645
Osteoporosis, severe; gonadal agenesis and tetany associated with (T. J. Geffen), 282 (O)
O'SULLIVAN, Christopher Francis Xavier, obituary of, 831

OSWALD, N.: Respiratory tract viruses, 1480
— Chronic bronchitis, 1539
Otitis media due to Gram-negative organisms; treatment, 1441
Oto-rhino-laryngology: *Diseases of the Ear, Nose, and Throat*, 2nd ed. (W. W. Morrison), 701
— Institute of Laryngology and Otolaryngology, facilities, 538
"Ovarian dust," effects of inhalation, 1559
OWEN, Sir Isambard, memorial plaque unveiled, 1234
OWEN, J. S.: Maladjusted children, 47 (C)
OWEN, K., and ROB, C. G.: Technique for by-pass operations in femoral arterial disease, 273 (O)
Oxford University. See Universities, Oxford.
Oxygen, availability in Pakistan, 240 (C)
— intra-arterial, in peripheral vascular disease (R. J. Marshall and R. F. Whelan), 1448 (O)
— value in peripheral arterial disease, 188
Oxytetracycline: Sensitivity; medical evidence on appeal in murder case (medico-legal notes), 556; 716 (committee of inquiry); 888
Ozone poisoning, 988 (A)

P

Paediatrics. See Children: Infants
PAGE, I. H.: See ELLIOTT, K. A. C., 141
Pakistan: Health plan, 611
PALEY, R. G.: See TURNER, R. E., 588
Palsy, cerebral. See Paralysis, cerebral
"Panadol." See N-acetyl-para-aminophenol
Pantoast syndrome due to acute osteomyelitis (J. Hirstenstein), 645

PANCREAS:
Desmoid tumour resembling pseudo-pancreatic cyst in a male (E. Wilson), 982
Fibrocystic disease, 648 (L)
— intestinal obstruction as late complication (E. Leslie Birse), 286
Glucagon, 288 (L)
Pancreatitis, haemorrhagic, acute; treatment with cortisone (J. G. Brockis and E. T. Jones), 1524 (O)
Pantothenic acid, action on hair, 1560
Para-aminosalicylate therapy, hyperthyroidism developing during (S. Tandhanand and R. Buri), 281 (O)
Paralysis, cerebral: Annual Report of British Council for the Welfare of Spastics, 1455
— surgery in treatment of spastics, 167
— facial (T. Cawthorne and D. R. Haynes), 1197 (O); 1488 (C)
— spinal, congenital (D. F. E. Nash), 1333 (O)
Parasitology: *Medical Parasitology*, 2nd ed. (W. G. Sawitz), 1416
— preservation of parasite ova, 1545 (C)
— *Veterinary Parasitology* (G. Lapage), 347
Parathyroid: Hyperparathyroidism, acute, with electrocardiographic changes (B. A. Bradlow and N. Segel), 197 (O)
— and steatorrhea (D. R. Davies, C. E. Dent, and A. Willcox), 1133 (O); 1363 (C), 1546 (C)
— tumour; operative parathyroid arteriography for location (R. E. Steiner, R. Fraser, and I. Aird), 400 (O)

PARISH, H. J.: See PERRY, W. L. M., 38
PARK, H.: Burst abdomen, 159
PARK, M.: Maladjusted children, 478 (C)
PARKASH, S.: Location of veins by palpation, 1305 (C)
PARKER, H. L.: *Clinical Studies in Neurology*, 518
PARKER, R. B.: Maternal death from aspiration asphyxia, 16 (O); 245 (C), 300 (C), 551 (C)
PARKER, W. S.: No doctor at sea, 552 (C)
Parkinson's disease: Bathroom aid, 480 (C)
— mental symptoms following benzhexol hydrochloride therapy (H. B. Porteous and D. N. Ross), 138 (O); 361 (C), 478 (C), 550 (C)
PARLIAMENT:
Arbuthnot, J., appointed Parliamentary Private Secretary to Minister of Health, 1065
Armed Forces medical examinations, 50
Atmospheric pollution, 1124
— and lung cancer, 248
Atomic radiation effects, 106
B.C.G. vaccination, 105
— of immigrants, 51
Blindness in young children; claims for cure, 249
Board of Control, 107
Bronchitis, loss of work due to, 105
Building cuts, 106
Burns and scalds, notification suggested, 50, 1552
Cancer registration in Scotland, 1312
Chiropody associations, 308; 480 (C)
Civil Defence economies, 106
Consultants' merit awards, 249
Crash helmets, 106
Danger in operating theatre, 309; 415 (C), 603 (C), 713 (C)
Detergents, synthetic, report on, 50
Drugs, cost of, 1124
— of prescriptions, 1552
— life-saving, 1247
— sales investigation, 1064
East Africa inquiry, 309
Epileptics in prison, 1064
Eye and ear droppers, 1552
Eyes, artificial, 366
Flour; controversy revived, 1312
— present regulations on composition, 1183
Fluoridation of water supplies, 107, 308
— tests on children's teeth, 249
Food, colouring in, 1376
Food-poisoning; cases in 1955, 1552
— from frozen eggs, 1125
French ban on pharmaceutical goods, 308
General practitioners, complaints against, 49
Genetics, research in, 309
Health questions by employers, 249
Homicide Bill in committee, 1376
Hong Kong medical staffs, 1125
Hospitals; alcoholic beverages prescribed, 51
— building schemes, 1495
— consultant establishment, 107
— consultants, part-time, 1246
— doctors' emoluments, 1065
— extensions in Scotland, 1495
— medical staff, junior, 1065
— money for buildings, 1494
— party at Royal Victoria Infirmary, Newcastle-upon-Tyne, 250
— psychiatric out-patient clinics, 50
Hungarian refugees; danger of spread of tuberculosis, 1495
Industrial Health Service, 1125
Infants, suffocation, accidental, 250
Leukaemia, deaths from, 1376
Malta: Commission on medical matters, 1125
Medical Officers of Health, deputy, 1436
Medical practice in Scotland, 248
Mental cases, observation in general wards, 50
— deficiency, 366
— deficiencies; review, 107
— hospitals; admissions of involuntary patients, 182
— illness research, 1312
— patients, 366
— voluntary, subsequently certified, 1312
Milk tablets in schools, 50
Motor-car parking by doctors, 182
N.H.S.: General practitioners; annual earnings, 366
Nutrition in British families, 249
Ophthalmic tests, 309
Opticians Bill, 1376
Parking charges for doctors' cars, 106
Parliamentary Medical Committee, 1557
Poliomyelitis: Salk vaccine supplies, 366
— statistics, 1064, 1495
— vaccination, 1183
— vaccine; manufacturers, 1436
Practice expenses, 1065
Prescription charges, 1063, 1124, 1247
— complaints, 1183
— grants for, 1312
— Minister's defence, 1375
Radiation hazards; new safety measures planned, 183
Remuneration claim, 106, 182, 309, 1125
Research staffs' pay, 249
School eyesight tests, 105
Smallpox regulations, 1436
Smoking and lung cancer, 1246
Strontium deposit, 249, 308
Tobacco advertisements by Independent Television Authority, 183
— higher tax proposed, 1436
Tranquillizer drugs, 309
— excessive prescription, 250
Tuberculosis infection from elderly people, 50
Vaccination certificate, 1125

PARNELL, R. W.: See BOLTON, R. H., 1235
PARR, D.: Cardiovascular collapse during apomorphine treatment, 860 (O); 996 (C), 1056 (C), 1238 (C)
PARSONS, C.: See D'ABREU, A. L., 390
Parthenogenesis in man, conclusive evidence, 1132
PASK, E. A.: Management of respiratory paralysis, 162
— See DAVISON, M. H. A., 1544
PATERSON, J. K.: Postgraduate medical education in preparation for entry into general practice, 513 (O); 767 (C), 882 (C)
PATEY, D.: Review of *Textbook of British Surgery. Volume I: The Abdomen*, edited by Sir Henry Souttar, 347
Pathological Society of Great Britain and Ireland; fiftieth anniversary meeting, 148
Pathology: *Human Pathology*, 8th ed. (H. T. Karsner), 31
— Institute of Pathology at Newcastle; opening by Sir Harold Himsworth, 297
— *Introduction to Pathology*, 2nd ed. (G. P. Wright), 701
— *Pathology* (P. A. Herbut), 701
PATON, W. D. M.: Pharmacology of ganglion-blocking drugs, 224
— and STEINBERG, Hannah: Class experiment on ganglion block in human subjects, 622 (O); 769 (C)
PATTERSON, Joseph Hume, obituary of, 1551
PATTLE, R. E., and CULLUMBE, H.: Toxicity of some atmospheric pollutants, 913 (O); 1058 (C)
PAUL, H.: Infectious diseases in general practice, 165
PAULLEY, J. W.: *Colonic motility*, 1300 (C)
PAVLOV, I. P.: *Selected Works*, edited by Kh. S. Koshoyants, 1552; 1482 (C)
PAYNE, R.: St. George-in-the-East Hospital, 421 (C)
— Degree in nursing, 1304 (C)
PAYNE, R. B.: Athlete's foot, 100 (C)
PEARSON, F. A.: See MCGREGOR, I. A., 686
PEARSON, H. E. S.: L-Triiodothyronine, 657 (C)
PEARSON, R. S. B.: Management of asthma, 156
"Pedoscope." See Radiology, x-ray fluoroscopes
Pellagra caused by isoniazid (R. J. Harrison and M. Feiwel), 852 (O)
Penicillin, severe reaction to, 722; 1070 (C)
Penicillin V and diabetes, 997 (C)
— blood levels after oral administration (free acid) in children (E. J. Holborow, E. G. L. Bywaters, and G. D. Johnson), 1338 (O); 1355 (A)
Penis, hypospadias, treatment, 240 (C)
PENNA, H. G.: Treatment of barbiturate poisoning, 1365 (C)
PENNY, A. E.: Twopenny-halfpenny advertising, 941 (C)
PENNY, W. M.: Medical evidence at inquests, 767 (C), 942 (C)
PENROSE, L. S.: Effect of radiation on mutation rate, 412
— Genetical effects of radiation on human populations, 823
— See COMFORT, A., 1173

PERITIC ULCER:
ABO blood groups and secretor character; population and sibship studies (C. A. Clarke and others), 725 (O); 757 (L)
Bad gastroscopies (V. J. Kinsella), 1277 (O); 1428 (C)
Blood groups (D. A. P. Brown, A. G. Melrose, and J. Wallace), 135 (O)
Effect of change from "summer" time on diet, 768 (C)
Late results of vagotomy combined with gastrojejunostomy or pyloroplasty in treatment (J. A. L. Davies), 1086 (O); 1366 (C), 1548 (C)
Of oesophagus; perforation into pericardial cavity; report of case (D. D. Gellman and K. Silberstein), 1413 (O)
Treatment, 238

Percentile; meaning of the term, 188
Periodic syndrome, 42 (C), 359 (C)
Peritoneoscopy; evaluation, with report of 136 cases (R. S. Handley and A. W. Nurick), 1211 (O)
Peritonitis caused by perforation of simple ulcers of ileum (J. H. Wrigley), 924
— recovery four years after bilateral transplantation of ureters (W. M. Keynes and J. N. Harcourt-Webster), 1463 (O)
PERRY, Helen S., and GAWEL, Mary L. (Editors): *The Interpersonal Theory of Psychiatry*, by H. S. Sullivan, 1223
— *The Psychiatric Interview*, by H. S. Sullivan, 1223
PERRY, W. L. M., and PARISH, H. J.: Abbreviated titles for serological products, 38
Personality and cancer, 357 (C)
Pes planus in children; treatment, 1132
PETERS, C. D.: Tranquillizers, 998 (C)
Pethidine addiction, treatment of, 957
— as supplement to nitrous oxide in anaesthesia, 1327
Pfizer Postgraduate Grants, 53
Phaeochromocytoma, 230
— diagnosis; colorimetric method (G. P. Burn and E. O. Field), 1152 (O)
Phenoxymethamine hydrochloride; action on the peripheral circulation (R. S. Duff), 857 (O)
Phenyl-iso-butyl-n-p-hydroxy epedrine, comparison with intra-arterial oxygen as vasodilator, 1448
Phenytoin sodium therapy, rare complication of (J. V. Morris, S. Fischer, and J. T. Bergin), 1529

PHILLIPS, E. B.: Benzhexol in Parkinsonism, 478 (C)
PHILLIPS, K. D., and STONE, D. G. H.: Glandular fever at the age of 6 weeks, 1222
PHILLIPS, T.: Recurrence of tetanus, 714 (C)
Phosphaturia, management of, 1009
Photography: *British Journal Photographic Almanac*, 405
— *Physics in Medicine and Biology*, 1067
Physiology; international congress in Brussels, 414
— *Principles of Human Physiology*, 12th ed. (E. H. Starling), 1042
— *Textbook of Medical Physiology* (A. C. Guyton), 646
Pica in a child; cause and treatment, 893; 1070 (C)
PICK, A.: See KATZ, L. N., 866
PICKERILL, Cecily M.: See PICKERILL, H. P., 240
PICKERILL, H. P., and PICKERILL, Cecily M.: Treatment of hypospadias, 240 (C)
PICKERILL, Henry Percy, obituary of, 483
PICKERING, G. W.: The purpose of medical education, 113 (O); 298 (C), 362 (C), 420 (C), 824 (C), 940 (C), 1116 (C)
— Aetiology of hypertension, 223
— review of *Medical Research: A Midcentury Survey*, 1530
PICKLES, W. N.: College of General Practitioners, 174 (C)
PICKWORTH, F. A.: Unconscious thought?, 605 (C)
PINCUS, G. (Editor): *Recent Progress in Hormone Research. Proceedings of 1954 Laurentian Hormone Conference*, vol. XI, 215
PINEY, A.: Nocturnal angina, 1070 (C)
— Treatment of iron-deficiency anaemia, 1118 (C)
Pink disease: Sympathin excretion, urinary, of normal infants and infants with pink disease (J. W. Farquhar, T. B. B. Crawford, and W. Law), 276 (O)
PINKERTON, J. H. M.: See ARNEAUD, J. D., 792
"Pipanol." See Benzhexol hydrochloride
Piperazine adipate in treatment of whipworm infections, 1159
— mass therapy in threadworm infestations (R. D. Hill), 1156 (O); 1369 (C)
— citrate in treatment of whipworm infections, 1159
— compounds, trial in treatment of whipworm infections (A. G. Hucker and F. D. Schofield), 1159 (O)
— low toxicity, 550 (C)
— phosphate in treatment of whipworm infections, 1159
— sebacate in treatment of whipworm infections, 1159
Pipes, frozen, 1358 (A)
PIRIE, Antoinette, and van HEYNINGEN, Ruth: *Biochemistry of the Eye*, 405
Pituitary: Hypopituitarism, 8
— cerebral disturbances in, 680
Pityriasis capitis, 92 (A)
Placebos, 157
Placentalgia, 1010
Plague: Zoonoses as a study in ecology; with special reference to plague, relapsing fever, and leishmaniasis (R. B. Heisch), 669 (O)
PLATT, B. S.: Review of *Infant Nutrition in the Subtropics and Tropics*, by D. B. Jelliffe, 86
PLATT, R.: Review of *Modern Views on the Secretion of Urine. The Cushman Memorial Lectures*, edited by F. R. Winton, 866
Pneumoconiosis: Fibrosis, massive, progressive, 417 (C)
— *Pneumoconiosis: Procedure for Claiming Benefit*, 890
— Respiratory symptoms and pulmonary disability in an industrial town; survey of a random sample of the population (I. T. T. Higgins, P. D. Oldham, A. L. Cochrane, and J. C. Gilson), 904 (O); 1119 (C), 1241 (C), 1487 (C)
Pneumonia, graphs (vital statistics), 557, 1006, 1184, 1314, 1496, 1556
— staphylococcal, in adults (W. Hausmann and A. J. Karlish), 845 (O); 867 (L)
— treatment; comparison of tetracycline with chlortetracycline; report from the City General Hospital, Sheffield, 1146 (O)
Pneumoperitoneum, therapeutic, 1534 (A)
POGGE, R. C.: "Meratran," 361 (C)
Poisoning. See Toxicology
Poland: Medical services and conditions (R. H. Dobbs), 1230; 1426 (C)
— visit of Sir Robert Macintosh and Professor Ian Aird, 719
POLE, K. F. M.: Tests for drunkenness, 1056 (C)

POLIOMYELITIS:
Acute, graphs (vital statistics), 51, 108, 185, 251, 312, 370, 427, 487, 557, 609, 664, 718, 775, 833, 889, 948, 1005, 1066, 1127, 1185, 1248, 1437
Early management, 175 (C), 304 (C), 417 (C), 657 (C), 828 (C), 997 (C)
In Cork, 421 (C)
In suburban Surrey; clinical and epidemiological observations in the light of virus isolation from faeces (A. F. Huston, J. B. Morwood, G. J. Christofinis, and W. Wood), 629 (O)
Incidence; relation to environment, 255
Infection from swimming-baths, 614
Live vaccine ready for mass trial, 949
Notifications (vital statistics), 184, 251, 426, 486, 557, 609, 664
Paralytic, and physical activity, 871 (A)
Respiratory problems, 163
Round-table conference, 153

POLIOMYELITIS (continued):
Spread by contact, 32 (L)
Statistics (parliamentary notes), 1064, 1495
Treatment, domiciliary, 241 (C)
Vaccination, 225
— Anti-poliomyelitis Vaccination, 981
— belated completion of, 1069
— parliamentary note, 1183
— resumption of injections, 1248, 1496
Vaccine; cheap propaganda on polio, 929 (L)
— manufacture, 371
— manufacturers (parliamentary note), 1436
— Salk vaccine supplies (parliamentary note), 366
— single doses, 109
— supplies for general practitioners, 1557
— Vaccines, address by A. B. Sabin, 1006
— in the Commonwealth, 313
Virus; location during alimentary-tract phase, 254
Viruses, attenuated, 407 (L)

POLLARD, Harold James Alexander, obituary of, 1063
POLLEY, H. F.: Present therapeutic status of cortisone and its derivatives, with special reference to rheumatic diseases, 151, 1253 (O)
POLLOCK, J. S. M.: appointed chief of the health division, United Nations Relief and Works Agency for Palestine Refugees, 1498
POLLOCK, T. M.: B.C.G. and vole bacillus vaccine, 227
Polycythaemia vera; diagnosis and treatment of Budd-Chiari syndrome in (O. FitzGerald, P. FitzGerald, D. Cantwell, and J. A. Mehigan), 1343 (O); 1354 (L)
Polymyxin: Polymyxin, Neomycin, Bacitracin (E. Jawetz), 589
POOLE, William Joseph, obituary of, 608
POPERT, A. J.: Adrenal response of patients with rheumatoid arthritis to the stress of operation and severe infection, 1110
Population: Census, 1951; Scottish marriage statistics, 595 (A)
— *Demographic Trends in Western Europe*, 5
— of world, 1047 (A)
Portal vein; perforating wound (J. W. Eadie and R. H. Thorlakson), 285
— splenoportal venography for evaluating abnormalities of portal circulation (A. K. Basu and A. Das), 916 (O)
PORTEOUS, H. B.: Benzhexol hydrochloride in Parkinsonism, 550 (C)
— and ROSS, D. N.: Mental symptoms in Parkinsonism following benzhexol hydrochloride therapy, 138 (O); 361 (C), 478 (C), 550 (C)
Postgraduate Medical School of London; courses, 537; extension appeal for funds, 1052; 1045 (L)
Postgraduate Travelling Fellowships, 1067
Post-mortem table (F. E. Camps), 656
POTTER, B. E.: Pitfalls in medicine, 1175 (C)
POTTER, C. T.: Blindness in children, 222
POWELL-TUCK, G. A.: Longer holidays, 769 (C)
POWER, J. G. P.: Atypical Weil's disease, 359 (C)
PRATAP, H. J.: Tranquillizers, 1116 (C)
PRATT, C. A.: Shoe-fitting, 714 (C)

PREGNANCY:
After complete rupture of uterus (D. H. Finlayson), 1415
Aldosterone excretion in normal and toxemic pregnancies (J. D. Martin and I. H. Mills), 571 (O)
Anaemia, intramuscular iron therapy; two-year survey (Jean M. Scott), 635 (O); 1239 (C)
— megaloblastic, treatment with vitamin B₁₂ (E. B. Adams), 398 (O)
Complicated by diabetes mellitus; review of 119 cases (A. E. M. Stevenson), 1514 (O)
Diagnosis by administration of synthetic hormones, 419 (C), 660 (C), 1118 (C)
— simple clinical test (G. D. Matthew), 979 (O); 987 (A); 1118 (C); 1489 (C)
Ectopic, diagnosis, 162
Factors influencing perinatal mortality, 1260
Fluorine requirements, 667
Hypertension, management, 162
Immunization for European going to Tropics, 721
Management after renal tubular osteomalacia treated with dihydrotachysterol (G. A. Rose), 805 (O)
Nausea and vomiting; hormonal factor as cause, 1487 (C)
Pelvic radiography risks in last month, 1499
Scientific basis for antenatal relaxation exercises, 1251
Vomiting; clinical trial of buclizine hydrochloride in treatment (M. P. Durham), 1276 (O)

PREM, D. R.: Practice in the U.S.S.R., 420 (C)

PREPARATIONS AND APPLIANCES:
Chailey Heritage combined note and x-ray trolley (E. P. Quibell), 1111
Easy lifting apparatus for helpless and heavy patients (A. B. Stewart), 1111
Occlusion clamp for intrathoracic intestinal anastomoses (K. S. Mullard), 1054
Post-mortem table (F. E. Camps), 656

PREPUCE, retraction, 1382
"Presidal," ganglion-blocking agent, in treatment of hypertension (S. Lockett), 116 (O); 418 (C)
Pressure suits in medicine, 1293 (A)

- PRESTON, P. G.: Apartheid in blood transfusion, 1487 (C)
- PRICE, J. H.: Arteriosclerosis and the McNaughton Rules, 1059 (C)
- PRIDIE, K. H.: Chondromalacia patellae complicating dislocation of patella, 169
- "Purisol." See Tolazoline
- PRITCHARD, E. K.: Diesel oil and lung cancer, 416 (C)
- "Prophylaxine." See Propantheline
- PROBERT, W. R.: Involvement of bronchi by metastatic pulmonary tumours, 299 (C)
- Probes made from galvanized iron wire, 240 (C), 482 (C)
- Procaine, oral and intravenous, 429
- sensitivity, and heart block, 893
- Proctology: International Academy of Proctology, annual prize, 1498
- Proctor Medal awarded to N. Ashton, 1128
- Propantheline bromide in primary dysmenorrhoea (T. G. E. White), 1527 (O)
- Prostate: Cancer; early diagnosis of, 1499
- function of, 995 (C), 1236 (C), 1427 (C)
- surgery; alternative approach (G. T. Watts), 1283 (O); 1488 (C)
- Prostatitis, chronic, 146 (A)
- Proteins: Total protein levels, variations in the individual (J. K. Fawcett and V. Wynn), 582 (O)
- PRUNTY, F. T. G.: Development of renal calculi, 158
- Chemical and clinical problems of the adrenal cortex, 615 (O), 673 (O); 824 (C), 1300 (C)
- Factors that influence the response of the human adrenal cortex to corticotrophin, 1110
- PRYOR, W. J.: *A Manual of Anaesthetic Techniques*, 31
- Pseudohaemophilia, 353 (A); 998 (C)
- Psoriasis: Treatment; toxic effects of mercury absorption (P. M. Inman, B. Gordon, and P. Trinder), 1202 (O); 1428 (C)
- with rauwolfia serpentina, 417 (C)
- PSYCHIATRY: see also Mental disease; Psychoneurosis; Psychosis
- Concepts of Modern Psychiatry*. First William Alanson White Memorial Lectures (H. S. Sullivan), 1223
- Institute of Psychiatry, facilities, 538
- Interpersonal Theory of Psychiatry* (H. S. Sullivan), 1223
- Neuropsychiatric observations in western Nigeria (T. A. Lambo), 1388 (O); 1420 (A)
- Psychiatric evidence in court (Sir David Henderson), 1 (O)
- Psychiatric Interview* (H. S. Sullivan), 1223
- Role in medical education (J. A. Ewing), 503 (O)
- Psycho-analysis and unconscious mental activity, 102 (C), 301 (C), 659 (C)
- *Fragments of an Analysis with Freud* (J. Wortis), 1352
- *On the Early Development of Mind*. Vol. I of Selected Papers on Psycho-Analysis (E. Glover), 31
- PSYCHOLOGY: see also Psychologist in the mental hospital (R. Hetherington), 708; 826 (C), 885 (C), 1059 (C)
- Genius, nature of (E. Jones), 257 (O)
- Medical; Tavistock Clinic, postgraduate courses, 541
- Subception, 835
- Psychoneurosis; benactyzine hydrochloride in treatment; controlled clinical trial in hospital patients (C. P. Seager and A. Leitch), 1407 (O)
- in Western Nigeria, 1391
- Psychosis, manic-depressive, treatment, 1442
- need for longer holidays, 769 (C), 941 (C)
- post-partum, 89 (A)
- Psychotherapy and the general practitioner, 235
- Puberty, age at, 1188
- PUBLIC HEALTH:
- Preventive medicine in hospital practice, 233
- Principles and methods of international health work (H. S. Gear), 471
- Public health services in relation to general practitioner, 233
- see also Society of Medical Officers of Health
- Teaching of social and preventive medicine (C. M. Fletcher), 497 (O); 712 (C)
- Pudendal block for low forceps, 1559
- indications for use in labour (I. R. Ricker), 78 (O)
- Puerperal sepsis; haemolytic streptococci on neonatal umbilicus (W. Kwantas and J. R. E. James), 576 (O); 594 (A); 711 (C)
- neonatal umbilicus as source of streptococcal infections in a maternity unit (Joan M. Boissard and B. Eton), 574 (O); 594 (A); 711 (C)
- Puerperium; anaemia, megaloblastic; treatment with vitamin B₁₂ (E. B. Adams), 298 (O)
- psychosis, 89 (A)
- PULLAR-STRECKER, H.: Apomorphine treatment for alcoholism, 1238 (C)
- Aetiology of chronic alcoholism, 1549 (C)
- Pulmonary artery, oedema due to angiocardioraphy; treatment with intravenous hydrocortisone (E. M. M. Besterman, J. C. Leonard, and P. Wood), 695 (O)
- PURCHASE, W. B.: Medical evidence at inquests, 480 (C)
- "Puri-nethol." See Mercaptopurine

- PURKYN, Jan; letters requested, 421 (C)
- Purpura, thrombocytopenic, and platelet agglutinins, 1357 (A); 1543 (C)
- PURSER, H. M.: See CAMPBELL, W. A. B., 1115
- Pylorus, stenosis, aetiology, 593 (A)
- PYRAH, L. N.: Renal calculi, 158
- Pyrexia of unknown origin; study of a series of cases (J. V. O. Reid), 23 (O); 180 (C), 245 (C)
- Pyridoxine; clinical actions and toxic effects, 188
- Pyrimethamine poisoning, 1486 (C)

Q

- Q fever, 1226 (L)
- QUASTEL, J. H.: See ELLIOTT, K. A. C., 141
- QUIBELL, E. P.: The physically handicapped child; functional assessment of the disability as an aid to planning, 991
- Chailey Heritage combined note and x-ray trolley, 1111

R

- RADIATION:
- Chemical protection, 647 (L)
- Dosage from television, 56
- Effect on mutation, 412
- Genetic effects on humans, 823
- Hazards, 41 (C), 362 (C), 549 (C)
- new safety measures planned (parliamentary note), 183
- of nuclear power stations, 293 (A)
- Irradiation-induced malignant hypertension cured by nephrectomy (W. M. Levitt and S. Oram), 910 (O); 1176 (C), 1236 (C), 1304 (C), 1368 (C)
- Leakage from diagnostic tubes, 41 (C)
- Leukaemia and exposure to x rays, 704 (L)
- Occupational hazards, 229
- Protection, 411 (A); 416 (C)
- and radiosensitizers; Cambridge meeting of Faculty of Radiologists, 39
- Quantitative examination of bone marrow in guinea-pigs after gamma irradiation; preliminary note (P. F. Harris), 1032 (O)
- Radiation-induced cancer in man, 1361
- Radioactive key-light, 1302 (C)
- Radiological Protection Service, 229
- Shoe-fitting x-ray fluoroscopes; radiation measurements and hazards (E. D. Dyson), 269 (O); 420 (C), 479 (C), 714 (C), 826 (C)
- Somatic and genetic effects, 229
- Units of dosage, 986 (A)
- RADIOLOGY: see also Radiation
- Aortography, translumbar; dissection of aorta as complication (H. Gaylis and J. W. Laws), 1141 (O); 1368 (C)
- Cerebral angiography in a neurosurgical service (S. Dimant, C. P. Moxon, and N. A. Lewtas), 10 (O)
- Chailey Heritage combined note and x-ray trolley (E. P. Quibell), 1111
- Fluoroscopy for children, 363 (C)
- Fluoroscopy in Diagnostic Roentgenology* (O. Deutschberger), 1162
- Intravenous cholangio-cholecystography with "biligradin"; value compared with oral contrast method (R. W. W. Hardie and M. Israelski), 779 (O)
- Iodine, intravenous, allergy to, 1178 (C)
- Leakage radiation from diagnostic tubes, 41 (C)
- Mass radiography in prevention of tuberculosis, 227
- proper uses, 1497
- value in diagnosis of tuberculosis, 101 (C), 551 (C)
- Pelvic radiography, risks in late pregnancy, 1499
- Pulmonary artery, oedema due to angiocardioraphy; treatment with intravenous hydrocortisone (E. M. M. Besterman, J. C. Leonard, and P. Wood), 695 (O)
- Radiology of the Alimentary Tract in Infancy* (R. Astley), 1289
- X-ray fluoroscopes for shoe-fitting; radiation measurements and hazards (E. D. Dyson), 269 (O); 420 (C), 479 (C), 714 (C), 826 (C)
- Radiotherapy: High energy radiation unit, 487
- megavoltage, 88 (L)
- new centre at Sheffield, 1557
- units of dosage, 986 (A)
- Radium therapy; jig for inserting radon seeds into bladder, 102 (C), 244 (C), 303 (C)
- Radon from coal, 371
- RAISTRICK, H., appointed professor emeritus, University of London, 253
- RANKIN, N. E., and DANCE, Jean: Case of acute haemorrhagic leuco-encephalitis, 808
- RAPER, A. B.: See LEHMANN, H., 333, 882
- Rauwolfia alkaloids, side-effects, 112
- serpentina, in treatment of psoriasis, 417 (C)
- RAVDIN, I. S., made honorary fellow, Royal College of Surgeons of England, 427
- RAYMOND, M. J.: Case of fetishism treated by aversion therapy, 854 (O); 1174 (C), 1301 (C), 1366 (C)
- Raynaud's disease, management, 1317

- READ, G. D.: Primary cervical dystocia, 43 (C)
- Reading Pathological Society, annual oration, 1067
- Recto-sigmoid, "strawberry lesion" (G. K. Thomas), 209 (O); 421 (C)
- Rectovaginal septum, rupture at parturition (M. R. Neely), 1288; 1543 (C)
- Rectum, carcinoma, conservative resection, 158
- results of treatment (E. G. Muir), 742 (O)
- Refresher Course for General Practitioners. Specially Commissioned Articles from the British Medical Journal*. Third collection, 1473
- Refuse: Composting of household waste, 758 (L); 940 (C)
- Registrar-General's Statistical Review of England and Wales for 1953*, Text Volume, 932 (A)
- Rehabilitation: Employment of the rheumatoid arthritic (F. S. Cooksey and D. A. Brewerton), 1169; 1369 (C)
- in the R.A.F., 1294 (A)
- *Report of Committee of Inquiry on Rehabilitation, Training, and Resettlement of Disabled Persons*, 1105 (L)
- REID, H.: Prolonged constipation in children, 374 (C)
- REID, H. A.: Sea-snake bites, 73 (O)
- REID, J. J. A.: Regular use of laxatives by school-children, 25 (O); 36 (A); 245 (C)
- REID, J. V. O.: Pyrexia of unknown origin; study of a series of cases, 23 (O); 180 (C), 245 (C)
- Subclinical oedema, 243 (C)
- REID, L. M. A.: Pathological changes in chronic bronchitis, 1540
- REILLY, M.: Anterior approach for bilateral adrenalectomy, 45 (C)
- Relapsing fever, transmission, 669
- Relaxin, 707 (A); 1171 (C)
- REMUNERATION:
- Claim, 216 (L); 106, 309 (parliamentary notes)
- crisis of confidence, 1290 (L)
- leading article in *The Times*, 406 (L)
- Minister's rejection, 144 (L); 182 (parliamentary note); 350 (L)
- Minister's view, 291 (L)
- Contractual obligations of Spens Reports, 1043 (L)
- Professional cohesion, 1165 (L)
- Reform, remuneration, and unity of purpose, 1417 (L)
- RENNIE, J. B.: Treatment of chronic renal oedema, 154; 1506 (O)
- RENNICK, J. H.: See LAWLER, Sylvia D., 714
- REPOUD, A.: Biological repercussions of the new forms of leisure activity, 599
- RESEARCH:
- Direction of research establishments, 185, (correction, 374)
- Directory of British research, 1497
- Experimental Design and its Statistical Basis* (D. J. Finney), 86
- Medical; co-operative research in the Commonwealth, 349 (L)
- *Medical Research: A Midcentury Survey*, 1530
- see also Medical Research Council
- Salaries of research workers (parliamentary note), 249
- Respiration, artificial, 362 (C)
- gases administered in, 176 (C)
- breath-holding test, 766 (C), 1177 (C)
- respiratory symptoms and pulmonary disability in an industrial town; survey of a random sample of the population (I. T. T. Higgins, P. D. Oldham, A. L. Cochrane, and J. C. Gilson), 904 (O); 1119 (C), 1241 (C), 1487 (C)
- Respiratory diseases: Farmer's lung in Radnor and North Breconshire; report of ten cases (D. I. Williams and P. P. Mulhall), 1216 (O)
- infections, acute; symposium for general practitioners, 1480
- paralysis, management of, 162
- tract; foreign bodies, inhaled (C. L. N. Robinson and W. W. Mushin), 324 (O); 714 (C)
- infections, recurrent; prophylaxis, 44 (C)
- management of acute obstruction; with report of case (A. E. W. Gregson and A. J. Gunning), 1150 (O); 1483 (C)
- viruses, 1474 (L)
- Resuscitation; an external defibrillator, 468 (A)
- Retinitis, diabetic, treatment and prognosis, 187
- Retrolental fibroplasia; claims for cure (parliamentary note), 249
- Rhesus factor and haemolytic disease, 161
- Rheumatic fever: *Splenin A in Rheumatic Fever. The Testing of Splenin A as an Anti-inflammatory Agent* (A. F. Coburn, Lucile V. Moore, Judith Wood, and Mary Roberts), 984
- Rheumatism: Present therapeutic status of cortisone and its derivatives (H. F. Polley), 1253 (O)
- Rheumatoid arthritis. See Arthritis, rheumatoid
- RHIND, Sydney Devenish, obituary of, 715
- Rhinitis, allergic; treatment, 55
- alternating nasal obstruction, 1069
- RHOADS, C. P.: The soluble puzzle of cancer control, 93
- presented with Walker prize, 949
- Rhodesia and Nyasaland: New medical school, 487
- Riboflavin in migraine, 550 (C)
- Richard Fox Linton Memorial Prize, 1316
- RICHARDS, Shelagh M.: See RENT, F. J., 1537

- RICHARDSON, D. W., awarded Nobel Prize in Medicine, 990 (A)
- RICHARDSON, R. W.: See COPE, E., 638, 1428
- RICHARDSON, W. W.: Intra-arterial thiopentone injection in a patient with anomalous forearm vessels, 754
- RICKARDS, J. F.: Neostigmine-resistant curarization, 1114 (C)
- RICKETTS, C. R.: See JEAVONS, S. M., 1016
- RIDDELL, R. W.: Mycotic diseases, 170
- Fungous diseases of Britain, 783 (O); 816 (A)
- RIMINGTON, C.: The biosynthesis of haemoglobin, 189 (O)
- RIPKA, M. D.: Medical education, 1175 (C)
- RITCHIE, A. C. P.: See FRANKLIN, R., 983
- "River blindness." See Onchocerciasis
- Road accidents. See Accidents
- ROB, C. G.: Gangrene due to venous thrombosis and arterial disease, 880
- Place of direct surgery in treatment of obliterative arterial disease, 1027 (O)
- See EDWARDS, C., 1265
- See OWEN, K., 273
- ROBERTS, F.: Morbidity yesterday and to-day, 653
- ROBERTS, Mary. See COBURN, A. F., 984
- ROBERTSON, P. W., and LEONARD, B. J.: Some delayed complications of inoculation, 1029 (O)
- ROBIN, A. A.: Suicide, 999 (C)
- ROBINSON, Alice M.: See SPENCE, A. W., 1348
- ROBINSON, C. L. N., and MUSHIN, W. W.: Inhaled foreign bodies, 324 (O); 714 (C)
- ROBINSON, S.: Paediatric anaesthesia, 360 (C)
- ROBSON, P. N.: Hyperextension and haematomyelia, 848 (O)
- Rockefeller Foundation: Aid to Hungarian refugees, 1497
- grants, 558, 1315
- ROCKER, I.: Obstetric indications for use of pudendal nerve block analgesia, 78 (O)
- ROGERS, A. T.: Public health services and the general practitioner, 233
- ROTH, A. I.: Herpes zoster after fractured spine complicating E.C.T., 865
- ROLAND, P. E.: Chorda tympani syndrome, 1176 (C)
- ROLLASON, W. N.: Asphyxia due to faulty apparatus, 658 (C)
- Paediatric anaesthesia, 769 (C)
- ROSE, Doris: Acute bilateral retrobulbar neuritis, 345
- ROSE, F. M.: Medical evidence at inquests, 356 (C), 606 (C), 1057 (C)
- ROSE, G. A.: Renal tubular osteomalacia; treatment of a case with dihydrotachysterol and management of a subsequent pregnancy, 805 (O)
- ROSENBERG, L.: High-grade defects, 176 (C)
- ROSENHEIM, M. L.: Phaeochromocytoma, 230
- ROSENTHAL, L.: Atrial septal defect with mitral stenosis (Lutembacher's syndrome) in a woman of 81, 1351
- ROSS, C. M.: See DAVEY, T. F., 65
- ROSS, D. N.: See PORTEOUS, H. B., 138
- ROSTEN, B. M. D.: Enzyme tests for glycosuria, 940 (C), 1238 (C)
- ROTHSCHILD, Lord: Fertilization, 701
- ROVING'S sign (W. W. Davey), 28 (O); 180 (C), 243 (C), 303 (C)
- ROWBOTHAM, G. F.: Tests for drunkenness, 941 (C)
- ROWE, J. T.: Piercing for ear-rings, 56 (C)
- Royal Australasian College of Physicians: Members admitted, 311
- Royal Australasian College of Surgeons: Fellows admitted, 369
- ROYAL COLLEGE OF OBSTETRICIANS AND GYNAECOLOGISTS:
- Annual dinner, 833
- Appointments, 1315
- Diplomas granted, 1555
- Elections, 51, 313, 369
- Fellows admitted, 51
- Honorary Fellows admitted, 833
- Libel action against *Daily Sketch* settled (medico-legal note), 309
- Library, 1497
- Members admitted, 51, 369, 1555
- ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH:
- Appointments, 1557
- Fellows elected, 1554
- Members elected, 369, 1554
- Presentation to W. J. Pilcher, 313
- ROYAL COLLEGE OF PHYSICIANS OF IRELAND:
- Elections, 1007
- Fellows admitted, 311
- Licences granted, 369
- Members admitted, 311
- Officers elected, 1552
- ROYAL COLLEGE OF PHYSICIANS OF LONDON:
- Bisset Hawkins Medal presented to G. S. Wilson, 1006
- Croonian Lectures, 895, 958
- Diplomas granted, 425, 1554
- Elections, 313, 425, 1067
- Harveian Oration, 949
- Humphrey Davy Rolleston Lectures, 615, 673
- Lecturers appointed, 425
- Licences conferred, 425, 1554
- Members admitted, 425, 1554
- Scholarship awarded, 425
- Watson Smith Lecture, 1558

- ROYAL COLLEGE OF SURGEONS OF EDINBURGH:
- Elections, 1007, 1554
- Fellows admitted, 311, 369, 1554
- ROYAL COLLEGE OF SURGEONS OF ENGLAND:
- Annual general meeting, 1178 (C); 1541
- Arnott Demonstratorships, 369
- Arts and Gale Lectureships, 369
- Begley Prize, 311
- Cecil Jolliffe Prize awarded to P. R. Allison, 949
- Diplomas granted, 311, 425, 1554
- Erasmus Wilson Demonstratorships, 369
- Fellows admitted, 311
- Handcock Prize awarded, 425
- Honorary fellowship conferred on I. S. Ravdin, 427
- Honorary medals awarded, 1186
- Hunterian professorships, 368
- Lister Medal awarded to Sir Stewart Duke-Elder, 990
- Lord Nuffield's gift to Faculty of Dental Surgery, 949
- Medals awarded, 311
- Nuffield College of Surgical Sciences, 1497, 1542
- Postgraduate activities, 1542
- education, pamphlet, 891
- Prizes, 1554
- Provincial meeting in Cardiff proposed, 185
- Supplemental Charter, 1541
- Walker Prize presented to C. P. Rhoads, 949
- ROYAL COLLEGE OF SURGEONS IN IRELAND:
- Abraham Colles Lecture, 1316
- Fellows admitted, 369
- Licences granted, 369
- ROYAL FACULTY OF PHYSICIANS AND SURGEONS' GLASGOW:
- Fellows admitted, 946, 1554
- Office bearers elected, 1186
- Wellcome Trust grant to library, 949
- Royal Free Hospital; epidemic virus infection, 157
- School of Medicine, facilities for students, 529; inaugural address at opening of new session, 878
- Royal Institute of Public Health and Hygiene: P. Drinker appointed Harben lecturer for 1956, 427; diploma courses, 541, 545
- Royal Masonic Hospital: Foundation stone laid, 313
- Royal Medical Benevolent Fund, Christmas appeal, 824 (C), 1305 (C)
- Royal Medico-Psychological Association: Maudsley Bequest Lecture, 1; annual dinner, 252
- Royal Northern Hospital; centenary dinner, 53
- ROYAL SOCIETY:
- Commonwealth bursaries, 110
- Council elections, 1379
- Instrument design, grants for, 1498
- Lecturers, 949
- Royal Medal, 1185
- Royal Society of Health; Elections, 1129
- ROYAL SOCIETY OF MEDICINE:
- Financial position, 1007
- Gowers Memorial Lecture, 1168 (A)
- Jenner Medal awarded to P. Stocks, 1129
- Library facilities, 665
- regulations revised, 54
- Nichols Fellowship: Prize for registrars in anaesthetics, 1067; awarded to Sheila M. Wilson, 611
- William Gibson Scholarship for medical women, 1249
- Royal Society of New Zealand: Sir Sydney Smith elected honorary member, 776
- Royal Victoria Infirmary, Newcastle-upon-Tyne, damage during party (parliamentary note), 250
- Royal Women's Hospital, Melbourne, centenary of, 1209
- Rubella, deliberate infection of girls, 243 (C)
- RUBIN, I. C., and NOVAK, J.: *Integrated Gynecology: Principles and Practice*, 517
- RUBINSTEIN, L. J.: Fungous infections of the central nervous system, 170
- RUDOLF, G. de M.: Preparation for marriage, 244 (C)
- Rumanian Society of Medical Sciences: M. Critchley elected honorary member, 776
- RUMSEY, H. St. J.: *Cardiac Diagnosis: A Physiologic Approach*, 984; 1176 (C)
- RUSS, S.: The insatiable critic, 180 (C)
- RUSSELL, B.: Exploitation of fear in advertising, 46 (C)
- Glycyrrhetic acid, 1113 (C), 1483 (C)
- RUSSELL, Dorothy S.: Pathology of endocrine tumours causing hypertension, 231
- review of *Human Pathology*, 8th ed., by H. T. Karsner, 31
- RUSSELL, J. K.: Teaching in the gynaecological outpatient department, 506 (O)
- SMITH, D. F., and YULE, R.: Foetal exsanguination associated with surgical induction of labour, 1414 (O)
- RUSSELL, W. R.: Freudian concepts and brain physiology, 415 (C)
- Pavlov's works, 1482 (C)
- Russia. See U.S.S.R.
- RYCROFT, B. W.: Surgical treatment of epiphora, 167
- RYLE, J. C.: Is tonsillectomy necessary?, 603 (C)

S

- SACHS, L., SERR, D. M., and DANON, Mathilde: Analysis of amniotic fluid cells for diagnosis of foetal sex, 795 (O); 815 (A)
- St. Andrews University. See Universities, Sr. Andrews
- St. Bartholomew's Hospital Medical College, facilities for students, 531
- St. George's Hospital Medical School, facilities for students, 530
- St. George-in-the-East Hospital, closing of, 421 (C)
- St. John Ambulance Brigade: Presentation to Major A. C. W. Knox, 1129
- St. John of Jerusalem, Order of, appointments and promotions, 97
- St. Luke's Day, 942 (C)
- St. Mary's Hospital Medical School, facilities for students, 530
- St. Teresa's Hospital, Wimbledon, new private wing for obstetrical patients, 1558
- St. Thomas's Hospital; magnetic call system, 833
- St. Thomas's Hospital Medical School, facilities for students, 531
- SAKLATVALA, D.: Twopenny-halfpenny advertising, 941 (C)
- Salmonella bacteraemia, 1009
- food-poisoning problems (Sir William Savage), 317 (O); 481 (C), 603 (C)
- Salt retention, role of oestrogens in, 220 (A); 361 (C)
- SAMANT, S.: Unconscious mental activity?, 102 (C), 659 (C)
- SAMPEY, A. W.: Accidental vaccination, 45 (C)
- SANDES, G. M.: Troublesome staphylococci, 999 (C)
- SANDLER, G.: A rare type of muscular dystrophy, 981
- Sarcoidosis; diagnosis and treatment (D. G. James), 900 (O); 931 (A); 1237 (C)
- SAUNDERS, J. C.: Poliomyelitis in Cork, 421 (C)
- SAVAGE, D.: A family history of uterine and gastrointestinal cancer, 341 (O)
- SAVAGE, O.: Effect of prolonged adrenal-stimulation therapy upon the course of rheumatoid arthritis, 1110
- SAVAGE, Sir William: Problems of salmonella food-poisoning, 317 (O); 481 (C), 603 (C)
- SAVILL, Agnes: Alexander the Great, 245 (C)
- SAVILLE, P. R.: Psychotherapy and the general practitioner, 235
- SAWITZ, W. G.: *Medical Parasitology*, 2nd ed., 1416
- Scabies, increased incidence, 1117 (C), 1427 (C)
- treatment, 1559
- SCADDING, J. G.: Patterns of lung involvement, 1480
- SCALES, J. T., TOWERS, A. G., and GOODMAN, N.: Development and evaluation of a porous surgical dressing, 962 (O); 988 (A)
- Scarlet fever, graphs (vital statistics), 251, 426, 718, 889, 1065, 1248, 1378, 1496
- SCHAUMANN, O.: Some new aspects of the action of morphine-like analgesics, 1091 (O)
- SCHÉE, L. A., resignation as surgeon-general of United States Public Health Service, 109
- SCHIFFRIN, M. J. (Editor): *Management of Pain in Cancer*, 1103
- SCHILLING, R. S. F.: Assessing the health of the industrial worker, 764
- Schizophrenia in uniovular twins; recovery (I. Atkin), 1041
- SCHMIDT, F. R.: *Clinical Selections in Dermatology and Mycology*, 1042
- SCHOFIELD, F. D.: See HUCKER, A. G., 1159
- SCHOFIELD, T. T.: Hazards of dental fillings under local analgesia, 112 (C)
- Schoolchildren: Infectious diseases and head-master's powers, 894
- medical inspection, legal aspects, 778
- SCHOU, M.: "Meratran," 657 (C)
- SCHWEITZER, A.: *More from the Primeval Forest*, 1289
- Schweitzer Medal of American Animal Welfare Institute awarded to C. W. Hume, 949
- Scientific exhibition B.M.A. Annual Meeting, 1957, 990 (A)
- Sclerosis, disseminated, cortisone and corticotrophin in treatment, 429
- treatment, 952
- tuberculous, familial (W. M. Jordan), 132 (O)
- Scoliosis, paralytic, prognosis and treatment, 1442
- SCORER, C. G.: Divine healing, 178 (C)
- SCOTLAND:
- Board of Control; appointment of deputy commissioner, 1067
- Cancer registration (parliamentary note), 1312
- Census 1951, vol. V. *Fertility of Marriage*, 595 (A)
- Conjoint Board diplomas granted, 369
- Department of Health: Appointments and retirements, 313
- Hospital extensions (parliamentary note), 1495
- Medical practice in Scotland (parliamentary note), 248
- Medical schools, 534
- Quarterly returns (vital statistics), 108, 1006
- Scottish Society of Anaesthetists, 186
- Scottish Society of the History of Medicine, report of proceedings, 1394
- SCOTT, A.: See CHAVE, S. P. W., 1543
- SCOTT, Alexander, obituary of, 1244
- SCOTT, D. G., and HILL, A. G. S.: Antibody to synovial tissue, 100 (C)

- SCOTT, F. E. T.: Review of *Splenin A in Rheumatic Fever. The Testing of Splenin A as an Anti-inflammatory Agent*, by A. F. Coburn, Lucile V. Moore, Judith Wood, and Mary Roberts, 984
- SCOTT, Sir Henry Harold, obituary of, 422
- SCOTT, J. A., appointed Honorary Physician to H.M. the Queen, 54
- SCOTT, C.: Structural effects of stress, 168
- SCOTT, Jean M.: Intramuscular iron therapy in anaemia of pregnancy; two-year survey, 635 (O); 1239 (C)
- Treatment of iron-deficiency anaemia, 996 (C)
- SCOTT, W. E. B., and CLARKE, J. C.: Neostigmine-resistant curarization, 1174 (C)
- Scurf, remedies for, 92 (A)
- Sea: Survival of men from ships lost at sea, 1044 (L)
- Sea-snake bites (H. A. Reid), 73 (O)
- SEAGER, C. P., and LEITCH, A.: Benactyzine in psychoneurosis; a controlled clinical trial in hospital patients, 1407 (O)
- Secretor character in duodenal ulcer, 727
- SEGEI, N.: See BRADLOW, B. A., 197
- Selenium poisoning, cause and treatment, 1499
- Selwyn College, list of old students, 942 (C)
- SELYE, H., and HEUSER, G. (Editors): *Fifth Annual Report on Stress, 1955-56*, 464
- SEMPLE, J. E.: Frequency in the female due to urethro-trigonitis caused by intestinal infection, 696 (O)
- SEN, S.: Natural childbirth, 1545 (C)
- Sensory deprivation, 1224 (L)
- Septic tanks, 722
- Serotonin. See Hydroxytryptamine
- Serous cavities, fluid exchange in, 1381
- SERR, D. M.: See SACHS, L., 795
- Serum: Abbreviated titles for serological products (W. L. M. Perry and H. J. Parish), 38
- C-reactive protein, 145 (A); 418 (C)
- Services. See Armed Forces; H.M. Oversea Civil Service
- SEVILLE, R. H.: Contact dermatitis from chlorpromazine, 1432 (C)
- Sewage: Septic tanks; 722
- Sex diagnosis; analysis of amniotic fluid cells for diagnosis of foetal sex (L. Sachs, D. M. Serr, and Mathilde Danon), 795 (O); 815 (A)
- sex chromatin in oral smears (A. D. Dixon and J. B. D. Torr), 799 (O); 815 (A)
- factor in coronary artery disease, 98 (C), 551 (C), 768 (C)
- Sexual aberrations: Fetishism treated by aversion therapy (M. J. Raymond), 854 (O); 1174 (C), 1301 (C), 1366 (C)
- abnormalities; recent advances in problems of intersexuality, 9
- intercourse in old age, 429
- Sexual Offences Act, 1956, 888
- SHACKLETON, P.: See BOURNE, J. G., 1485
- SHAIKH, S. M.: Preservation of parasite ova, 1545 (C)
- SHANKS, S. C.: Medical litigation, past and present, 765
- SHAPIRO, J. H. L.: Apartheid in blood transfusion, 769 (C)
- SHARP, A. A.: Platelet agglutinins and thrombocytopenic purpura, 1543 (C)
- SHAW, D. B.: Serum proteins in pulmonary tuberculosis, 47 (C)
- SHAW, S.: See BELL, A. D., 692
- Sheffield: Radiotherapy centre, 1557
- University. See Universities, Sheffield
- SHEPHERD, I. D. D.: Grammar school for physically handicapped, 245 (C)
- SHEPPARD, P. M.: See CLARKE, C. A., 725
- SHERA, A. G.: "Strawberry lesion" of the recto-sigmoid, 421 (C)
- SHERLOCK, Sheila: Treatment of cirrhosis of liver, 155
- review of *The Biliary Tract: With Special Reference to the Common Bile Duct*, by J. A. Sterling, 405
- SHERWOOD, P. H.: Athlete's foot, 360 (C)
- SHERWOOD, S. L.: Prefrontal leucotomy, 885 (C)
- SHILLITOE, A. J.: Divine healing, 44 (C)
- SHIPLEY, R. A.: See DORFMAN, R. I., 1416
- Ships without doctors, medical advice for, 363 (C), 552 (C)
- Shock: Value of "hibernation" in severely shocked patients (Sheila Kenny), 211 (O); 419 (C), 999 (C)
- Shoe-fitting x-ray fluoroscopes; radiation measurements and hazards (E. D. Dyson), 269 (O); 420 (C), 479 (C), 714 (C), 826 (C)
- Shoes for the young, 168, (correction), 312
- SHOESMITH, J. H., and SHUCKSMITH, H. S.: Enteritis and polyarthritis following partial gastrectomy, 404
- Shoulder, frozen, cause of, 1009
- painful, 168
- SHUCKSMITH, H. S.: See SHOESMITH, J. H., 404
- SHUTE, P. G.: Species diagnosis of malaria, 1171 (C)
- Sickle-cell trait with haemolytic anaemia (A. A. Chazan and J. G. A. McSorley), 283 (O)
- "Sigmamycin," 1007
- SIKER, E. S.: Analgesic supplements to nitrous oxide anaesthesia; a review, 1326 (O)
- SILBERSTEIN, K.: See GELLMAN, D. D., 1413
- Silicone barrier cream, 99 (C)
- SILVERSTONE, Maurice, obituary of, 771
- SIMMONDS, F. A.: Painful shoulder, 168
- SIMON, G.: Radiological appearances in chronic bronchitis, 1540
- SIMPSON, Mary C.: Troublesome staphylococci, 1057 (C)
- SIMPSON, R. E. H.: Herpes zoster, 1115 (C)
- SIMPSON, Robert Gordon, obituary of, 1374
- SIMPSON, S. L.: Adrenal cortical function, 824 (C)
- See FOSS, G. L., 1426
- SIMPSON, T. Y.: Liquorice-all-sorts as anastomotic aid, 1175 (C)
- SINGER, C.: 80th birthday, 1067
- SINGER, Karl, obituary of, 246
- SINKER, F. S.: Divine healing, 178 (C)
- Sjögren's syndrome, 470 (A)
- SKIN: See also Dermatitis; Dermatology
- Cancerous conditions, 171
- Flaps, blood supply, 238
- Glycerethinic acid ointment; clinical trial (E. M. Donaldson and D. A. Duthie), 1161
- Pellagra caused by isoniazid (R. J. Harrison and M. Feiwel), 852 (O)
- Tumors of the Skin* (H. Conway), 464
- SKIRVING, Robert Scot, obituary of, 306, 423
- SLACK, C. C.: Early management of poliomyelitis, 241 (C)
- SLANEY, G.: See BEVAN, P. G., 1366
- SLATER, E.: Review of *Etiology of Chronic Alcoholism*, edited by O. Diehl, 1352
- See ELITHORN, A., 739
- Sleep, disturbed, in children, 56 (C)
- learning during, 315
- Sleeplessness, 166
- SLESSOR, James Runciman, obituary of, 715
- Sloan-Kettering Institute for Cancer Research, 933
- SLOANE, John Sireton, obituary of, 247
- SMALLPEACE, Victoria: Treatment of the cord in the newborn, 104 (C)
- Smallpox regulations (parliamentary note), 1436
- vaccination, accidental, 45 (C)
- and atopic eczema, 315
- generalized vaccinia (W. H. Galloway and Lena M. McBean), 1102; 1239 (C)
- international certificate (parliamentary note), 1125
- opposition in Nigeria, 881
- technique, 1545 (C)
- SMARE, D. L.: See BUSH, H. D., 81
- SMART, G. A.: Cortisone and aspirin in rheumatoid arthritis, 239 (C)
- SMART, John: *A Handbook for the Identification of Insects of Medical Importance*, 3rd ed., 1103
- SMART, Joseph: Management of chronic bronchitis, 1540
- SMART, R. A.: appointed leader of main party, Royal Society International Geophysical Year Antarctic Expedition, 949
- SMEED, I. M. Patricia: Glycyrrhetic acid, 1483 (C)
- SMILLIE, I. S.: Loose bodies in joints, 710
- SMITH, A. C.: Respiratory problems of poliomyelitis, 163
- SMITH, D. F.: See RUSSELL, J. K., 1414
- SMITH, E. E.: Radiological Protection Service, 229
- SMITH, E. J. R.: Results of hypophysectomy in carcinomatosis, 229
- SMITH, G. S.: See JEFFERIES, D., 1040
- SMITH, H. W.: Food-poisoning, 481 (C)
- SMITH, Harold Edgar, obituary of, 47
- SMITH, J.: See TYRRELL, W. F., 1451
- SMITH, J. W.: Fatigue in bone, 709
- SMITH, M. J. H., and TAYLOR, K. W.: Blood pyruvate and α -ketoglutarate in normal and diabetic subjects, 1035 (O)
- SMITH, S. E.: Fetishism treated by aversion therapy, 1301 (C)
- SMITH, Stuart Laurie, obituary of, 663
- SMITH, Sir Sydney, elected honorary member, Royal Society of New Zealand, 776
- SMITHS, R. W.: Mercury absorption and psoriasis, 1428 (C)
- Snakes: Sea-snake bites (H. A. Reid), 73 (O)
- SNELL, R. S.: See NICOL, T., 800
- SNELL, W. E.: Degrees in nursing, 1429 (C)
- SNOW, Eileen R. B.: Books for Christian Medical College, 1060 (C)
- Soap and the skin, 299 (C)
- Social medicine: *Health and Social Workers in England and France*, 1293 (A)
- teaching of social and preventive medicine (C. M. Fletcher), 497 (O); 712 (C)
- Society for Analytical Chemistry; change of address, 1249
- Society of Analytical Psychology, facilities, 536
- SOCIETY OF APOTHECARIES OF LONDON: Appointments, 1555
- Critchley, M., elected Master, 558
- Diploma examination, 535
- Diplomas granted, 51, 1555
- Examination results, Diploma in Public Health, 369
- Honorary Freeman, 253
- Wardens elected, 558
- Society of Medical Officers of Health, functions, 545; presidential address, 764; annual dinner, 1006
- Society for Psychosomatic Research; annual dinner, 1249
- See also American Academy of Paediatrics
- Chelsea Clinical Society
- North-east Clinical Society
- Royal Society of Medicine
- West London Medico-Chirurgical Society

- STEVENSON, A. E. M.: Pregnancy complicated by diabetes mellitus; a review of 119 cases, 1514 (O)
- STEVENSON, C. J.: See BECKETT, A. G., 27
- STEWART, A. B.: Easy lifting apparatus for helpless and heavy patients, 1111
- STEWART, C. J., and VAN ZWANENBERG, D.: Vaccination against tuberculosis in childhood, 174 (C)
- STEWART, G. A.: See WOLFF, F. W., 440
- STEWART, I. M.: Use of prepared cancellous bone grafts, 710
- STEWART, I. McD. G., awarded Buckston Browne Prize, 1439
- STEWART, J. P.: Review of *Diseases of the Ear, Nose, and Throat*, 2nd ed., by W. W. Morrison, 701
- STEWART, J. S.: Clinical trial of methypyrone, a piperidine hypnotic, 1465 (O)
- STEWART, K. A.: Neostigmine-resistant curarization, 1174 (C)
- STEWART, Matthew John, presentation to, 253
- obituary of, 1179, 1311
- STOCKER, B. A. D.: See SPOONER, E. T. C., 926
- STOCKS, P.: Statistical studies in relation to environment, 823
- awarded Jenner Medal, 1129
- STOMACH: See also Peptic ulcer
- Cancer; diagnosis (A. McKenzie), 204 (O)
- Gastrectomy, delayed emptying of gastric stump after, 1172 (C), (correction), 1318, 1364 (C), 1428 (C)
- "Staggered dumping" and sugar tolerance, 358 (C)
- Surgery; bad gastrectomies (V. J. Kinsella), 1277 (O); 1428 (C)
- STONE, D. G. H.: See PHILLIPS, K. D., 1222
- STOPFORD, Sir John, retirement from Vice-Chancellorship, Manchester University, 252
- made Freeman of Manchester, 1129
- STOREY, G. O.: Management of hemiplegia, 233
- STOWERS, J. M.: See MCKENZIE, J. M., 448
- Strabismus. See Squint
- STRAUSS, E. B.: Suicide, 818; 813 (L); 998 (C)
- "Strawberry lesion" of recto-sigmoid (G. K. Thomas), 209 (O); 421 (C)
- Streptococcal infection, haemolytic, from neonatal umbilicus (W. Kwantes and J. R. E. James), 576 (O); 594 (A), 711 (C)
- neonatal umbilicus as source in a maternity unit (Joan M. Boissard and B. Eton), 574 (O); 594 (A); 711 (C)
- Streptococcus viridans* and subacute bacterial endocarditis; teeth as source of infection (F. G. Hobson and B. E. Juel-Jensen), 1501 (O)
- Stress and coronary thrombosis (medico-legal note), 1126
- and corticotrophin secretion, 33 (L)
- as cause of disease, 392 (L)
- *Fifth Annual Report on Stress, 1955-56* (Editors: H. Selye and G. Heuser), 464
- structural effects, 168
- Stromium deposit (parliamentary notes), 249, 308
- Stychnine poisoning; case (Cecily Statham), 1101
- Student health: Some ideas in regard to meaning, and its assessment (A. H. Macklin), 524; 520 (L)
- mental health; first international conference, 936; 1175 (C)
- Student's Guide to London*, 719
- STURDY, D. E.: Benign multilocular intraperitoneal air cysts simulating carcinoma of the colon, 212
- STURM, Dorothy. See DIGGS, L. W., 589
- Styes, crops of, treatment, 721
- "Suavitil." See Benactyzine hydrochloride
- Subarachnoid haemorrhage due to intracranial aneurysms; results of treatment of 249 verified cases (W. McKissock and L. Walsh), 559 (O), (correction), 668, 590 (L)
- Subdural effusions, infected (J. Hankinson and L. V. Amador), 122 (O)
- haematoma and effusions in infancy (G. Ormiston), 126 (O)
- Sugar tolerance and "staggered dumping," 358 (C)
- Suicide (E. B. Strauss), 818; 813 (L); 998 (C)
- Sulkowitch test for urinary calcium, reagents and technique, 1559
- SULLIVAN, H. S.: *Conceptions of Modern Psychiatry*. First William Alanson White Memorial Lectures, 1223
- *The Interpersonal Theory of Psychiatry*, 1223
- *The Psychiatric Interview*, 1223
- Sulphadimidine therapy, acute haemolytic anaemia after (H. Sterndale), 1101
- SULPHONAMIDES: BZ 55; clinical trial in treatment of diabetes (L. J. P. Duncan, Joyce D. Baird, and D. M. Dunlop), 433 (O); 465 (L)
- clinical trial of new hypoglycaemic agent (J. A. Hunt, W. Oakley, and R. D. Lawrence), 445 (O); 465 (L)
- in treatment of diabetes (J. M. McKenzie, P. B. Marshall, J. M. Stowers, and R. B. Hunter), 448 (O); 465 (L)
- trial of oral hypoglycaemic agent in diabetes (F. W. Wolff, G. A. Stewart, M. F. Crowley, and A. Bloom), 440 (O); 465 (L)
- value in control of diabetes (I. Murray and J. Wang), 451 (O); 465 (L)
- Hypoglycaemic and antidiabetic (F. G. Young), 431 (O); 465 (L); 637 (C)
- in treatment of diabetes (G. Walker, W. L. B. Leese, and J. D. N. Nabarro), 451 (O); 465 (L)
- In aetiology of *lycus erythematosis*, 418 (C), 659 (C)
- SULPHUR DIOXIDE, toxicity as air pollutant, 913
- Sulphuric acid mist, toxicity, 913
- Suprarenals. See Adrenals
- SURGERY: Abdomino-thoracic approach, 159
- Air-conditioning of operating theatres, 1577
- Artificial materials; London Medical Exhibition, 1171
- Code of Surgical Operations with Classifications of Radiotherapy and Anaesthetic Procedures*, 932 (A)
- Development and evaluation of a porous surgical dressing (J. T. Scales, A. G. Towers, and N. Goodman), 962 (O); 988 (A)
- Plastic, blood preparations for, 295
- blood supply of skin flaps, 238
- British Association of Plastic Surgeons, annual summer meeting, 238
- reconstructive surgery of the hand with special reference to skin cover (S. H. Harrison), 746 (O)
- Recovery rooms, 163
- Standardization of surgical implants, 1305 (C)
- Surgical Diagnosis* (P. Thorek), 287
- Textbook of British Surgery. Volume I: The Abdomen* (Editor: Sir Henry Souttar), 347
- Trendelenburg tilt; an obsolete position (J. M. Inglis and B. N. Brooke), 343 (O); 479 (C)
- SUTHERLAND, I.: See GRANT, Jean, 140
- SUTHERLAND, J. D.: Review of *On the Early Development of Mind. Vol. I of Selected Papers on Psycho-Analysis*, by E. Glover, 31
- SUTTER, V. A.: to be Minister of Public Health and Social Assistance, El Salvador, 833
- SUTTON, S. G.: awarded M.B.E. (Military) for gallantry, 1439
- SVATY, J.: See BOR, I., 1055
- Sweating, unilateral, of submental region, after eating (chorda tympani syndrome) (A. G. Young), 976 (O); 1176 (C)
- SWIFT, P.: Use of antibiotics in infancy, 225
- Swimming-pool, salt-water, 721
- SWYER, G. I. M.: Some recent advances in endocrinology, 5 (O)
- Treatment of premenstrual tension; progesterone-withdrawal bleeding, 256 (C)
- review of *Androgens: Biochemistry, Physiology, and Clinical Significance*, by R. I. Dorfman and R. A. Shipley, 1416
- review of *Fertilization*, by Lord Rothschild, 701
- review of *Recent Progress in Hormone Research*. Proceedings of 1954 Laurentian Hormone Conference, vol. XI, edited by G. Pincus, 215
- Sycosis barbae, obstinate, treatment, 430
- Sydney Body Trust Medal and Lecture, 1007
- Sydney Ringer Memorial Lecture, 189
- SYKES, W. S.: Shoe-fitting x-ray fluoroscopes, 420 (C)
- SYMMERS, W. St. C.: Deep-seated fungal infections, 170
- Histoplasmosis contracted in Britain; a case of histoplasmic lymphadenitis following clinical recovery from sarcoidosis, 786 (O); 816 (A)
- Localized cutaneous histoplasmosis, 790 (O); 816 (A)
- Sympathectomy, lumbar, in treatment of arteriosclerosis, 1108 (A)
- Sympathin excretion, urinary, of normal infants and infants with pink disease (J. W. Farquhar, T. B. B. Crawford, and W. Law), 276 (O)
- Symptoms: *The Relief of Symptoms* (W. Modell), 31
- Synovial tissue, antibody to, 100 (C)
- Syphilis, congenital, eradication of, 1163 (L); 1369 (C)
- serological tests, 40
- SYRED, Deryck Ralph, obituary of, 887
- Syringomyelia, leprosy diagnosed as (C. J. Lucas), 214
- SZUR, L., and BROMLEY, L. L.: Obstruction of the superior vena cava in carcinoma of bronchus, 1273 (O)
- T
- T.A.B. vaccine, intravenous, in treatment of nephrosis (D. Mendel and R. J. McGill), 83 (O)
- Tachycardia, ventricular, management, 1560
- TANDHANAND, S., and BURI, R.: Hyperthyroidism developing during P.A.S. therapy, 281 (O)
- TANNER, J. M., and INVELDER, B. (Editors): *Discussions on Child Development*, vol. 1, 1473
- See NEWTON, D. R. L., 1096
- Tavistock Clinic, postgraduate courses, 541
- Tay-Sachs disease, aetiology, 255
- TAYLOR, A. W.: Letterer-Siwe syndrome in adults; report of two cases, 68 (O)
- TAYLOR, E. T.: Rovsing's sign, 243 (C)
- TAYLOR, Joseph: Anaesthesia and apnoea neonatorum after caesarean section, 241 (C)
- TAYLOR, Julian, appointed to chair of surgery, Khartoum University, 1007
- TAYLOR, K. W.: See SMITH, M. J. H., 1035
- TAYLOR, L.: Medical relief appeal, 1304 (C)
- TAYLOR, S.: Burst abdomen, 160
- TAYLOR, W. A.: appointed to chair of pathology, Dathousie University, 719
- Teeth, correlation to diet, 111
- Dental Caries in Ireland, 35 (A)
- hazards of dental fillings under local analgesia, 112 (C)
- Teeth, *Streptococcus viridans*, and subacute bacterial endocarditis (F. G. Hobson and B. E. Juel-Jensen), 1501 (O)
- Teething powders containing calomel, 660 (C)
- Telephone manners, 1367 (C), 1547 (C)
- Television, radiation from, 56
- Tendons: Swapbook tenotomy, 715 (C)
- Terminology. See Nomenclature
- Terramycin. See Oxytetracycline
- Testis: Spermatic cord, torsion; plea for manipulative reduction, 345; 552 (C), 713 (C)
- Tetanus, incidence, mortality, and immunization, 224
- prevention, 348 (L); 481 (C)
- recurrence, 714 (C)
- respiratory problems, 163
- Tetany, gonadal agenesis and severe osteoporosis associated with (T. J. Geffen), 282 (O)
- Tetracycline; comparison with chlortetracycline in treatment of pneumonia; report from the City General Hospital, Sheffield, 1146 (O)
- Thalassaemia. See Anaemia, hypochromic
- Therapeutics; recent advances, 156, (correction), 316
- Thermometers, electrical, 220 (A)
- Thiopentone, intra-arterial, injection in patient with anomalous forearm vessels (W. W. Richardson), 754
- THOMAS, A. R.: Pitfalls in medicine, 1298 (C)
- THOMAS, C. G. A.: See HARE, R., 840
- THOMAS, D. W.: Torsion of the gall-bladder, 1427 (C)
- THOMAS, G. K.: "Strawberry lesion" of the recto-sigmoid, 209 (O); 421 (C)
- THOMAS, J. E.: Composting of household waste, 941 (C)
- THOMAS, Mair E. M., and CHARTER, Ruth E.: Aetiology of juvenile diarrhoea; laboratory investigation of specimens referred from general practices in north-east London, 339 (O); 350 (A)
- THOMAS, W. A., and LEE, K. T.: Sex factor in coronary artery disease, 99 (C)
- THOMPSON, E. W. L.: Management of hypertension in pregnancy, 162
- THOMPSON, Jane H.: Purpose of medical education, 420 (C)
- THOMSON, Ian Fream, obituary of, 1493
- THOMSON, J. D., and McSWAN, N.: Apicolysis with fascial fixation, 1409 (O)
- Thorax. See Chest
- THOREK, P.: *Surgical Diagnosis*, 287
- THORLAKSON, R. H.: See EADIE, J. W., 285
- THORNE, R. T.: Cigarette filters, 1490 (C)
- THORNLEY, Robert Lewis, obituary of, 608
- THORNTON, H. L.: Anaesthesia for aortic grafts, 163
- Respiratory sign of first-plane anaesthesia, 548 (C), 767 (C)
- THOROGOOD, D. E.: See HUNT, J. A., 586
- Threadworm infestations; mass therapy with piperazine adipate (R. D. Hill), 1156 (O); 1369 (C)
- Thrombocytopenia, advances in treatment, 835
- hypoplastic, congenital; study of transfused platelets in case (A. D. Bell, J. W. Mold, R. A. M. Oliver, and S. Shaw), 692 (O); 828 (C)
- Thrombocytopenic purpura and platelet agglutinins, 1357 (A)
- Thrombophlebitis, ilio-femoral, convalescence after, 56
- Thrombosis: Arteriosclerosis, thrombosing; result of long-term anticoagulant therapy (J. Dedichen), 1038 (O)
- bilateral, of renal artery (D. G. Chambers), 1472
- coronary, analgesics and sedatives, 667
- relation to fatty acids in diet, 614
- stress not a contributory factor (medico-legal note), 1126
- temporary thrombotic state, 1292 (A); 1547 (C)
- Thrush napkin rash, 37 (A)
- THURSTON, G.: Carbon-monoxide poisoning, 1365 (C)
- Thymus gland, role in aetiology of Hodgkin's disease, 35 (A)
- Thyroid cancer; value of radical thyroidectomy in treatment (M. Dargatzis), 1138 (O)
- Graves's disease; aetiology in relation to recent experimental findings (G. W. Harris and J. W. Woods), 737 (O)
- hyperthyroidism developing during P.A.S. therapy (S. Tandhanand and R. Buri), 281 (O)
- TIBBETTS, T. M.: Abuse of antibiotics, 1037 (C)
- TILLY, C. R.: Unusual injury, 304 (C)
- TITCOMBE, Roland Hereward, obituary of, 1062
- TITTERTON, P.: Low toxicity of piperazine, 550 (C)
- TOBACCO: Advertisements by Independent Television Authority (parliamentary note), 183
- Cigarette filters, 1490 (C)
- smoking, 358 (C), 553 (C), 605 (C)
- swallower, 102 (C)
- Consumption in Britain, 665
- Higher tax proposed (parliamentary note), 1436
- Smoking and the cardiovascular system, 90 (A); 659 (C)
- association with respiratory tuberculosis (C. R. Lowe), 1081 (O); 1104 (L); 1367 (C), 1427 (C)
- lung cancer and other causes of death in relation to smoking; second report on mortality of British doctors (R. Doll and A. B. Hill), 1071 (O); 1104 (L); 1246 (parliamentary note), 1367 (C), 1426 (C), 1427 (C)
- statistical relationship to lung cancer, 180 (C)
- Sore tongue from pipe-smoking, 778; 952 (C)

Tolazoline, comparison with intra-arterial oxygen as vasodilator, 1448
 "Tolseram." See Mephensin
 TOMLIN, Edgar Ernest Dexter, obituary of, 1372
 TOMLINS, F. G.: Diesel fumes, 939 (C)
 TOMLINSON, K. M.: Glycyrrhetic acid, 1484 (C)
 Tonsillectomy: Incidence among R.A.F. recruits (Carnie), 19 (O); 302 (C), 420 (C), 603 (C), 713 (C), 827 (C)
 — necessity for, 549 (C)
 Tooth. See Teeth
 TORLEY, J.: Apartheid in blood transfusion, 179 (C)
 Toronto forensic clinic, 488
 TORR, J. B. D. See DIXON, A. D., 799
 TOWERS, A. G. See SCALES, J. T., 962
 TOXICOLOGY:
 Accidents with drugs, 290 (A)
 Arsenic poisoning, chronic, 351 (A)
 Barbiturate poisoning treated with amphenazole and bemegride (A. Worlock), 1099 (O); 1107 (L); 1365 (C)
 Carbon monoxide poisoning, 1291 (L)
 — accidental, dangers of inadequate ventilation (F. S. Fiddes), 697 (O)
 — recent statistics: report to Medical Research Council (A. B. Hill), 1220 (O); 1365 (C)
 Endrin: food-poisoning caused by endrin-contaminated flour (G. M. Davies and I. Lewis), 393 (O)
 Ingested detergents, 316
 Ozone poisoning, 988 (A)
 Pyrimethamine poisoning, 1486 (C)
 Selenium poisoning, cause and treatment, 1499
 Strychnine poisoning; case (Cecily Statham), 1101
 Tracheostomy, and management of the unconscious patient (J. Andrew), 328 (O)
 TRAFFORD, H. S. See ZINCK, L. M., 346
 TRANQUILIZER DRUGS: see also Benactyzine; Chlorpromazine; Meprobamate; Methylpentynol; Reserpine; etc.
 Advertising, 998 (C), 1178 (C)
 Cost (parliamentary note), 309
 Dangers of indiscriminate use, 487; 1116 (C), 1547 (C)
 Excessive prescription (parliamentary note), 250
 Trendelenburg tilt; an obsolete position (J. M. Inglis and B. N. Brooke), 343 (O); 479 (C)
 TREVAN, John William, obituary of, 943
 Trichinosis, treatment of, 1251
 Tri-iodothyronine, effect on response to corticotrophin, 674
 L-Triiodothyronine, 657 (C)
 TRIMMER, E. J.: Itchy measles, 1299 (C)
 — See CHAVE, S. P. W., 1543
 TRINDER, P. See INMAN, P. M., 1202
 TROENSEGAARD-HANSEN, E.: Amnion implantation in peripheral vascular disease, 262 (O); 477 (C), 553 (C), 606 (C), 769 (C), 998 (C)
 Trolley for x-ray films and notes used at Chailey Heritage (E. P. Quibell), 1111
 Tropical medicine: *Control of Disease in the Tropics* (T. H. Davey and W. P. H. Lightbody), 141
 — *More from the Primeval Forest* (A. Schweitzer), 1289
 — Research Fellowship awarded to D. G. Jamison, 109
 TRUELOVE, S. C.: Treatment of ulcerative colitis with local hydrocortisone, 1267 (O); 1486 (C)
 Truss, effect on subsequent herniorrhaphy, 893
 Truth drugs, 894
 Trypanosomiasis in Africa, 1418 (L)
 Tubercle, subcutaneous; painful (W. B. Law), 30
 TUBERCULOSIS:
 B.C.G. and vole bacillus vaccines, 826 (C), 938 (C), 1114 (C)
 — vaccination, 225; 105 (parliamentary note)
 — after replacement blood transfusion (A. S. Hutcheson and P. Macpherson), 863 (O); 1115 (C), 1363 (C)
 — and local authorities, 371
 — complications, 303 (C)
 — in childhood, 174 (C), 356 (C)
 — of immigrants (parliamentary note), 51
 — protective value, 227
 — vaccine, freeze-dried; methods adopted in preparation of a standard product (J. Ungar, Pauline Farmer, and P. W. Muggleton), 568 (O)
 — — vaccination of newborn infants with a British vaccine (Margaret I. Griffiths and W. Gaisford), 565 (O), (correction), 722
 — Dried B.C.G. Vaccine (Y. Obayashi), 756
 Eradication: Annual conference of the British Tuberculosis Association, 94
 Glasgow mass radiography campaign, 1007
 Infection from elderly people (parliamentary note), 50
 Mantoux testing, multiple-puncture, 1382
 Mass radiography, value in diagnosis, 101 (C), 551 (C)
 N.A.P.T. Canadian scholarship, 775
 Pelvic, indications for operation, 952; 1252 (C)
 Prevention (F. Heaf), 227; 1383 (O)
 Primary: chemotherapy in, 373
 — of mouth, 147 (A)
 Pulmonary: apicalysis with fascial fixation (J. D. Thomson and N. McSwan), 1409 (O)
 — in north Glasgow; epidemiological study (W. F. Tyrrell and J. Smith), 1451 (O)
 — pneumoperitoneum, therapeutic, 1534 (A)

TUBERCULOSIS (continued):

Pulmonary: serum proteins in, 47 (C)
 Respiratory: association with smoking (C. R. Lowe), 1081 (O); 1104 (L); 1367 (C), 1427 (C)
 Scottish antituberculosis campaign, 109
 Treatment: alleged delay (medico-legal note), 1182
 TUDHOPE, G. R. See COHEN, H., 1023
 TULLIS, J. L.: Platelet transfusion, 763
 Tumours: *Histological Appearances of Tumours: With a Consideration of their Histogenesis and Certain Aspects of their Clinical Features and Behaviour* (R. W. Evans), 926
 TUNBRIDGE, R. E., PALEY, R. G., and COULSON, D.: Enzyme test for glycosuria, 588; 827 (C), 1058 (C), 1238 (C), 1487 (C)
 TUTTLE, Esther: Prediction and correction of degenerative arthritis, 233
 Twins: two types, 412
 — schizophrasia in uniovular twins; recovery (I. Atkin), 1041
 Typhoid: Intradermal T.A.B. for boosting, 427
 TYRRELL, W. F., and SMITH, J.: Pulmonary tuberculosis in north Glasgow; an epidemiological study, 1451 (O)
 TYSER, P. A.: Child guidance clinics, 1318 (C)

U

UA CONCHUBHAIR, S.: Broken probe, 482 (C)
 Ulcer, duodenal. See Peptic ulcer
 — gastric. See Peptic ulcer
 — peptic. See Peptic ulcer
 Ulcers, non-specific, of abdomen, 553 (C), 768 (C)
 — simple, of ileum; perforation as cause of peritonitis (J. H. Wrigley), 924
 — varicose, in ambulant patients, 1484 (C)
 — treatment, 188 (C), 256 (C)
 Ultra-violet rays; efficacy and dangers, 255
 Umbilical cord, bleeding from, 1299 (C)
 — treatment in newborn, 104 (C)
 Umbilicus, hernia, in infants; clinical trial of adhesive strapping (J. C. Haworth), 1286 (O)
 — neonatal, as source of streptococcal infections in a maternity unit (Joan M. Boissard and B. Eton), 574 (O); 594 (A); 711 (C)
 — haemolytic streptococci on (W. Kwantes and J. R. E. James), 576 (O); 594 (A); 711 (C)
 Unconsciousness and mental activity, 102 (C), 301 (C), 659 (C)
 — tracheostomy, and management of the unconscious patient (J. Andrew), 328 (O)
 UNOAR, J., FARMER, Pauline, and MUGGLETON, P. W.: Freeze-dried B.C.G. vaccine; methods adopted in preparation of a standard product, 568 (O)
 Union Internationale de la Presse Médicale, 1229 (A)
 UNITED STATES OF AMERICA:
 American physicians to visit U.S.S.R., 314
 Eighteen days in the U.S.A.; some random notes (Sir Ernest Kennaway), 933
 Experiment in medical education, 522 (A)
 Medical and associated services (M. G. Jacoby), 596
 Medical education, 522 (A)
 — reflections on current trends (W. Bauer), 1443 (O)
 Population (vital statistics), 557

UNIVERSITIES:

Aberdeen: Degrees conferred, 367, 1552
 Medical school, 534
 Belfast: Queen's University: Appointments, 719
 Degrees and diplomas conferred, 1553
 Gibson, J. G., appointed to chair of mental health, 719
 Research work, 535
 Birmingham: Appointments and retirements, 310, 368, 1007, 1380, 1553
 Degrees conferred, 368
 Medical school, 533
 Postgraduate facilities, 540
 Scholarships awarded, 368
 Bristol: Examination results, 310
 Medical school, 534
 Postgraduate facilities, 539
 Cambridge: Appointments, 250
 Degrees conferred, 250, 367, 485, 1552
 Examination results, 310
 Medical school, 532
 Postgraduate facilities, 539
 Dalhousie: Taylor, W. A., appointed to chair of pathology, 719
 Dublin: School of Physic, Trinity College; degrees conferred, 367, 1552
 — examination results, 367
 Trinity College; Moorhead, T. G., elected honorary fellow, 1379
 Durham: Degrees conferred, 367
 Diplomas awarded, 367, 946
 Emeritus professors, 1186
 Medical school, 533
 Postgraduate facilities, 539
 Edinburgh: Appointments, 371, 1498
 Bruce, J., appointed to Regius chair of clinical surgery, 371
 Degrees conferred, 485
 Diplomas conferred, 485
 Honorary degrees conferred, 109

UNIVERSITIES (continued):

Edinburgh (continued):
 Learmonth, Sir James, appointed professor emeritus, 253
 Medical school, 535
 Postgraduate facilities, 540
 Woodruff, M. F. A., appointed to chair of surgical science, 371
 Glasgow: Benefaction from Bloch Trust, 109
 Degrees conferred, 485
 Diplomas awarded, 367, 1552
 Medical school, 535
 — postgraduate facilities, 540
 Postgraduate Medical Education Committee, 540
 Khartum: Taylor, J., appointed to chair of surgery, 1007
 Leeds: Appointments, 1439
 Emeritus appointments, 1129
 Examination results, 1553
 Gerontological research grant, 313
 Medical school, 533
 Nuffield grant, 1129
 Postgraduate facilities, 540
 Liverpool: Examination results, 368
 Medical school, 534
 Postgraduate facilities, 539
 London: Appointments, 368, 427, 833, 1315, 1553
 Barnard, W. G., elected Dean of the Faculty of Medicine, 313
 Bertram, D. S., appointed to Chair of Medical Entomology, 1185
 Diplomas awarded, 1552
 Emeritus professors, 253
 Examination results, 310, 1553
 Scholarships, 1553
 Senate elections, 367
 Teachers recognized, 313, 1553
 Manchester: Examination results, 368
 Medical school, 532
 Retirement of Sir John Stopford, 252
 Melbourne: Clay, A. M., received honorary doctorate of medicine, 558
 Oxford: Appointments, 1552
 Degrees conferred, 51, 367, 425, 946, 1552
 Medical school, 531
 Postgraduate facilities, 538
 Scholarships awarded, 367
 St. Andrews: Appointments, 1186
 Examination results, 367
 Medical school, 535
 Walker, J., inducted into Chair of Midwifery and Gynaecology, 950
 Sheffield: Appointments, 368, 1438, 1553
 Medical school, 533
 New teaching unit, 1425
 Postgraduate facilities, 539
 Wales: Degrees conferred, 310
 Welsh National School of Medicine, 534
 — Appointments, 1067
 — Examination results, 250, 368, 1553
 — Postgraduate facilities, 540
 — 25th anniversary, 719, 937
 University College Hospital Medical School, facilities for students, 530; inaugural address at new session, 877
 University College London: "Brown Dog" memorial (J. H. Baron) (Nova et Vetera), 547; 661 (C), 827 (C), 942 (C)
 — old students, 715 (C)
 University education: its value in medicine, 519 (L)
 University Grants Committee, returns, 372
 Ureters: Bilateral transplantation; recovery from peritonitis four years later (W. M. Keynes and J. N. Harcourt-Webster), 1463 (O)
 Urethro-trigonitis due to intestinal infection as cause of frequency in female (J. E. Semple), 696 (O)
 Urinary tract, fungal infections of, 1189
 — infection, chronic, associated with renal calculi; treatment with nitrofurantoin (Mary G. McGeown), 274 (O)
 Urination: Frequency in the female due to urethro-trigonitis caused by intestinal infection (J. E. Semple), 696 (O)
 — nocturnal frequency in elderly men, 1131
 Urine: *Modern Views on the Secretion of Urine. The Cushty Memorial Lectures* (Editor: F. R. Winton), 866
 — tests for lead, 614
 Urolithiasis, recurrent; treatment with aspirin, 650 (A); 997 (C)
 Urology: Institute of Urology, facilities, 538
 U.S.S.R.:
 B.M.A. visit, 53, 558
 — (J. G. M. Hamilton), 1049
 Journals, translations of, 1438
 Medical practice, 420 (C)
 Russian advances in medicine, 661 (C)
 Visit of British surgeons, 1129
 UTERUS:
 Cervix, primary dystocia of, 43 (C)
 Family history of uterine and gastro-intestinal cancer (D. Savage), 341 (O)
 Involution: effect of oestrogens, 490
 Relaxing factor, 707 (A)
 Retroversion, 162
 Rupture, complete, with subsequent pregnancy (D. H. Finlayson), 1415
 UVNAs, B. K. M.: Nervous and humoral control of gastric secretion, 414

V

Vaccinia, generalized (W. H. Galloway and Lena M. McBean), 1102; 1239 (C)
 Vaccination. See Smallpox, vaccination
 VASINAVA, H.: Dissecting aortic aneurysm presenting as a cerebral catastrophe, 1237 (C)
 — Cortisone and the defence mechanisms, 1549 (C)
 Vancomycin, anti-staphylococcal activity, 62
 VAN DEN BREK, H. A. S.: Wound healing, 363 (C)
 VAN HEYNINGEN, Ruth. See PRIE, Antoinette, 405
 Van Meter Prize, 612
 VAN TRAL, Joan H.: Speech therapy, 884 (C)
 VAN ZWANENBERG, D. See STEWART, C. J., 174
 VARADI, S.: Congenital hypoplastic thrombocytopenia, 828 (C)
 Varicella. See Chickenpox
 Varicose ulcers in ambulant patients, 1484 (C)
 — treatment, 188 (C), 256 (C)
 VEINS:
 Diagnosis and surgery of high-pressure leaks in the leg; new overall concept of surgery of varicose veins and venous ulcers (F. B. Cockett), 1399 (O)
 Location by palpation, 1305 (C)
 Obstruction of superior vena cava in carcinoma of bronchus (L. Szur and L. L. Bromley), 1273 (O)
 Portal, perforating wound (J. W. Eadie and R. H. Thorlakson), 285
 Varicose, aetiology and treatment, 159
 — Pathology and Surgery of the Veins of the Lower Limb (H. Dodd and F. B. Cockett), 1103
 Venography, splenoportal, for evaluating abnormalities of portal circulation (A. K. Basu and A. Das), 916 (O)
 Venereal diseases: see also Granuloma inguinale; Syphilis
 — notifications (vital statistics), 664
 VERRILL, P. J.: Neostigmine-resistant curarization, 1054 (C)
 "Viadri," new steroid anaesthetic; preliminary communication (L. H. Lerman), 129 (O); 300 (C)
 "Vibazine." See Buclizine hydrochloride
 Virilism, adrenal, treated with steroids (A. W. Spence, J. S. Jenkins, and Alice M. Robinson), 1348 (O)
 — with mental symptoms, 478 (C), 604 (C), 767 (C), 1488 (C)
 Virus diseases, corneal ulceration in, 111
 — production laboratory, 1315
 Vision: see also Blindness; Eye; Ophthalmology
 — aids for partially-sighted children, 167
 VITAL STATISTICS:
 Diphtheria, graphs, 774, 1065, 1378
 Dysentery, graphs, 51, 108, 185, 370, 487, 610, 664, 832, 948, 1127, 1248, 1378, 1556
 Epidemics, early detection of, 1005
 England and Wales: deaths in 1955, 251
 — Report of the Ministry of Health for 1955, 1478 (A)
 — vital statistics, June quarter, 252
 Enteric fever, graphs, 51, 184, 251, 312, 370, 426, 487, 664, 718, 775, 832, 1006, 1248, 1496
 Hospitals; beds, emergency admissions to London hospitals, 1377
 Industrial accidents and diseases, notifications, 312, 832, 1065, 1378
 Infectious diseases, notifications, 52, 108, 184, 251, 312, 369, 427, 486, 557, 610, 664, 717, 774, 833, 889, 948, 1006, 1066, 1127, 1184, 1248, 1314, 1377, 1438, 1496, 1556
 — weekly tables, 52, 107, 184, 250, 311, 370, 426 (correction), 490, 486, 556, 610 (correction), 668, 663, 718, 774, 833, 890, 947, 1005, 1066, 1128, 1184, 1247, 1313, 1377, 1438, 1495, 1555
 Ireland, Republic of; population in second quarter, 889
 — Registrar-General's quarterly returns, 252, 1556
 Leukaemia, deaths from (parliamentary note), 1376
 Maternal mortality in 1953, 932 (A)
 Measles, graphs, 557, 774, 1005, 1185, 1314, 1437, 1556
 Meningococcal infection, graphs, 108, 312, 486, 609, 832, 889, 948, 1185, 1314, 1496
 Morbidity yesterday and to-day (F. Roberts), 653
 Northern Ireland; vital statistics in 1955, 1314
 Ophthalmia neonatorum, graphs, 108, 184, 312, 426, 610, 889, 1127, 1438
 Pneumonia, acute, graphs, 557, 1006, 1184, 1314, 1496, 1556
 Poliomyelitis, acute, graphs, 51, 108, 185, 251, 312, 370, 427, 487, 557, 609, 664, 718, 775, 833, 889, 948, 1005, 1066, 1127, 1185, 1248, 1437
 — notifications, 184, 251, 426, 486, 557, 609, 664
 — vaccination to recomence, 1496
 Road accidents in 1955, 609
 Scarlet fever, graphs, 251, 426, 718, 889, 1066, 1248, 1378, 1496
 Scotland: Census 1951, vol. V. Fertility of Marriage, 595 (A)
 — quarterly returns, 108
 — vital statistics in second quarter, 1006
 United States: Population, 557
 Venereal diseases, notifications, 664
 Whooping-cough, graphs, 52, 251, 369, 557, 664, 718, 948, 1065, 1127, 1314, 1378, 1437, 1556
 World population, 1047 (A)
 Vitamin B₁₂ deficiency, cerebral manifestations (J. M. Holmes), 228; 1394 (O)

W

Vitamin D; excessive intake and hypercalcaemia in infants, 149
 Vivisection: Brown Dog of University College (J. H. Baron) (Nova et Vetera), 547; 661 (C), 827 (C), 942 (C)
 VORA, D. D.: Shadow in the lung, 1483 (C)
 WAARDENBURG, P. J., and WALKER, N. F.: Methods available for distinguishing the two types of twins, 412
 WADDINGTON, C. H.: Principles of Embryology, 1530
 WADY, F. F.: Diesel oil and lung cancer, 44 (C), 605 (C)
 WADY, Sidney Hill, obituary of, 1550
 WAINWRIGHT, William Longworth, obituary of, 662
 WAKSMAN, S. A. (Editor): *Perspective and Horizons in Microbiology*, 141
 Waldenström, macroglobulinaemia of (D. G. Fertiman and A. B. Anderson), 402 (O); 409 (A)
 Wales, University of. See Universities, Wales
 WALKER, C. H. M., and LANGOUTH, P. R.: Developmental speech anomalies in apparently normal children, 1455 (O); 1475 (L)
 WALKER, C. W.: Review of *Refresher Course for General Practitioners. Specially Commissioned Articles from the British Medical Journal*. Third collection, 1473
 WALKER, W. L. B., and NABARRO, J. D. N.: Hypoglycaemic sulphonamides in treatment of diabetes, 451 (O); 465 (L)
 WALKER, J.: Management of prolonged pregnancy, 160
 — inducted into Chair of Midwifery and Gynaecology, St. Andrews University, 950
 WALKER, J. H. C.: Pica in a child, 1070 (C)
 WALKER, Joan B.: BZ 55 in diabetes, 657 (C)
 WALKER, Lena, appreciation of, 49; (for obituary, see *Journal*, 1956, 1, 1432)
 WALKER, R. M.: Value of thoraco-abdominal approach in surgery, 159
 WALKER, W. See HUNTER, R. B., 1214
 Walker Prize of Royal College of Surgeons presented to C. P. Rhoads, 949
 WALLACE, J. See BROWN, D. A. P., 135
 WALLER, R. E. See COMBINS, B. T., 753, 1235
 WALLIS, H. R. E.: Pyrexia of unknown origin, 245 (C)
 WALMSLEY, R.: Fatigue in bone, 709
 WALSH, A.: Risk of translumbar aortography, 1368 (C)
 WALSH, L. See MCKISSOCK, W., 559
 WALSH, Sir Francis: Inaugural address at new session, Royal Free Hospital School of Medicine, 878
 — awarded Gowers Memorial Medal, 1185; 1168 (A)
 WALTER, W. J.: Neostigmine-resistant curarization, 1303 (C)
 WALTERS, J. H. See MCGREGOR, I. A., 686
 WALTON, K. W. See JEAVONS, S. M., 1016
 WAND, S., elected Chairman of Council, 92 (A)
 WANG, I. See MURRAY, I., 451
 WARD, W. D., GUNTER, W., MCGEOCH, A., and DOWNIE, D.: Sulphonamides in aetiology of lupus erythematosus, 418 (C)
 — Warts and granuloma annulare, 1484 (C)
 WARIN, R. P.: Response to topical hydrocortisone, 226
 — and EVANS, C. D.: Effect of glycyrrhetic acid on eczema, 480 (C)
 WARREN, J. N.: Amnion implantation in peripheral vascular disease, 769 (C)
 WARRICK, C. K., and FARMER, F. T.: Future of diagnostic procedures, 1301 (C)
 Warsaw, visit (R. H. Dobbs), 1230; 1426 (C)
 Wart charming, 112
 Warts and granuloma annulare, 1484 (C)
 WARTENBERG, Robert, obituary of, 1550
 Water mains in Britain, 126
 — pollution, by trade effluents, 1497
 — research, 1536 (A)
 — supply: frozen pipes, 1358 (A)
 — undertakings, regrouping of, 823
 WATERWORTH, Pamela M. See GARROD, L. P., 61
 WATSON, G. I.: Infectious diseases in general practice, 165
 — Children handicapped by maternal rubella, 1059 (C)
 WATSON, George William, obituary of, 1491
 WATTE, Nora, elected president, Royal Sanitary Association of Scotland, 720
 WATTS, C. A. H.: Problems of sleeplessness, 166
 WATTS, G. T.: An alternative approach to the prostate; preliminary report, 1283 (O); 1488 (C)
 WAYNE, E. J.: Placebos, 157
 WEBB, R. A.: appointed professor emeritus, University of London, 253
 WEBB-JOHNSON, Lord: Christmas Gifts Fund Appeal, 824 (C)
 WEBER, F. P.: Chorda tympani syndrome, 1176 (C)
 WECHSLER, I. S.: Hypothalamic syndromes, 375 (O)
 Well's disease, atypical, 100 (C), 359 (C)
 — Wassermann reaction in, 1442
 WEDNER, W. See BOLTON, R. H., 1235
 WELBOURN, R. B.: Delayed emptying of gastric stump after gastrectomy, 1172 (C), (correction, 1318)
 WELCH, H.: Antibiotic therapy, 1112

WELDON, S. G., appointed honorary physician to the Queen, 1129
 Wellcome Trust: Wellcome associate research professorship in anaesthesiology, 1128
 Vivisection: Brown Dog of University College (J. H. Baron) (Nova et Vetera), 547; 661 (C), 827 (C), 942 (C)
 WELLS, G. C.: Nickel dermatitis, 226
 WELLS, Joseph Douglas, obituary of, 1434
 Welsh National School of Medicine. See Universities, Wales
 WEST, E. D., and DA FONSECA, A. F.: Controlled trial of meprobamate, 1206 (O); 1227 (A)
 WEST, H. F.: Cortisone and aspirin in rheumatoid arthritis, 42 (C)
 West London Hospital, centenary (Nova et Vetera), 41
 West London Medical Journal discontinued, 1272
 West London Medical-chirurgical Society; annual dinner, 53
 Western Ophthalmic Hospital; plaque to commemorate centenary, 1186
 Westminster Medical School, facilities for students, 530; inaugural meeting of session
 WHEATLEY, D.: Treatment of hypertension, 418 (C)
 WHELAN, R. F. See MARSHALL, R. J., 1448
 Whipworm infections; trial of four piperazine compounds (A. G. Hucker and F. D. Schofield), 1159 (O)
 WHITAKER, Donald Faraday, obituary of, 365, 484
 WHITAKER, W. See HAMMOND, J., 71
 WHITBY, Sir Lionel Ernest Howard, obituary of, 1306, 1434, 1493
 WHITE, A.: Acute systemic reaction to acetarsol, 1528 (O)
 WHITE, R. H. R.: Piperazine adipate in threadworm infestations, 1369 (C)
 WHITE, T. G. E.: Propantheline bromide in primary dysmenorrhoea, 1527 (O)
 WHITE, T. H.: Cutaneous anthrax, 1300 (C)
 WHITEHEAD, R.: Education of the general practitioner, 93
 — Preparing for medicine, 491 (O)
 WHITNEY, J. D. W.: Pharmaceutical advertisements, 1116 (C), 1431 (C)
 WHITTAKER, Hermon, obituary of, 306
 WHITTERTIDGE, D.: Machinery of posture, 602
 WHITWELL, G.: Troublesome staphylococci, 1364 (C)
 Whooping-cough, graphs (vital statistics), 52, 251, 369, 557, 664, 718, 948, 1065, 1127, 1314, 1378, 1437, 1556
 — vaccination; relation between protection in children and results of laboratory tests; report to Whooping-cough Immunization Committee, Medical Research Council, and to Medical Officers of Health for Cardiff, Leeds, Leyton, Manchester, Middlesex, Oxford, Poole, Tottenham, Walthamstow, and Wembley, 454; 467 (L)
 WICKES, I. G.: Pica in a child, 1070 (C)
 — See ELPHINSTONE, R. H., 336
 WIDDOWSON, E. M. See MCCANCE, R. A., 810
 WIGGEB, Simon, obituary of, 773
 WIGHTMAN, Arthur Robertson, obituary of, 48
 WILCOX, D. C. M.: Maternal death from aspiration asphyxia, 551 (C)
 WILKINSON, A. W.: Metabolic response to operation in childhood, 296
 WILKINSON, George, obituary of, 1492
 WILKINSON, J. F.: presidential address to Manchester Medical Society, 1186
 WILCOX, A. See DAVIES, D. R., 1133
 William Gibson Scholarship for medical women, 1249
 William Hunter Memorial Lecture, 775
 William Hyde Award, 253
 WILLIAMS, D.: Review of *Clinical Studies in Neurology*, by H. L. Parker, 518
 WILLIAMS, D. A.: Treatment of asthmatic attack, 156
 — review of *Allergy in Childhood*, by J. Glaser, 1473
 WILLIAMS, D. I., and MULLHALL, P. P.: Farmer's lung in Radnor and North Breconshire; a report of ten cases, 1216 (O)
 WILLIAMS, J. B.: Medical education, 767 (C)
 WILLIAMS, L.: Unit for alcoholics, 101 (C)
 WILLIAMS, Morgan Watkin, obituary of, 1493
 WILLIAMS, R. H. (Editor): *Textbook of Endocrinology*, 2nd ed., 347
 WILLIAMSON-NOBLE, F. A. See NEAME, H., 811
 WILLIS, R. A.: Review of *Histological Appearances of Tumours: With a Consideration of their Histogenesis and Certain Aspects of their Clinical Features and Behaviour*, by R. W. Evans, 926
 WILLOUGHBY, Dorothy, obituary of, 1003
 WILSON, C., and LEDINGHAM, J. M.: Irritation-induced malignant transformation, 1236 (C)
 WILSON, Dagmar C. See LEWIS, Jean, 140
 WILSON, E.: Desmoid tumour resembling a pseudopapillary cyst in female, 982
 WILSON, G. S.: presented with Bisset Hawkins Medal, 1006
 WILSON, Gordon Charles Edwyn, obituary of, 831
 WILSON, H. B.: Respiratory paralysis in tetanus, 163
 WILSON, K.: Telephone manners, 1367 (C)
 WILSON, Richard, obituary of, 247
 WILSON, Sheila M.: awarded Registrar's Prize in Anaesthetics, 611
 WILSON, T. G.: Nasal obstruction, 169
 WILSON, W. A.: Suckling in African community, 481 (C)
 WILSON, William Muirhead, obituary of, 1004
 WINGROVE, D. J.: Silicone barrier cream, 99 (C)
 WINTON, F. (Editor): *Modern Views on the Secretion of Urine. The Cushty Memorial Lectures*, 866
 WITMER, Helen L. See KOTINSKY, Ruth, 405

- Witnesses, medical, 1000 (C)
 WITTS, L. J.: Modern concepts of anaemia, 155
 — review of *Cytology of the Blood and Blood-forming Organs*, by M. Bessis, 589
 — review of *Morphology of Human Blood Cells*, by L. W. Diggs, Dorothy Spurr, and Ann Bell, 589
 — review of *Practical Haematology*, 2nd ed., by J. V. Dacie, 866
 WOHL, M. G., and GOODHART, R. S. (Editors): *Modern Nutrition in Health and Disease*, 31
 WOLFF, F. W., STEWART, G. A., CROWLEY, M. F., and BLOOM, A.: Trial of an oral hypoglycaemic agent in diabetes, 440 (O); 465 (L)
 Women: Medical Women's International Association, 1297
 WOOD, Judith. See COBURN, A. F., 984
 WOOD, P.: Review of *Cardiac Diagnosis: A Physiologic Approach*, by R. F. Rushmer, 984; 1176 (C)
 — review of *Clinical Electrocardiography. Part I*, by L. N. Katz and A. Pick, 866
 — review of *Diagnosis of Congenital Heart Disease*, by S. R. Kjellberg and others, 215
 — review of *Heart Disease: Its Diagnosis and Treatment*, 2nd ed., by E. Goldberger, 518
 — See BESTERMAN, E. M. M., 695
 WOOD, W. See HUSTON, A. F., 629
 WOODHEAD, Barbara: Speech therapy, 1118 (C)
 WOODRUFF, A. W.: Review of *Control of Disease in the Tropics*, by T. H. Davey and W. P. H. Lightbody, 141
 — review of *More from the Primaval Forest*, by A. Schweitzer, 1289
 — appointed honorary consultant in tropical diseases to the Army at Home, 1498
 WOODRUFF, M. F. A., appointed to Chair of Surgical Science, Edinburgh University, 371
 WOODS, J. W. See HARRIS, G. W., 737
 WOOLF, A. L.: Perinatal mortality, 1542 (C)

World Federation for Mental Health, conference, 599
 — Family Mental Health and the State; proceedings of eighth annual meeting, 1285

WORLD HEALTH ORGANIZATION:
 P. J. J. van de Calseyde appointed regional director for Europe, 719
 Regional office for Africa, 665
 Report on fly control, 573
 Some principles and methods of international health work (H. S. Gear), 471
 The Work of W.H.O., 1955, 91 (A)

WORLOCK, A.: Barbiturate poisoning treated with amphetamine and bemegride, 1099 (O); 1107 (L); 1365 (C)

WORTIS, J.: *Fragments of an Analysis with Freud*, 1352

WOUNDS: Development and evaluation of a porous surgical dressing (J. T. Scales, A. G. Towers, and N. Goodman), 262 (Q); 988 (A)

— healing, 363 (C)
 WRIGHT, A. D.: Rovsing's sign, 303 (C)

WRIGHT, G. P.: *An Introduction to Pathology*, 2nd ed., 701
 WRIGHT, Henry Cecil; obituary of, 716

WRIGHT, R. B.: Aetiology and treatment of varicose veins, 159
 WRIGLEY, J. H.: Perforation of simple ulcers of ileum as cause of peritonitis, 924

WYBAR, K.: Modern trends in cataract surgery, 166
 WYBURN, G. M.: Ectopic bone formation, 710

WYDELL, S. H.: Non-specific ulcers, 553 (C)
 WYMAN, A. L.: Lesions of the feet in diabetes, 1239 (C)

WYNN, V. See FAWCETT, J. K., 582

X

X rays. See Radiation; Radiology; Radiotherapy

Y

YATER, W. M.: *Fundamentals of Internal Medicine*, 4th ed., 141

YATES, A. J.: Clinical psychologist in the mental hospital, 826 (C)

YAVAGAL, Shivalingappa Shivappa, obituary of, 1005
 Yeasts: nutritional value, 614

YOFFEY, J. M. See BOYD, J. D., 1162
 YOUNG, A. G.: Unilateral sweating of the submental region after eating (chorda tympani syndrome), 976 (O); 1176 (C)

YOUNG, F. G.: Hypoglycaemic and antidiabetic sulphonamides, 431 (O); 465 (L); 657 (C)
 — review of *The Chemistry of Living Cells*, by Helen R. Downes, 1416

YOUNG, G.: Rupture of tympanic membrane during syringing, 112 (C)

YOUNG, I. Maureen. See HOLLAND, W. W., 1331
 YOUNG, T. M. See MAITLAND, A. I. L., 102

YUDKIN, J.: Cheeses for reducing diets, 1500 (C)
 YULE, R. See RUSSELL, J. K., 1414

Z

ZAUSMER, D. M.: Schools for mentally backward children, 1190 (C)

ZINCK, L. M., and TRAFFORD, H. S.: Leukoplakia of the bladder, 346

Zoological nomenclature, 245 (C)
 Zoonoses as a study in ecology; with special reference to plague, relapsing fever, and leishmaniasis (R. B. Heisch), 669 (O)

ZOTTERMAN, Y.: Taste, appetite, and the selection of food, 601
 Zoxazolamine, 293 (A)
 ZUCKERMAN, Sir Solly. See BOYD, J. D., 1162

KEY TO DATES AND PAGES

The following table gives a key to the dates of issue and the page numbers of the BRITISH MEDICAL JOURNAL and SUPPLEMENT in the second volume for 1956.

Serial No.	Date of Issue	Journal Pages	Supplement Pages
4983	July 7	1-56	1-6
4984	" 14	57-112	7-54
4985	" 21	113-188	55-74
4986	" 28	189-256	75-88
4987	Aug. 4	257-316	89-96
4988	" 11	317-374	97-102
4989	" 18	375-430	103-108
4990	" 25	431-490	109-114
4991	Sept. 1	491-558	115-120
4992	" 8	559-614	121-126
4993	" 15	615-668	127-132
4994	" 22	669-722	133-138
4995	" 29	723-778	139-146
4996	Oct. 6	779-836	147-150
4997	" 13	837-894	151-158
4998	" 20	895-952	159-166
4999	" 27	953-1010	167-172
5000	Nov. 3	1011-1070	173-178
5001	" 10	1071-1132	181-186
5002	" 17	1133-1190	187-194
5003	" 24	1191-1252	195-200
5004	Dec. 1	1253-1318	201-208
5005	" 8	1319-1382	209-214
5006	" 15	1383-1443	215-220
5007	" 22	1443-1500	221-226
5008	" 29	1501-1560	227-232